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FAUNA OF UTTARAKHAND
(PART-2)
Insects

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STATE FAUNA SERIES

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INSECTA : COLLEMBOLA

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INTRODUCTION

Collembola are small wingless insects, the largest species attaining a maximum length of 6 mm. The mouth parts are withdrawn into the head capsule; the first abdominal segment bears a ventral pair of basally fused vesicles, the collophore; most species have ventral bifurcate appendage, the tenaculum and furcula, on the third and fourth abdominal segments. With very few exceptions (e.g., *Tomocerus),* juveniles closely resemble adults. Collembola are abundant and ubiquitous, probably exceeding all other insects in numbers of individuals, but their small size and sensitivity to desiccation restrict most species to humid situations.

The first study of Collembola from India is of Ritter (1911). Imms (1912) made significant contribution on Indian Collembola. The knowledge of Indian Collembola was further enriched through the contribution of several workers like Carpenter (1913, 1924), Handschin(1920), Mukherjee (1932), Denis (1936), Salmon (1957-64), Baijal (1955-58), Choudhuri (1963, 1966), Yosii (1966a, b), Mitra (1967-2001), Prabhoo (1971) and Hazra (1995).

The present study of Collembolan fauna is based on collection made during 2002-2005 from Uttarakhand by Zoological Survey of India, as a part of the Action Plan on State Fauna. The key to the families, genera & species have been provided for easy identification of the taxa. The classification followed here after Christiansen & Bellinger (1980).

SYSTEMATIC ACCOUNT

Order COLLEMBOLA
Suborder ARTHROPLEONA

Key to the Super families of ARTHROPLEONA

1. First thoracic segment dorsally distinct with dorsal setae ..... PODUROIDEA Womersley, 1933

   First thoracic segment without dorsal setae and frequently more or less reduced or hidden dorsally by mesothoracic segment ..... ENTOMOBRYODEA Womersley, 1933

Key to the families of PODUROIDEA

1. Pseudocelli present, at least on antennal base or dorsum of fifth abdominal segment ..... ONYCHIURIDAE, Gervais, 1841

   - Pseudocelli absent ..... HYPOGASTRURIDAE Bourlet, 1839

Key to the families of ENTOMOBRYODEA

Hind coxae usually with trochanteral organ. Abdomen IV appreciably longer than abdomen III. Scales present or absent, often ciliated. Furcula well developed ..... ENTOMOBRYIDAE, Tomosvary, 1882

Hind coxae without trochanteral organ. Abdomen III and IV usually subequal; the abdomen IV never more than one and one half times as long as the abdomen III, the other posterior abdominal segments often fused. Scales usually not present ..... ISOTOMIDAE, Borner, 1913

Key to the subfamilies of ENTOMOBRYIDAE

1. Dentes dorsally crenulated and curving upwards basally in the line with manubrium ..... ENTOMOBRYINAE, Schaeffer, 1896

   - Dentes not crenulated, straight and usually forming a basal angle with manubrium 2

2. Dental scale absent 3

   - Dental spine present on the basal portion of the dentes only ..... TOMOCERINAE, Schaeffer, 1896

3. Eyes and pigment absent; dentes with large dorsal scale without apical lobe ..... CYPHODERINAE, Borner, 1913

- Eyes and pigment present; dentes without dorsal scale and with apical lobe..... ..... PARONELLINAE, Borner, 1913

Family HYPOGASTRURIDAE
Subfamily HYPOGASTRURINAE

Absence of true pseudocelli and the simplicity of the sense organ of the third antennal segment are best recognized of this family. Mandible with a basal molar plate is easily seen of this subfamily.

Genus ***Hypogastrura*** Bourlet, 1839

1. ***Hypogastrura indovaria*** Salmon, 1970

1970. *Hypogastrura indovaria* Salmon, *Trans. Biol. Sci.*, **12**(13) : 149.

Material examined : F.R.H. Campus, Almora, 03.01.2003, Coll. A.K. Hazra & Party, 42 exes; D.A.R.L hostel Campus, Pithoragarh, 23.9.2005, coll. A.K. Hazra & Party, 68 ex.; Z.S.I. N.R.S. Campus, Dehradun, 06.11.2003, coll. A.K. Hazra & Party, 35 ex.

Diagnostic characters : Body length upto 0.8 mm. Brownish black fields. Sparse to heavy clothing of short and long curved simple setae. Antennae shorter than head. P.A.O. very irregular consists of 4-12 indistinct disconnected lobes. With or without central boss. Abd. VI with two long anal spines on papillae. Tenant hairs never clavate. Mucro finely cranulate and spoon-shaped with two distinct lamellae.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Mizoram, Sikkim.

Genus ***Xenylla*** Tullberg, 1869

2. ***Xenylla obscura*** Imms, 1912

1912. *Xenylla obscura* Imms, *Proc. Zool. Soc. London.*, 80-125.

1970. *Xenylla obscura* Salmon, *Roy. Soc. N. Z. Biol. Sci.* **12**(13) : 145-152.

Material examined : Sithlakhet F/R/H campus, Almora, 5.1.2003, coll. A.K. Hazra & Party, 52 ex.; Hill stream 27 km away from Dehradun – Mussori Road, 07.11.03, A.K. Hazra & Party, 28ex.

Diagnostic characters : Body length upto 1.4 mm; elongate in shape; colour indigo-blue, segmental margins and ventral side pale. Antennae ratio as 10 : 12 : 12 : 14. P.A.O. absent. Unguis carinate, without lateral teeth, but with 1, 1, 1 inner tooth near the apex. Unguiculas absent. Ventral tube with 4 + 4 setae. Tenent hair, 2, 2, 2 very long and capitate at the end. Dentes and mucro separated. Mucro short, obtuse anal blunt on apex, with a narrow rounded lamella, which is often very obscure.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Nagaland, Sikkim and Maharashtra.

(b) Subfamily NENAURINAE, Salmon, 1964

Mandible without molar plate or absent and easily distinguish from Hypogastrurinae.

Genus ***Lobella*** Borner

The genus is represented by single species from Uttarakhand.

3. ***Lobella kraepelini*** Yosii, 1959

1906. *Protanura kraepelini* Borner

1910. *Neanura dubiosa* Ritter

1912. *Neanura pudibunda* Imms

1917. *Protanura spinifera* Carpenter

1959. *Lobella kraepelini* Yosii, *Contr. Biol. Lab. Kyoto. Univ.*, **10** : 1-65.

Material examined : Dinapani Road Side, Binsar, 7.1.2003, coll. A.K. Hazra & Party, 6 exs.; Company Garden, Masoori, 7.11.2003, coll. A.K. Hazra & Party, 24 exs.

Diagnostic characters : Body length upto 2.3 mm. Colour red in living and milky white in alcohol. Antennae Head as 5 : 6. Ant. III and IV are almost fused dorsally. P.A.O. present. Eyes 3 + 3. Mandibles are well developed, triangular in shape and with 6 teeth. Maxillae are elongated, distally 2 toothed and accompanied by a fringed, hyaline lamella, whose apex is surpassing by far the head of the maxillary shaft. A paired tubercle of Abd. VI are also situated far apart to each other, thus giving rise to the species a prominent feature to distinguish it from other related species of the genus.

Distribution : India : Uttarakhand, Arunachal Pradesh and Mizoram.

Family ENTOMOBRYIDAE
Subfamily ENTOMOBRYINAE Schaeffer, 1896

Body with hairs or scales or both the chaetotaxy of head and trunk and eye numbers are useful in identifying the members of this family. Dentes crenulated dorsally. Mucrone fulcate with basal spine, it is short and hook-like.

Genus ***Lepidocyrtus*** Bourlet, 1839

The genus is represented by five species from Uttarakhand.

Key to the species of *Lepidocyrtus*

1. VI-th abdominal segment with elongate cerciform tergum .... *Lepidocyrtus caudatus* Carpenter, 1917
- VI-th abdominal segment without elongate cerciform tergum 2
2. Dental lobe with accessory apparatus .... *L. (Acrocyrtus) malayanus* Yosii, 1959
- Dental lobe without accessory apparatus .. 3
3. Th. II is very prominent and protruded over the head, Abd. II : IV = 1 : 7 .... *L. magnificus* Carpenter, 1917
- Th. II is protruded considerably over the head 4
4. Th. II is slightly protruded over the head. Th.II, III as 75 : 25. Abd. III : IV as 3 : 12..... *L. (Acrocyrtus) heterolepis* Yosii, 1959

   Th. II is moderately hanging over the head. Th. II : III as 2 : 1. Abd. III: IV as 1 : 3.... .....*L.* (s. str) *curvicollis* Bourlet

4. ***Lepidocyrtus caudatus*** Carpenter, 1917

1917. *Lepidocyrtus caudatus* Carpenter, *Rec. Ind. Mus. Cal.* 8(ix) : 561-568.

Material examined : 1 km away from forest rest house Binsar, 7.1.2003, coll. A. K. Hazra & Party, 24 ex.; Hill stream 31 km away from Dehradun –Mussori Road, 07.11.03, A.K. Hazra & Party, 37 exes.

Diagnostic characters : Mesonotum slightly prominent, half as long as metanotum. Abd. IV six times as long as Abd. III. Abd. VI. prolonged into a slender cerci form process. Colour pale yellow with violet patches on antennal segments, a violet spot on Th. II and Abd. III, IV and V.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim.

5. ***Lepidocyrtus (Acrocyrtus) malayanus*** Yosii, 1959

1959. *Lepidocyrtus (Acrocyrtus) malayanus* Yosii, *Contr. Biol. Lab. Kyoto. Univ.*, **10** : 28.

Material examined : Western slope, 2 km away from forest rest house, Binsar, 8.1.2003, coll. A.K. Hazra & Party, 18 exs. Hill stream (32 km away) to Mussori, 07.11.03, A.K. Hazra & Party, 18 ex.

Diagnostic characters : Body length 2.5 mm. Ground colour brownish white, antennal distally with bluish pigment from Ant. II. Eye 6 + 6. Scales are present dorsally upon Ant. I and II. Ratio of Antennal segs. = 9 : 18 : II : 23; Ths II : III = 7 : 3; Abd. III : IV = 1 : 5. Manubrium: dentes = 9 : 8. Dorsal appendix of dental lobe is prominent, acutely pointed in profile.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim.

Elsewhere : Singapore.

6. ***Lepidocyrtus*** (s. str.) ***magnificus*** Carpenter, I 924

1924. *Lepidocyrtus* (s. str.) *magnificus* Carpenter, *Rec. Ind. Mus. Cal.*, **26** : 285-289.

Material examined : 3 km away from forest rest house, Binsar, 9.1.2003, coll. A.K. Hazra & Party, 12 exs. Ganga river bed near Gaytri Sadan, West of Lakshmanjhula, 10.11.2003, coll. A.K. Hazra & Party, 10 exs.

Diagnostic characters : Mesonotum four times as long as metanotum. Abd. IV. Seven times as long as Abd. III. Antennae twice as long as head. Colour pale-yellow with Ant. III and IV, edges of Th. II and III and last abdominal segment dark violet. Relatively short III antennal segment. Mucro stout with strong teeth, the dorsal spine short.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim, Mizoram, Assam, Tripura (West Distt.).

7. ***Lepidocyrtus (Acrocyrtus) heterolepis*** Yosii, 1959

1959. *Lepidocyrtus (Acrocyrtus) heterolepis* Yosii, *Cont. Biol. Lab. Kyoto. Univ.*, **10** : 33.

Material examined : Meadow valley, AULI, 12.11.2003, coll. A.K. Hazra & Party, 26 exs.

Diagnostic characters : Length upto 1.6 mm. Antennae uniformly bluish pigmented. A transverse stripe along the fore margin head. Eyes black. Ant. segment ratio as 15 : 30 : 28 : 48. Th. II. is slightly protruded over the head. Th. II, III as 75 : 25. Abd. III : IV as 3 : 12. Manubrium; Dens as 24 : 28. Mucro bidentate, two teeth sub equal and with a basal spine.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur.

Elsewhere : Singapore, Malay.

8. ***Lepidocyrtus*** (s. str.) ***curvicollis*** Bourlet

1959. *Lepidocyrtus* (s. str.) *curvicollis* Yosii, *Cont. Biol. Lab. Kyoto. Univ.*, **10** : 23.

Material examined : Zero Point, Binsar, 9.1.2003, coll. A.K. Hazra & Party, 24 exs.; Base of Auli, 12.11.2003, coll. A.K. Hazra & Party, 12exs.

Diagnostic characters : Body up to 2.0 mm. Ground colour white with slight brownish tinge. Antennal bluish distally from Ant. II. Basal two segments of each leg slightly pigmented to blue. Eyes black. A black spot is present between eyes. Ant. : Head as 2 : 1. Ant. segment ratio as 1 : 2 : 3. Antennae scaled from the basis until to the basal part of Ant. IV. Meso thorax is moderately hanging ones the head. Th. II : III as 2 : 1. Abd. III/IV as 1 : 4. Legs are scaled until to the tibiotarsus. Manubrium : Dens = 25 : 26. Dentes without dental appendix. Mucro bidentate and with a basal spine.

Distribution : India : Uttarakhand, Arunachal Pradesh.

Elsewhere : Europe (Belgium).

9. ***Lepidocyrtus cyaneus*** (Tullberg) 1869

1959. *Lepidocyrtus cyaneus* Yosii, *Cont. Biol. Lab. Kyoto. Univ.*, **10** : 25.

Material examined : Zero Point, Binsar, 9.1.2003, coll. A.K. Hazra & Party, 15 exs; Base of Auli, 12.11.2003, coll. A.K. Hazra & Party, 10exs.

Diagnostic characters : Body length up to 1.0 mm. Legs are coloured on the proximal half of each coxae. Furcula coloured until to the basal part of dentes. Ant. segments ratio as 10 : 19 : 19 : 32. Mesothorax slightly protruded over the head. Th. II : III as 5 : 3. Abd. III : IV as 4 : 13. Dental lobe without appendix. Manubrium : Dens = 10 : 9. Manubrium ventrally scaled and with 2 + 2 serrated terminal setae.

Distribution : India : Uttarakhand, Manipur, Arunachal Pradesh.

Elsewhere : Singapore, Malay, Vietnam.

Genus ***Lepidosira*** Schott., 1925

The genus is represented only single species from Uttarakhand.

10. ***Lepidosira unguserrata*** Salmon, 1970

1970. *Lepidosira unguserrata* Salmon, *Trans. Biol. Sci.*, **12**(13) : 145-152.

Material examined : 2 km away from forest rest house, Kausani, 11.1.2003, coll. A.K. Hazra & Party, 12 exs. Hill stream near Nanda Devi Forest Rest House, 12.11.2003, Joshi mutt, coll. A.K. Hazra & Party, 22 exs.

Diagnostic characters : Brownish with deep blue ocellar fields. Antenne about three times as long as head, the four segments related as 45: 90 : 75 : 125. Ant. IV with apical sensory knob. Abd. IV four times as long as Abd. III. A single strong clavate tenant hair sub equal to claw in length. Mucro bidentate with slightly curved basal spine; Length upto 2.2 mm.

Distribution : India : Uttarakhand, Arunachal Pradesh, Sikkim.

Genus ***Dicranocentrus*** Schott, 1925

The genus is represented by two species from Uttarakhand.

Key to the species of *Dicranocentrus*

1. Ant. 5 segmented. Ant. I being subdivided. Ant. IV is elongated, distinctly annulated .... ***D. indicus***

- Ant. 6 segmented, the first two segments being subsegmented and their ratio is as 5 : 23 : 31 : 70 : x ..... ***D. simplex***

11. ***Dicranocentrus indicus*** Bonet, 1930

1966. *Dicranocentrus indicus* Yosii. *Kyoto Univ. Sci. Expd. Karakoram & Hindukush*, **8** : 330-405.

Material examined : 4 km away from forest rest house Kausani near hill slope, Kausani, 12.1.2003, coll. A.K. Hazra & Party, 36 exs.; Oak forest sking ground, 3 km from Auli Village, 12.11.2003, coll. A.K. Hazra & Party, 46 exs.

Diagnostic characters : Body length upto 3.2 mm. Antenna reddish violet. Eye black. Antennae '5' jointed. Ant. I being subdivided. Ant. IV is elongated, distinctly annulated. Manubrium is dorsally beset with many plumose setae. No dental spine. Mucro is bidentate equally and with or without a basal spine. Dentes dorsally crenulated and with one blunt ciliated seta.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Mizoram, Nagaland, Maharashtra (Bombay)

Elsewhere : Formosa, South Pacific Island.

12. *Dicranocentrus simplex* Yosii, 1959

1959. *Dicranocentrus simplex* Yosii. *Contr. Biol. Lab. Kyoto. Univ.*, **10** : 41.

Material examined : 4 km away from forest rest house Kausani near hill slope, Kausani, 12.1.2003, coll. A.K. Hazra & Party, 22 exs.; Base of Hot spring near Tapovan, 18 km away from Joshi mutt, coll. A.K. Hazra & Party, 10 exs.

Diagnostic characters : Body length 1.7 mm.Ground colour whitish. Antennae, legs and ventral side of the body diffusely pigmented to blue. Antennae '6' segmented, the first two segments being sub segmented and their ratio is as 5 : 23 : 9 : 31 : 70 : x. The last segment is lost. Tenant hair is in all legs spiny. Unguiculus lanceolate and prominently acute, furcula well developed. Manu: Dens = 11 : 17. Distal end of the dentes has a smooth portion very long, being about '6' times the mucro in length. Mucro is bidentate.

Distribution : India : Uttarakhand, Arunachal Pradesh.

Genus *Sinella* Brook, 1882
13. *Sinella curviseta* Brook, 1882

1966. *Sinella curviseta* Yosii, *J. Coll. Arts. & Sci. Chiba. Univ.* 4(4) : 461-531.

Material examined : Nainital Lake embankment, Nainital, 14.1.2003, A.K. Hazra & Party, 26 exs.

Diagnostic characters : White with pigment limited to eyes; body with scattering of reddish pigment granules. Eyes with on separate patches, apical half of the third antennal segment with many extremely minute blunt setae. Clavate tenant hair. Unguis with sminute apical tooth, unguiculus acuminate. Basal spines of mucro very long.

Distribution : India : Uttarakhand, Arunachal Pradesh, Sikkim.

Genus *Siera* Ritter, 1911
14. *Siera indica* (Ritter) 1911

1911. *Callistocyrtus indicus* : Ritter.

1930. *Pseudosira indica* Bonet

1911. *Drepanura punctata* : Ritter, Syn.

1936. *Lepidocyrtinus unifasciatus* Denis, Syn

Material examined : Nainital Zoo campus, Nainital, 14.1.2003, coll. A.K. Hazra & Party, 26 exs. Oak forest sking ground, 3 km from Auli Village, 12.11.2003, coll. A.K. Hazra & Party, 18exs.

Diagnostic characters : Body length 1.8 mm. Slender in general forms. Body colour brownish with bluish pigments. Yellowish brown pigments cover the whole of abd. II, III ans well as some spots of head and Th. II. Ant. ratio as 7 : 9 : 9 : 45. Antennae scaled dorsally until ant. III. Ant. IV faintly annulated.

Distribution : India : Uttarakhand, Arunachal Pradesh And Maharashtra.

Genus *Homidia* Borner 1906
15. *Homidia cingula* Borner, 1906

1906. *Homidia cingula* Borner, *Mitt. Nat. Hist. Mus. Hamburg.*, **23** : 180.

Material examined : Agriculture Farm, Kaunchidham, 15.1.2003, coll. A.K. Hazra & Party, 64 exs.

Diagnostic characters : Back ground yellowish, blue black pigment forming transverse band on the III-rd and IV th abdominal segments. Body not compressed. Dental spine '33' in numbers. Apical mucronal tooth smaller than ante apical.

Distribution : INDIA : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim.

Subfamily CYPHODERINAE Borner, 1913

Members of this subfamily may be distinguished from other Entomobryids by the reduced numbers of ocelli, dental foliate appendages and sometimes dental spines appendage.

Genus ***Cyphoderus*** Nicolet, 1842

16. ***Cyphoderus javanus*** Borner 1906

1906. *Cyphoderus javanus* Borner, *Mitt. Nat. Hist. Mus. Hamburg.*, **23** : 180.

1966. *Cyphoderus javanus* Yosii, *Kyoto. Univ. Expd. Karakoram and Hindukush.*, **8** : 381.

1971. *Cyphoderus javanus* Prabhoo, *Oriental. Ins.*, **5**(1) : 38.

Material examined : Gulabbag, Culvert no.98/8B, Ranibagh, 6.11.04 coll. A.K. Hazra & Party, 48 exs.; Base of Hot spring near Tapovan, 18 km away from Joshi mutt, 13.11.03 coll. A.K. Hazra & Party, 24 exs.

Diagnostic characters : White without trace of pigment. Eyes lacking, elongated mucro with a well developed lamellate ante apical tooth. Large fringed scale on dens, unguis and unguiculus both have enlarged wing like teeth.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim, West Bengal (Kolkata), Kerala.

Elsewhere : Java, Malaya, Thailand, Japan.

Subfamily TOMOCERINAE Schaeffer, 1896

Fourth antennal segment shorter than the third easily separates this subfamily from all other Entomobryids.

Genus ***Tomocerus*** Nicolet, 1842

This genus is represented by single species.

17. ***Tomocerus*** (s. str.) ***mitrai*** Prabhoo, 1980

1980. *Tomocerus* (s. str.) *mitrai* Prabhoo and Murlidharan, *Entomon.* **5**(3) : 207-210.

Material examined : Hill stream 8 km away from Didihat, Culvert no.323/2, 01.10.05, coll. A.K. Hazra & Party, 48 exs.

Diagnostic characters : Ground colour yellowish white with blue pigment towards lateral margin of thorax and Ant. II-III. Ocellar field deep blue. Body clothed with brownish blunt scales with prominent striation and finely ciliated setae. Dentes with scales on ventral side, towards the distal half two rows of unilaterally plumose setae 8-10 in a rows. Ocelli 6 + 6, unguis of annul type with 5 to 6 teeth. Dental spine brown in colour, finely striated longitudinally in a single row as 3, 1.5, 1. Mucro elongated 4 intermittent teeth on outer lamella and two basal teeth. Outer basal tooth of mucro with a corner toothlet.

Distribution : India : Uttarakhand, Arunachal Pradesh, Sikkim, Himachal Pradesh (Kulu).

Subfamily PARONELLINAE Borner, 1913

This subfamily can be distinguished from other Entomobryids by the right and short dentes, presence of dental scale appendage on the terminal part of dentes. The mucrones in majority cases are plump, lobed into several teeth and are different in shape from the members of subfamily Entomobryinae.

Key to genera of subfamily PARONELLINAE

1. Body covered with scale 2
- Body not covered with scale 3
2. Dental scale appendage and 4 + 4 frontal spines present, antennal segments without thick outstanding brush setae ..... ***Callyntrura*** Borner

   Dental scale appendage and 4 + 4 frontal spines absent, antennal segments with thick outstanding brush setae ..... ***Dicranocentroides*** Schott.
3. Mucro well developed, stout, bidentate or tridentate, dental scale appendage equal or subequal to mucronal length 4
- Mucro vestigial in the form of a hook; dental scale appendage highly enlarged ..... ***Yosiia*** Mitra
4. Mucro with 2 apical teeth; ventral tube anteriorly on anterior face with 5 + 5 macrochaetae; 1+ 1 frontal spines reduced. ..... ***Pseudosalina*** Mitra
- Mucro with 3 apical teeth; ventral tube anteriorly on anterior face with 4 + 4 macrochaetae; 1 + 1 frontal spines well developed ..... ***Salina*** MacGillivary

Genus ***Dicranocentroides*** (Imms, 1912)

The genus is represented by three species from Uttarakhand.

Key to the species of *Dicranocentroides*

1. Body devoid of dark pigmented patches ..... . *Dicranocentroides flavescens* Yosii, 1966
- Body with distinct dark pigmented patches 2
2. Thorax II totally pigmented, Abd. II with its lateral extensions and Abd. IV totally dark, no distinct transverse band on Abd. Iv. In living specimens shining metallic golden pigment occurs posterior on head, Th. II, Abd. I, II, poster medially on Abd. IV .... *D. fasciculatus* Salmon, 1957
- Median patches on Th. II. may be absent but anterior margin always pigmented, Abd. III and its lateral extensions pigmented. Abd IV with medially and posteriorly pigmented transverse band. No shining metallic pigment occurs in living conditions .... *D. salmoni* Mitra, 1975

18. ***Dicranocentroides flavescens*** Yosii, 1966

1966. *Dicranocentroides fasciculatus* f.n. *flavescens* Yosii, *Res. Kyoto. Univ. Sci. Exped. Karakoram and Hindukush,* 1955. **8** : 333-405.

Material examined : Hill stream, 16 km away from Thal towards Munsiyari, 01.10.2005, coll. A.K. Hazra & Party, 48 exs.; Vinayak Chatti, Ganesh Temple,18 km from Badrinath, 15.11.2003, coll. A.K. Hazra & Party, 28 exs.

Diagnostic characters : A dark patch, characteristic of the species, present on vertex in between two ocellar fields. Darks patches absent on body. Ocelli 8 + 8. Relative length index of Ant. I : II : III : IV = 15 : I 7 : 12 : 19. Ths, II : III = 14 : 8.5. Legs all similar unguiculus lanceolate, acuminate with 2 external teeth. Relative length index of Abds I : II : III IV : V : VI = 5 : 6 : 4 : 39 : 5.5 : 2. Ventral tube long with a row of macrochaetal anteriorly. Manubrium: Mucrodens 28: 38, dentes armed with two closely apposed rows of spines on inner margin; mucro large, parallel sided with '6' teeth. Body length 2-3.5 mm.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Nagaland, Mizoram And Kerala.

19. ***Dicranocentroides fasciculatus*** Imms, 1912

1912. *Dicranocentroides fasciculatus* Imms, *Proc. Zool. Soc. London* : 80-125.

1917. *Paronella crassicornis* Carpenter, *Rec. Ind. Mus. Cal.*, **8** : 561-568, New Syn.

1957. *Dicranocentroides fasciculatus* Salmon, *Acta. Zool.Cracov.*, **11**(14) : 313-362.

1975. *Dicranocentroides fasciculatus* Mitra, *Rec. Zool. Surv. Ind.*, **71** : 57-95.

Material examined : Hill stream, 4 km away from Munsiyari towards Ratapani, 01.10.2005, coll. A.K. Hazra & Party, 46 exs.; Mana village, 3 km away from Badrinath hill top, 15.11.2003, coll. A.K. Hazra & Party, 20 exs.

Diagnostic characters : Th. II always with reddish to brown pigment. Abds III, IV, V usually dark brown. Head 1 + 1 dark ocellar field; Relative length index of Th II : III 46 : 32; Relative length index of Abds I : II : III : IV : V : VI : 21 : 21 : 13 : 108 : 9 : 4. Manubrium: Mucrodens as 85 : 122; each dentes armed with an inner row of spines which transit into stiff ciliated setae distally, mucro large with 5-6 teeth.

Distribution : India : Arunachal Pradesh, Nagaland, Manipur, Sikkim, Uttar Pradesh.

20. ***Dicranocentroides salmoni*** Mitra, 1975

1957. *Dicranocentroides fasciculatus* : Salmon, *Acta. Zool. Cracov.*, **11**(14) : 313-362.

1957. *Handschinphysa crassicornis* Sensu Salmon ibid.

1975. *Dicranocentroides salmoni* Mitra, *Rec. Zool. Surv. India*, **71** : 57-95.

Material examined : Hill stream, 6 km away from Munsiyari, culvert no.68/1,02.10.2005, coll. A.K. Hazra & Party, 62 exs. Beside water pool on top of Badrinath hill, 15.11.2003, coll. A.K. Hazra & Party, 34 exs.

Diagnostic characters : Th. III, Abds. I. II. almost always dark pigmented. Antennae sub equal to the length of head and body; Relative length index of Ths. II : III 14 : 10; Relative length index of Abds I : II : III : IV : V : VI as 7 : 7 : 4 : 37 : 4 : 2. Manubrium : mucrodens 28 : 40; each dentes armed with a row of stout spines that beyond three-fourth of its length transit into stiff, mucro large with six prominent teeth. Body length upto 2-3 mm.

Distribution : India : Uttarakhand, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Assam And Sikkim.

Genus ***Salina*** MacGillivary 1894 (Imms, 1912)

The genus is represented by four species from Uttarakhand.

Key to the species of *Salina*

1. Body without any pigment, sometime tergal margins of Th. II, III, abd. I, II darker..... .....S. *indica*
- Body always with patches involving blue-black or orange pigment, blue-black patches sometimes suffused with orange pigment 2
2. Lateral margins of Th. II, III and Abd. I, II darker; darker pigments intrude from tergal margin of Abd. II to its postero-dorsal margin ..... *S. montana* (Imms)
- Pigment does not cover entire surface of any segment.....*tricolor tricolor*
- Two longitudinal bands on each side of body formed by patches present on Th. II, III and Abd. I to VI ..... *S. striata* (Handschin)

21. ***Salina indica*** (Imms), 1912

1912. *Cremastocephalus indicus* Imms, *Proc. Zool. Soc. London.*

1957. *Salina indica* Salmon, *Acta. Zool. Cracov.*, **11**(14) : 313-363 (in part).

1973. *Salina indica* Mitra, *Oriental Ins.*, **7**(2) : 159-202.

Material examined : Hill stream mosses, 10 km away from Ratapani towards Berinag, Culvert no.60/1, 04.10.2005, coll. A.K. Hazra & Party, 32 exs.; 3 km away from Govindaghat towards Valley of flowers, 16.11.2003, coll. A.K. Hazra & Party, 50 exs.

Diagnostic characters : Ground colour yellowish, overlaid irregularly by violet pigment which usually follows lateral edges of the terga. Ocelli on black 8 + 8. General clothing of short to medium length ciliated setae with some long, stout, and lightly flexed ciliated setae at the apex of mesotergum and along the dorsal surface of the thorax. Apex of dens with scale like appendage. Mucro bearing three plain teeth.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Sikkim, Tripura (West and South distts.), West Bengal and Uttar Pradesh.

22. ***Salina montana*** (Imms) 1912

1912. *Cremastocephalus montanus* Imms. *Proc. Zool. Soc. London :* 80-125.

1957. *Salina montana* Salmon, *Acta. Zool. Cracov.*, **11**(14) : 313-362.

1973. *Salina montana* Mitra, *Oriental Insects*, **7**(2) : 159-202.

Material examined : Hill stream mosses, 18 km away from Berinag, 04.10.2005, coll. A.K. Hazra & Party, 52 exs.; 1 km away from Govindaghat towards Valley of flowers, 16.11.2003, coll. A.K. Hazra & Party, 26 exs.

Diagnostic characters : Body length 2 mm. Ground colour of head and body usually white; sometime pale yellow; Head pear-shaped, with 1 + 1 dark ocellar field, each field with 8 + 8 ocelli. Relative length index of the antennal segment = 47 : 67 : 57 : 93; Ths. II : III = 29 : 17; Relative length index of Abds I : II : III : IV : V : VI = 13 : 23 : 4 : 79 : 14 : 8.5; Manubrium: Mucrodens = 58 : 63; Mucro short, broad, prominently lobed into three teeth, dental scale appendage large, striated apically, sub equal to the length of mucro.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Uttar Pradesh, And West Bengal.

23. ***Salina tricolor tricolor*** (Handschin) 1928

1928. *Cremastocephalus tricolor* Handschin, *Treubia*, **10** : 245-270.

1929. *Salina tricolor :* Handschin, *Rev. Suisse Zool.*, **36** : 229-262.

1973. *Salina tricolor tricolor* Mitra, *Oriental Ins.*, **7**(2) : 159-202.

Material examined : Hill stream, 4 km away from Munsiyari towards Ratapani, 01.10.2005, coll. A.K. Hazra & Party, 32 exs.

Diagnostic characters : General ground colour of head and body pale yellow; Abds V and VI with symmetrical patches of orange to dark pigment; antennae pale yellow to dark brown with diffused blue pigment. Head pear shaped dorsally; relative length index of Ants I : II : III : IV = 26

: 33 : 29 : 46; The II : III = 9 : 4; Relative length index of Abds I : II : III : IV : V : VI = 4 : 9 : 1.5 : 29 : 4 : 2.5; Manubrium: Mucrodens = 22 : 25; Mucro deeply lobed into three teeth, dental scale appendage striated longitudinally, sub equal to mucro.

Distribution : India : Uttarakhand, Arunachal Pradesh And Manipur.

24. *Salina striata* (Handschin, 1928)

1928. *Cremastocephalus striatus* Handschin, *Treubia*, **10** : 245-270.

1929. *Salina striata* Handschin, *Rev. Suisse. Zool.*, **36** : 229-262.

1961. *Salina striatella* Yosii, *Nature and Life in South East Asia*, **1** : 171-200 (Lapsus for *striata).*

Material examined : Gothi hill slope opposite 7B India-Tibet Border Police Camp, Dharchula, 28.9.2005, coll. A.K. Hazra & Party, 42 exs; 2.5 km away from Govindaghat towards Valley of flowers, 16.11.2003, coll. A.K. Hazra & Party, 22 exs.

Diagnostic characters : Body white inclining to pale yellow; Head pear shaped dorsally, 1 + 1 frontal spines present; oceli 8 + 8. Relative length index of Antennal segment = 22 : 33 : 42 : Th. II : III = 15 : 9. Abds I : II : III : IV : V : VI = 8 : 14 : 3 : 41 : 7 : 3; Manubrium : Mucrodens = 28 : 33. Mucro short, broad, prominently lobed into three teeth. Length upto 3 mm.

Distribution : India : Uttarakhand, Arunachal Pradesh, Assam.

Genus *Pseudosalina*, Mitra 1966

The genus represented by three species from Uttarakhand.

25. *Pseudosalina nigrocephala* (Mitra, 1966)

1966. *Salina nigrocephala* Mitra, *Indian J. Ent.*, **28** : 70-72.

1973. *Pseudosalina nigrocephala* Mitra, *Rev. Ecol. Biol. Sol.*, **10** : 359-377.

Material examined : Hill stream mosses, 18 km away from Berinag, 04.10.2005, coll. A.K. Hazra & Party, 42 exs; *Sahasradhara* Hills, Dehradun distt., Uttaranchal, Coli. S. K. Mitra, 26.10.2000, 22 exs.; 1 km away from Govindaghat towards Valley of flowers, 16.11.2003, coll. A.K. Hazra & Party, 12 exs.; Mussoori near Campty falls, 28.10.2004, coll. A.K. Hazra & Party, 12exs.

Diagnostic characters : Ground colour pale green in spirit, general surface of body clothed with slender acuminate setae; each ocellar field contains 8 ocelli, arranged in two longitudinal parallel rows. Relative length index of Ths. II : III = 18: 9. Relative length index of Abds. I : II; m : IV : V : VI = 9 : 14 : 4 : 40 : 9 : 5; ventral tube well developed. Relative length index of manubrium: mucrodens = 50 : 59 : mucro stout, with two prominent leg like teeth, dental scale appendage well developed; dental spines absent. Body length (excluding appendages) : 1.6-2 mm.

Distribution : India : Uttarakhand (Dehradun distt.).

26. *Pseudosalina multiformis*, Mitra, 1973

1966. *Pseudosalina multiformis* Mitra, *Rev. Ecol. Biol. Soc.*, **10**(3) : 359-377.

Material examined : Hill stream, 4 km away from Munsiyari towards Ratapani, 01.10.2005, coll. A.K. Hazra & Party, 22 exs; Sahasradhara Hills, Dehradun distt., Uttaranchal, Coll. S. K. Mitra, 26.10.2000, 15 exs.; 2.5 km away from Govindaghat towards Valley of flowers, 16.11.2003, coll. A.K. Hazra & Party, 18 exs.; Mussoori near Campty falls, 28.10.2004, coll. A.K. Hazra & Party, 22 exs.

Diagnostic character : General ground colour of head and body varies from white to pale yellow, darker patches present on Ths. II, m and anteriorly as Abd. I; body clothed with micro and macrochaetae; microchaetae acuminate and form the general clothing of the body; 8 + 8 ocelli in dark pigmented ocellas fields; relative length index of Ants I : II : III : IV = 13 : 8 : 7 : 18; Relative length index of Ths. II : III = 26 : 17; Relative length index of Abds. I : II : III : IV : V: VI = 14 : 21 : 8 : 75 : 7; relative length index of manubrium: mucrodens = 59 : 66; mucro bidentate; dental scale appendage faintly striated. Body length (excluding appendages) : 1.29-2 mm.

Distribution : India : Uttarakhand (Dehradun distt.).

27. *Pseudosalina christianseni* Mitra, 1973

1973. *Pseudosalina christianseni* Mitra, *Rev. Ecol. Biol. Soc.*, **10**(3) : 359-377.

Material examined : 2 km away from Dharchula, 28.9.2005, Coll. A.K.Hazra, 44 exs; Rajaji National Park, Saharanpur distt., Uttaranchal, Coll. S. K. Mitra, 16 exs.; Hill slope 2 km away from Gopeswar towards Mandal, 18.11.2003, Coll. A.K.Hazra, 24 ex.; 4 km away from Gangotri, Mile post no.73, 04.11.2004, Coll. A.K.Hazra, 12 ex.

Diagnostic characters : Ground colour of head and body pale yellow; violet to blue black patches present on III, Abd. I and Abd. II. General surface of body uniformly clothed with ciliated microchaetal interspersed with flexed, obliquely truncated, ciliated macrochaetae on vertex. 2 dark ocellas fields, containing 8 ocelli; relative length index of Ants. I : II : III : IV = 40 : 43 : 41 : 55; Th. I reduced; relative length index of Ths. II : III = 34 : 30; Relative length index of Abds. I : II : III : IV : V : VI = 12 : 17 : 10 : 57 : 11 : 7; ventral tube moderately long. Manubrium : mucrodens = 49 : 62; mucro broad with two teeth and a ridge like thickening on inner lateral surface; dental scale appendage simple, with a basal plate and apically striated. Length (excluding appendages) : 0.6-1.1 mm.

Distribution : India : Uttarakhand

Genus ***Yosiia*** Mitra, 1967

28. ***Yosiia dehradunia*** Mitra 1967

1967. *Yosiia dehradunia* Mitra, *Proc. Zool. Soc, Calcutta,* **20** : 43-47.

Material examined : Hill slope grasses, 3 kms away from Jaljivi, 27.9.2005, Coll. A.K. Hazra, 64 exs; Motichur Forest Range, Hardwar Distt. 3900', 8.11.2000, Coil. S. K. Mitra, 18 exs. Rajaji National Park, Dehradun Distt., Uttarakhand, 27.x.20oo, Coll. S. K. Mitra, exs.; Hill slope 7 km away from Gopeswar towards Mandal, 19.11.2003, Coll. A.K.Hazra, 64 ex.; Mussoori near kempty falls, 28.10.2004, coll. A.K. Hazra & Party, 24 exs.

Diagnostic characters : Ground colour pale yellow, dusted with blue pigment all over the body. Clothed with slender accuminate setae. Dens crenulated, mucro. falsiform, some time preceptible in the form of a booklet, not demarcated from dens. Dental appendage highly enlarged. Pear shaped head, 8 + 8 ocelli. Ant. III and IV faintly annulated, relative length index of Ants. I : II : III : IV = 32 : 46 : 48 : 70. Th. I reduced, the relative length index of Th. II : III = 23 : 11. Each tibiotarsus with two large tibio-tarsallobes. The relative length index of Abd. I : II : III : IV : V : VI = 6 : 15 : 4 : 67 : 9 : 6. Ventral tube short. Body length 1.14 mm.

Distribution : India : Uttarakhand, Sikkim, Tripura (West Distt.), West Bengal.

Genus ***Callyntrura*** Borner, 1906

29. ***Callyntrura variabilis*** Mitra, 1974

1974. *Callyntrura (Callyntrura) variabilis* Mitra, *Rev. Ecol. Biol. Soc.,* 11(3): 397-439.

Material examined : Hill slope grasses, 70 kms away from Dharchula, 27.9.2005, Coll. A.K.Hazra, 56 exs; Nepalifarm, Dehradun distt. Uttaranchal, 29.10.2000. Coll. S. K. Mitra, 16 exs. Golatappar Forest Block, Dehradun distt. 30. 10.2000, Coll. S. K. Mitra, 22 exs. Hill slope on the bank of the river Balkhilla, Mandal, 19.11.2003, Coll. A.K. Hazra, 34 exs.; 8 km away from Uttarkashi, 01.11.2004, Coll. A.K. Hazra, 14 exs.

Diagnostic characters : General ground colour of body yellow to brown with variable dark blue-black patches; body clothed VI = 17 : 24 : 8 : with scales and flexed setae; 8 + 8 ocelli in pigmented ocellar fields; relative length index of Ants. I : II : III : IV = 18 : 17 : 11 : 27; relative length index of Ths. II : III = 42 : 25; legs all similar; relative length index of Abds. I : II : III : IV : V : VI = 17 : 24 : 8 : 94 : 10 : 4; relative length index of manubrium: microdens = 23 : 29.5; micro with 6 teeth; dental scale appendage absent. Body length (excluding appendages) : 2 mm.

Distribution : India : Uttarakhand (Dehradun distt).

30. ***Callyntrura japonica*** (Kinoshita, 1917)

1954. *Handschiniphysa japonica* Yosii.

1977. *Callyntrura japonica* Yosii, *Forest Res. Centre. Sepilok. Sand. East Malaysia* : 1-37.

Material examined : Hill slope grasses, 70 kms away from Dharchula, 27.9.2005, Coll. A.K. Hazra, 34 exs; 2 km away from Gopeswar towards Mandal, 18.11.2003, Coll. A.K. Hazra, 24 ex.; 4 km away from Gangotri, Mile post no.73, 04.11.2004, Coll. A.K. Hazra, 15 ex.

Diagnostic characters : Body length is 3 mm. Ground colour of body is cremish white. Head is dark all over the base of the antennae are deeper in colour. Thorax is obscurely dusky all over along the marginal area of each segment. IV th abdominal segments bears a narrow transverse patch. Antennal scaled. Ventral tube deeply dark. furca long, scaled dens without spines but with prominent dorsal vescile. Mucro elongated with teeth.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Meghalaya; Japan.

Family ISOTOMIDAE, Borner, 1913
Subfamily ISOTOMINAE Schaeffer, 1896

Head prognathus, tracheae absent. Antennae inserted in front half of head. P.AO. usually present; always simple, mucrones short.

Genus ***Isotomurus*** Borner, 1906

31. ***Isotomurus balteatus*** (Reuter, 1876)

1876. *Isotoma balteatus* Reuter, *Med. Soc. Fauna et. Flora. Fenn.*, **1** : 82.

1963. *Isotomurus balteatus* : Yosii, *Contr. Biol. Lab. Kyoto. Univ.*, **15** : 4.

Material examined : D.A.R.L hostel Campus, Pithoragarh, 23.9.2005, coll. A.K. Hazra & Party, 102 exs.; Hill slope 7 km away from Gopeswar towards Mandal, 19.11.2003, Coll. A.K. Hazra, 44ex.

Diagnostic characters : Colour with a violettish black pigment which form distinct transverse band on the anterior margin of tergites. Antennal ratio = 10 : 15 : 16 : 26; Ant. IV with two short sub apical sense rods. P. A. O. as large as anterior ocellus. Ocelli 8 + 8. Furcula reaches forward to the ventral tube, segments as 5 : 12 : 1. Dens distinctly annulated with dorsal side; mucro with a small apical, 2 large sub apical and a large external lateral teeth.

Distribution : India : Uttarakhand, Arunachal Pradesh, Manipur, Tripura (West distt.) and Kerala.

SUMMARY

The present contribution is the first consolidated record of this group of insects from the State of Uttarakhand involving 31 species under 16 genera of 3 families.

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REFERENCES

BAIJAL, H.N. 1955. Two New Species of Collembola, *Agra. Univ. Journ. Sci. Res.*, **4** : 175-177.

DENIS, J.R. 1936. Yale North India Expedition: Report on Collembola. *Mem. Connect. Acad. Arts and Sci.*, **10** : 261-282.

IMMS, A.D. 1912. On some Collembola from India, Burma and Ceylon with a catalogue of the oriental species of the order. *Proc. Zool. Soc. London*, 80-125.

HAZRA, A.K. 1995. *Fauna of Meghalaya : State Fauna Series*, 4(Part 3) : 13-32.

MITRA, S.K. 1973. A revision of *Salina* Macgillivary, 1894 (Collembola : Entomobryidae) from India. *Oriental Insects, Delhi*, **7** : 159-202.

MITRA, S.K. 1974. A critical study on some species of *Callyntrura* Borner, 1906 (Collembola: Entomobrydae : Paronellinae) from India. *Rev. Ecol. Biol. Soc. Paris*, **11** : 397-439.

MITRA, S.K. 1975. Studies on the genus *Dicranocentroides* Imms, 1912 (Collembola : Entomobryidae : Paronellinae) from India. *Rec. zool. Surv. India*, **71** : 57-95.

PRABHOO, N.R. 1971. Soil and litter Collembola of South India. I. Arthropleona. *Oriental. Ins.*, **5** : 1-46

PRABHOO, N.R. and V. MURLIDHARAN, 1980. A new species of *Tomocerus* (s. str.) (Tomoceridae : Collembola) from India. *Entomon. vol.*, **3** : 207-210.

SALMON, J.T. 1957. Some Paronellinae (Collembola) from India. *Acta. Zool. Cracov.*, **11**(14) : 313-363.

YOSII, R. 1966a. Collembola of Himalaya: *Journal of the College of Arts and Science, Chiba Univ., Vol.* 4 No. (4) : 461-531.

YOSII, R. 1966b. On some Collembola of Afghanistan, India and Ceylon, collected by the *Kuphe Exped.* 1960. *Res. Kyoto. Univ. Sci. Exp. Karakoram and Hindukush,* 1955, **8** : 333-405.

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Fauna of Uttarakhand, State Fauna Series, 18(Part-2), 2010 : 13-16.

INSECTA : THYSANURA

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INTRODUCTION

The order Thysanura comprises insects popularly known as 'silver fish' and 'bristle tail' and some species are considered as a serious house hold and library pest in India, the members of the order are small, soft bodied, mostly scaled, wingless. They are relatively larger insects than the other members belonging to the subclass Apterygota; they are easily distinguishable from the other closely related orders by long, many segmented antennae, 2 anal cerci, and a single median telson projecting posterior from the terminal part of abdomen. These free-living forms are found in the forest floor, in the nests of ants and termites, under bark of trees, under rocks. The members of the family Machilidae representing 'bristle tail' occur mostly in the decomposing litters of the forest floor and are capable of jumping by means of the apical ventral stylets.

HISTORICAL RESUME

The history of taxonomic studies of the Indian Thysanura dates back to 1903 by Escherich. The first important work of significance on the order Thysanura comes from the efforts of Escherich in 1905 in *'Das system der Lepismatiden'* Thereafter, Silvestri (1913, '38, '48) described some new Indian species from India, later Wygodzinsky (1954, '72) and recently Hazra and his co-workers (1980 to till date) doing extensive studies on Thysanura and contributed significantly to the knowledge of Indian fauna, Mendes (1990) published on Zoogeographic affinities of Indian Thysanura and pointed out the poorly known diversity of the group due to not proper exploration.

The study of Indian Thysanuran fauna has been neglected for a long time and our knowledge of this order from India is far from perfect in contrast to world fauna. The poorly known Indian fauna of Thysanura presently represented by 31 species belonging to 21 genera and 5 families.

The Thysanuran fauna of Uttarkhand was first known by the work of Silvestri (1911). Since then the knowledge of diversity of Thysanura from this region remains still ignored due to the lack of proper survey and there exists ample scope for further exploration of more taxa from this region in future.

The present analysis of the composition of the species of thysanura is based on a small collection collected by Apterygota section of Zoological Survey of India during 2002-2005 from Uttarakhand. The work also provides key to families, genera and species. The classification followed in the present study is after Paclt, 1967.

SYSTEMATIC ACCOUNT

Order THYSANURA
Sub-order ZYGENTOMA
Super family LEPISMATOIDEA

Key to the families

1. Eyes and ocelli absent ..... NICOLETIIDAE

   Eyes present 2

2. Ocelli present; scales absent .... LEPIDOTRICHIDAE

   Ocelli absent; scales present .... LEPISMATIDAE

Family LEPISMATIDAE

Key to the Sub families

Eyes absent; general body colour white or yellowish, hypodermal pigment absent, scales, if present, white or yellowish, never forming a pattern ..... NICOLETIINAE

Eyes present; general body colour whitish, hypodermal pigment mostly present; scales always present, often forming a definite pattern ..... LEPISMATINAE

Key to the genera of Lepismatidae

1. Dorsal and abdominal setae or bristles arranged singly 4

   Dorsal and abdominal setae or bristles arranged in 1+1 or 2+2 bristle combs 2

2. Last tergum not sharply pointed with only 1+1 bristle combs ..... ***Ctenolepisma*** Escherich, 1905

   Last tergum sharply pointed with more than 1 + 1 bristle combs 3

3. Sub median fields of macrochaetae of head capsule narrowly elongated, not attaining the anterior border of head capsule ..... ***Acrotelsa*** Escherich, 1905

   Dorsal and abdominal setae or bristle arranged singly. Tergite X of abdomen mostly longer than broad at base without any traces of bristle combs ..... ***Lepisma*** Linnaeus 1756

Genus ***Ctenolepisma*** Escherich, 1905

1. ***Ctenolepisma longicaudata*** Escherich, 1905 (Fig.1)

1905. *Ctenolepisma longicaudata* Eschcrich, *Zoologica (Stuttgart)*, Vol. **43** : 83.

Material examined : Munsiyari, 2.10.2005, Coll. A.K.Hazra and Party, 2 ex.; Munsiyari Forest Rest House Campus, 01.10.2005, Coll. A.K. Hazra and Party, 3 exs.

Diagnosis : Body long. The thorax is very little broader than the abdomen which is gradually tapering with relatively short segments. Length ranges from 13 mm to 15 mm, whitish in colour without marked very shun. Antennae, cerci, and median tail appendages are distinctly longer than the body length. Abdominal terga II-VI with 3 + 3 bristle combs, tergum 'X' twice as long as tergite IX, and wide at base Posteriorly last abdominal tergums distinctly truncate. Long stylets are present on sternum VIII-IX. Ovipositor long and slender.

Distribution : INDIA : Uttarakhand (Dehradun, Joshimutt) Andhra Pradesh, Sikkim, West Bengal, Uttar Pradesh, Bihar, Tripura, Manipur.

Elsewhere : USA, South Africa, Australia.

Remarks : This species is widely distributed in the tropics and subtropics of old and New World.

Genus ***Lepisma*** Linnaeus 1756

2. ***Lepisma saccharina*** Linnaeus 1758

1758. *Lepisma saccharina* Linnaeus, *Syst. Naur.*, (ed. 10) **1** : 806.

1984. *Lepisma saccharina* Mendes, *Stuff. Heit. Naturk*, **9** : 372.

Diagnosis : Body colour Silvery gray; Length - 1/2 inch; Body long, narrow and slightly tapering. Head narrower than thorax without distinct neck; eyes present but not much protruding; prothorax the longest; maxillary palpi 5 segmented, long; labial palpi 4 segmented with swollen apical segment, which is wider than long. Stylets in two pairs on abdomen VIII and IX; abdominal tergite with 1+1 bristle combs; tenth abdominal tergum rather elongate, distinctly longer than wide; abdominal sterna with median bristle combs in addition to sub lateral ones; ovipositor of female hardly extends beyond apex of inner process of coxites IX.

Material examined : Rishikesh, 9.11.03, Coll. A.K.Hazra and Party, 2 ex.; Pithoragarh, 22.9.2005, Coll. A.K.Hazra and Party, 3 exes.

Distribution : INDIA : Uttarakhand, Uttar Pradesh, Andhra Pradesh and Sikkim.

Remarks : The above species is normally domestic and widely distributed in Palaerctic Ethiopian and Indian Regions.

Genus ***Acrotelsa*** (Fabricius, 1793)

3. ***Acrotelsa collaris*** (Fabricius, 1793)

1793. *Lepisma collaris Fabricius, Ent. Sys.*, II. p. 64.

1873. *Lepisma mucronata* Packard, *Fifth Ann. Rept. Peabody Acad. Sci.*, pp. 23-51.

1913. *Acrotelsa collaris* Silvestri, *Rec. Indian Mus.* (Calcutta) **9** : 58.

Diagnosis : Body long and robust. Base of the body is light yellowish in colour and covered with dark brown scales. The macrochaetae in submedian field of the head capsule are arranged in a narrow elongated strip, which do not touch the anterior border of-the head capsule). The prosternum is covered by the fore coxae. A bunch of solitary macrochaetae is present in the middle

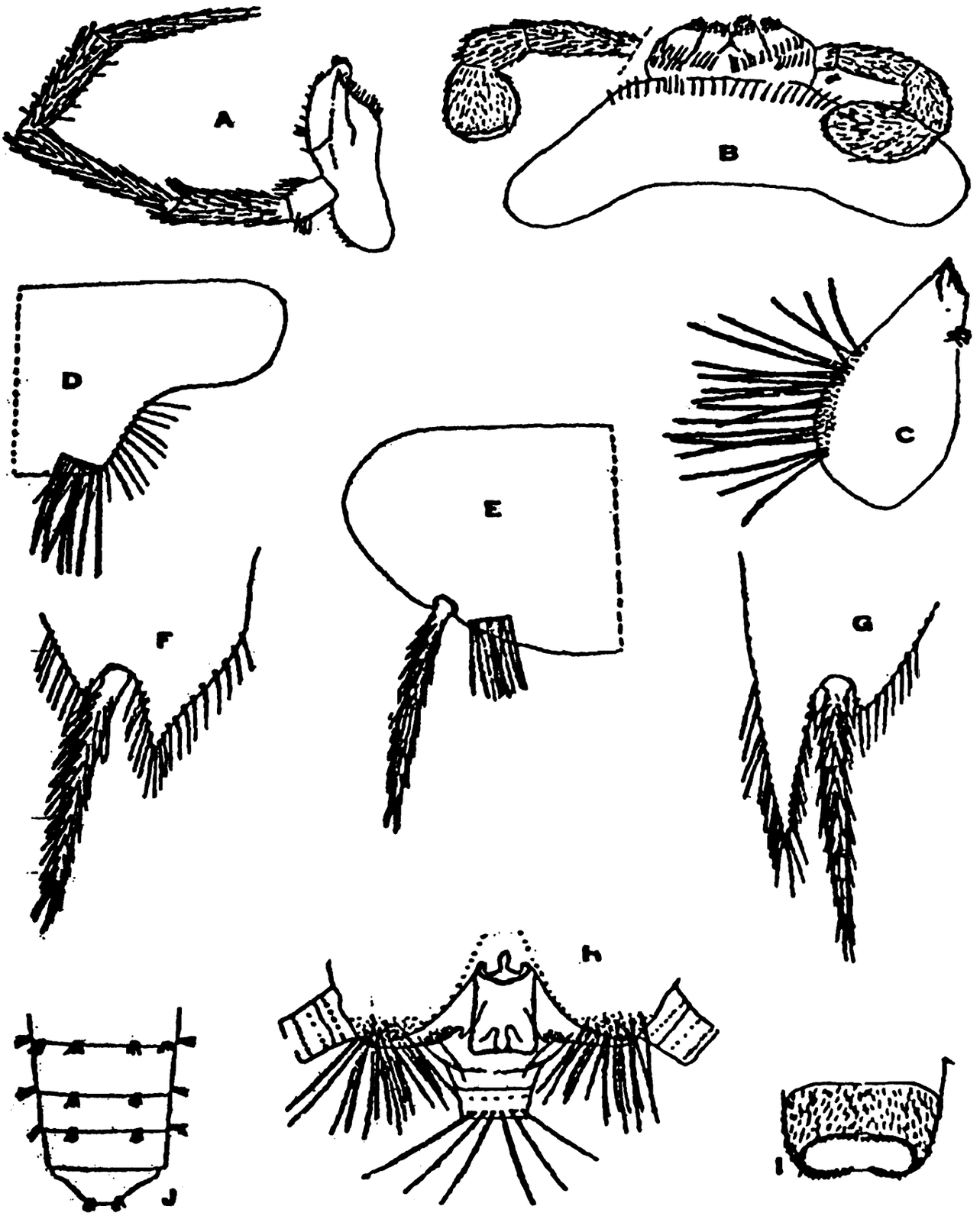

Fig. 1. *Ctenolepisma longicaudata,* A. Maxillary palp, B. Labium and labial palp, C. Mandible, D. Tenth Tergite, E. Sternite VIII, left half and stylet, F. Subcoxae and stylet of sternite IX of male, right half, G. Right half of same of female Penis, H. Annual plates. I. Penis of male. J. Abdominal tergites VI-X showing setal brushes.

of the prosternum. The species can also be recognised by the arrangement of macrochaetae on legs and cerci which are in distinct whirls, this type of arrangement of setae on these appendages are not found in other Lepismatids. Tergum X is triangular and sharply pointed with at least 5 pairs of bristle combs. Ovipositor with forsorial spines apically on posterior gonapophyses and male with parameers. Body length : 16 mm 18 mm.

Material examined : Rishikesh, F/R/H campus, 9.11.2003, Coll. A.K. Hazra and Party, 3 exes.

Distribution : INDIA : Uttarakhand, Andhra Pradesh, West Bengal.

Elsewhere : USA, Carribean Islands.

Remarks : It is a tropicopolitan species.

Family NICOLETIIDAE
Genus ***Atelura*** Vonheyden, 1855
4. ***Atelura typhloponis*** Silvestri, 1913

Material examined : Rishikesh, F/R/H campus, 09.11.03, Coll. A.K.Hazra and Party, 6 exes.

Diagnosis : Body colour whitish yellow, covered with scales. Head dorsally with scales, anterior and lateral margins with isolated setae, four larger and isolated, with apex bifid. Antennae shorter than body. Thorax not much more widened than the anterior part of abdomen and about 1/3 shorter than abdomen, the hind margin of terga without any setae, the lateral margin with two short setae. Abdomen gradually narrower posteriorly, the hind margin of the terga with only one robust bifid seta, the other shorter. Tergum 'X' is 1/3 wider at the base than long and hind margin gradually thiner, and the margin is deeply sinuate, the posterior angles acute with a long and strong apical seta. Sternum II with a pair of median vesicles, the sterna III-VII with a pair of submedian setae. Sterna V-IX with sty lets and the VIIth with pseudovesicle stylus elongated in the IX, where they are clearly stronger and more than twice longer than in the VIII.Ovipositor robust attains more or less the half of the length of IX stylets, not conspicuously annulated and with short setae. Body length : 3 mm.

Distribution : INDIA : Uttarakhand, Andhra Pradesh.

SUMMARY

The present paper deals with 4 species of Thysanura under 4 genera distributed over 2 families recorded from different districts of Uttarakhand state.

ACKNOWLEDGMENT

The authors are grateful to the Director, Zoological Survey of India, Kolkata for kind encouragement and providing laboratory facilities.

REFERENCES

Escherich, K.1905. Das System der Lepismatidcn. *Zoolgica* (Stuttgart), **43** : 1-164.

Hazra, A.K. 1980. On a new species of *Siylifera* (Lepismatidae : Thysanura : Insecta) from India. *Bull. Zool. Surv. India,* **2**(2 & 3) : 187-191.

Lucas, H. 1846. Aperen des especes nouvelles d'Insectes qui se trouvent dans nos possessions francaises du Nord de ('Afrique). *Rev. Zool.* IX.

Mendes, L.F. 1988. Revisao Do Genero Lepisma Lin., 1758 S. Lat. (Zygentoma, Lepismatidae), *Suplemento No. 2 ao Bolm Soc. Port. Ent.,* 1-236 pp.

Mendes, L.F. 1990. On the Zoogeographic affinities of the Thysanurans (Microcoryphia and Zygentoma from India. In : *Advances* in *Management and Conservation of soil fauna* (eds. G.K. Veeresh *et al.)* : 15-24.

Paclt, J. 1967. Thysanura. Fam. Lepidotrichidae, Maindroniidae, Lepismatidae. In: *Wytsman., P. Genera Insectorum,* fase **218** : 3-86.

Slabaugh, R.E.A. 1940. A new Thysanuran and a key to the domestic species of Lepismatidae : Thysanura. Ann. *Mus. Zool. Polonici,* **9** : 341-349.

Silvestri, F. 1913. On some Thysanura in the Indian Museum. *Rec. Ind. Mus.,* **9** : 51-62.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 17-28.

ODONATA : ZYGOPTERA

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INTRODUCTION

It is the second part of the Odonata (Suborader Zygoptera) fauna of Uttarakhand State. The first part containing therein on the Odonata (Suborder Anisoptera) fauna of State and the importance of the study and references etc. have already been included in this part and submitted for publication. A total of 47 species/subspecies distributed amongst 24 genera and 9 families are recorded. of these, *Lestes umbrinus* Selys is recorded for the first time from the State.

CLASSIFIED LIST

A comprehensive list of the Odonata (Zygoptera) known from Uttarakhand is given below, arranged systematically.

Order ODONATA
Suborder ZYGOPTERA
Superfamily COENAGRIONOIDEA
Family COENAGRIONIDAE

1. Genus ***Aciagrion*** Selys

1. *Aciagrion pallidum* Selys

2. Genus ***Agriocnemis*** Selys

2. *Agriocnemis clauseni* Fraser
3. *Agriocnemis corbeti* Kumar and Prasad
4. *Agriocnemis pygmaea* (Rambur)

3. Genus ***Cercion*** Navas

5. *Cercion calamorum dyeri* (Fraser)

4. Genus ***Ceriagrion*** Selys

6. *Ceriagrion cerinorubellum* (Brauer)
7. *Ceriagrion coromandelianum* (Fabricius)

5. Genus ***Enallagma*** Charp

8. *Enallagma parvum* Selys

6. Genus ***Himalagrion*** Fraser

9. *Himalagrion exclamationis* Fraser

7. Genus ***Ischnura*** Charp

10. *Ischnura aurora aurora* (Brauer)
11. *Ischnura forcipata* Morton
12. *Ischnura rufostigma rufostigma* Selys
13. *Ischnura senegalensis* (Rambur)

8. Genus ***Pseudagrion*** Selys

14. *Pseudagrion decorum* (Rambur)
15. *Pseudagrion laidlawi* Fraser
16. *Pseudagrion rubriceps rubriceps* Selys
17. *Pseudagrion spencei* Fraser

9. Genus ***Rhodischnura*** Laidlaw

18. *Rhodischnura nursei* (Morton)

Family PLATYCNEMIDIDAE

10. Genus ***Calicnemia*** Strand

19. *Calicnemia carminea pyrrhosoma* Lieftinck
20. *Calicnemia eximia* (Selys)
21. *Calicnemia mortoni* (Laidlaw)
22. *Calicnemia pulverulans* Selys

11. Genus ***Coeliccia*** Kirby

23. *Coeliccia renifera* (Selys)

12. Genus ***Copera*** Kirby

24. *Copera ciliata* (Selys)
25. *Copera marginipes* (Rambur)
26. *Copera vittata serapica* (Selys)

Family PLATYSTICTIDAE

13. Genus ***Drepanosticta*** Laidlaw

27. *Drepanosticta carmichaeli* (Laidlaw)

14. Genus ***Protosticta*** Selys

28. *Protosticta davenporti* Fraser

Family PROTONEURIDAE

15. Genus ***Elattoneura*** Cowley

29. *Elattoneura campioni campioni* (Fraser)

16. Genus ***Prodasineura*** Cowley

30. *Prodasineura autumanalis* (Fraser)

Superfamily LESTOIDEA
Family LESTIDAE
17. Genus ***Indolestes*** Fraser

31. *Indolestes cyaneus* (Selys)

18. Genus ***Lestes*** Leach

32. *Lestes praemirsus decipiens* (Kirby)
33. *Lestes thoracicus* Laidlaw
34. *Lestes umbrinus* Selys
35. *Lestes viridulus* Rambur

Family SYNLESTIDAE
19. Genus ***Megalestes*** Selys

36. *Megalestes major* Selys

Superfamily CALOPTERYGOIDEA
Family CALOPTERYGIDAE
20. Genus ***Neurobasis*** Selys

37. *Neurobasis chinensis chinensis* (Linn.)

Family CHLOROCYPHIDAE
21. Genus ***Libellago*** Selys

38. *Libellago lineata lineata* (Burmeister)

22. Genus ***Rhinocypha*** Rambur

39. *Rhinocypha biforata biforata* Selys
40. *Rhinocypha immaculata* Selys
41. *Rhinocypha quadrimaculata* Selys
42. *Rhinocypha spuria* Selys
43. *Rhinocypha trifasciata* (Selys)
44. *Rhinocypha unimaculata* Selys

Family EUPHAEIDAE
23. Genus ***Anisopleura*** Selys

45. *Anisopleura comes* Hagen
46. *Anisopleura lestoides* Selys

24. Genus ***Bayadera*** Selys

47. *Bayadera indica* (Selys)

SYSTEMATIC ACCOUNT

Key to the superfamilies of Zygoptera

1. Only 2 (exceptionally 3) antenodal nervures present; postnodals in strict alignment with the vein below; anal vein fused at base with the posterior of wing 2

   Never less than 5 antenodals present; postnodals not in line with the veins below them; anal vein separate from posterior border of wing from its base ..... CALOPTERYGOIDEA

2. The vein IRiii and Riv + V begining much near or to the nodus than to arculus; genital hamules of male quadrate ..... COENAGRIONOIDEA

   The vein IRiii + V beginging much nearer to the arculus than to the nodus; genital hamules of male elongate ..... LESTOIDEA

Key to the families of COENAGRIONOIDEA

1. The anal vein absent or greatly reduced; Cup varying from a vein of normal length to only 1 cell or so long 2

   The anal vein and Cup of normal length 3

2. A short cross vein at the base of wings joining Cup with the border of wing proximal to the normal cross vein AC; discoidal cell elongate, obtuse apically, subdiscoidal cell contiguous with posterior border of wing or greatly shortened and more or less triangular in shape; pterostigma subquadrate ..... PLATYSTICTIDAE

   - No acessary cross-vein in the dubito-anal space at base of wing; discoidal cell elongate, anterior and posterior sides nearly equal; subdiscoidal cell more or less contiguous with posterior border of wing ..... PROTONEURIDAE

3. Discoidal cell elongate, anterior and posterior sides subequal, apex rather obtuse; anal vein separating from wing border proximal to AC; which later lies about midway between the two antenodals; veins MA, and IRiii running straight for the greater part of their length, only zigzagged apically or not at all ..... PLATYCNEMIDIDAE

   Discoidal cell short, anterior side considerably shorter than the posterior; anal vein separating from wing border at various levels; either proximal to, at or distal to the vein AC, Veins MA and IRiii markedly zigzagged for the greater part bof their length ..... COENAGRIONIDAE

Family COENAGRIONIDAE

Key to the genera of family Coenagrionidae

1. Arc situated distal to the level of the distal antenodal nervure ..... *Agriocnemis* Selys
- Arc situated at the level of the distal antenodal nervures 2
2. Vein AB arising from the hind border of the wing at the point where AC meets it 3
- Vein AB arising from the hind border of the wing more or less proximal to the point where AC meets 6
3. Wings petiolation shorter in length ..... *Cercion* Navas
- Wings petiolation longer in length 4
4. A proximal ridge on the frons present; no post ocular coloured spot on the head; head and thorax uniform ..... *Ceriagrion* Selys
- No ridge on the frons; post ocular coloured spot always present; head and thorax not of uniform colour 5
5. Pterostigma in fore and hindwings of the same size; abdomen not unduly long and slender; female without a ventral spine on apical border of segment 8 ..... *Pseudagrion* Selys
- Pterostigma in fore wings longer than that in the hindwing; abdomen usually very long and slender; female with an apical ventral spine on segment 8 ..... *Aciagrion* Selys
6. Pterostigma of the same colour and shape in forewing and hindwing of male; dorsal apical tubercle on segment 10 of male absent 7
- Pterostigma differing in shape and size in fore and hindwings of male; dorsal tubercle on segment 10 of male present 8
7. Female with a robust ventral apical spine on segment 8 ..... *Enallagma* Charp
- Female without a ventral apical spine on segment 8, 15 to 16 postnodal nervures in forewing ..... *Himalagrion* Fraser
8. Postocular coloured spot always present in adult stage; tubercles on apical border of segment 10 closely opposed ..... *Ischnura* Charp
- Postocular coloured spot absent in the adult stage tubercles on apical border of segment 10 widely seperated by a shallow notch ..... *Rhodischnura* Laidlaw

Genus ***Aciagrion*** Selys

1. ***Aciagrion pallidum*** Selys

1891. *Aciagrion pallidum* Selys, *Ann. Mus. Civ. Genova*, (2), **10** : 512-513.

1933. *Aciagrion pallidum*, Fraser, *Fauna Brit. India, Odonata*, **1** : 344-345.

Material examined : 1♀, Jeolikot, district Nainital, 11.11.2000, coll. S. K. Mondal and 1♀, Manan (Kausani), district Bageshwar, 9.4.2002, coll. S. Roychaudhary.

Distribution : India (Assam, Bihar, Eastern and Western Himalaya, Orissa, Madhya Pradesh, Maharashtra, Uttar Pradesh, Uttarakhand and Western Ghats).

Elsewhere : Kampuchea, Myanmar, Nepal, Thailand, Vietnam and Zambia.

Genus ***Agriocnemis*** Selys

Key to the species of Agriocnemis Selys

1. Labrum non metallic 2

   Labrum metallic blue; superior anal appendages longer than inferior ..... *A. pygmaea* (Rambur)
2. Abdominal segment 8 entirely black ..... *A. clauseni* Fraser

   Abdominal segment 8 and 9 totally black, 10th with a small rounded basal black spot on dorsum ..... *A. corbeti* Kumar and Prasad

2. ***Agriocnemis clauseni*** Fraser

1922. *Agriocnemis clauseni* Fraser, *Mem. Dept. Agric. India (Ent.)*, **7** : 53-55.

1933. *Agriocnemis clauseni*, Fraser, *Fauna Brit. India, Odonata*, **1** : 390-392.

Distribution : India (North East India, Punjab, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Myanmar, Nepal and Thailand.

3. ***Agriocnemis corbeti*** Kumar and Prasad

1978. *Agriocnemis corbeti* Kumar and Prasad, *J. Bombay nat. Hist. Soc.*, **75** : 174-179.

1981. *Agriocnemis corbeti*, Kumar and Prasad, *Rec. zool. Surv. India, Occ. Pap.*, No. **20** : 41.

Distribution : India (Uttarakhand : Dehra Dun).

4. *Agriocnemis pygmaea* (Rambur)

1842. *Agrion pygmaea*, Rambur, *Ins. Neurop.*, : 278.

1933. *Agriocnemis pygmaea*, Fraser, *Fauna Brit. India, Odonata*, **1** : 398-401.

Material examined : 1♂, Jeolikot, district Nainital, 11.11.2000, coll. S. K. Mondal; 1♂, Manan (Kausani), district Bageshwar, 2.10.2001, coll. A. Bal; 1♀, Dhalwal (Rishikesh), district Tehri Garhwal, 3.10.2001, coll. S. K. Mondal; 6♂♂, Katramri, district Almora, 3.10.2001, coll. A. Bal and 1♂, Bhojbasa, district Uttar Kashi, 10.5.2002, coll. S. K. Chakraborty.

Distribution : Throughout India.

Elsewhere : Afganistan, Africa, Australia, Bangladesh, Bhamo, Cambodia, China, Hong-Kong, Indonesia, Japan, Laos, Kampuchea, Malaysia, Myanmar, Nepal, Pakistan, Palon, Papua, New Guinea, Philippines, Reinbode, Seychelles, Singapore, Sri Lanka, Sydney, Taiwan and Thailand.

Genus *Cercion* Navas

5. *Cercion calamorum dyeri* (Fraser)

1919. *Agriocnemis dyeri* Fraser, *Rec. Indian. Mus.*, **16** : 451.

1933. *Coenagrion dyeri*, Fraser, *Fauna Brit. India, Odonata*, **1** : 413.

1991. *Cercion calamorum dyeri*, Tsuda, *A distributional list of world Odonata*, : 25.

Material examined : 1♂, Around Nakuchiatal, district Nainital, 9.10.1974, coll. P. K. Maiti.

Distribution : India (Bihar, Himachal Pradesh, Orissa, Madhya Pradesh, Maharashtra, Uttar Pradesh, Uttarakhand, West Bengal and Western Ghats).

Elsewhere : China, Indonesia, Korea, Malaysia, Myanmar, Nepal, Taiwan and Thailand.

Genus *Ceriagrion* Selys

Key to the species sof Ceriagrion Selys

1. Abdomen bright red at base and anal ends black on dorsum .... *C. cerinorubellum* (Brauer)

   Abdomen bright citron yellow without markings ..... *C. coromandelianum* (Fabr.)

6. *Ceriagrion cerinorubellum* (Brauer)

1865. *Pyrrhosoma cerinorubellum* Brauer, *Verh. Zool. bot. Ges. Wein.*, **15** : 511.

1933. *Coenagrion cerinorubellum*, Fraser, *Fauna Brit. India, Odonata*, **1** : 326-328.

Distribution : Throughout India.

Elsewhere : Bangladesh, Kampuchea, Indonesia, Laos, Malaysia, Myanmar, Pakistan, Sri Lanka, Singapore, Thailand and Vietnam.

7. *Ceriagrion coromandeliaum* (Fabricius)

1798. *Agrion coromandellanum* Fabricius, *Ent. Syst. Suppl.* : 287.

1933. *Coenagrion coromandellanum*, Fraser, *Fauna Brit. India, Odonata*, **1** : 315-316.

Material examined : 1♀, Jaspur, district Nainital, 6.8.1989, coll. R. K. Varshney; 1♂, chunoti, district Nainital, 13.11.2000, coll. S. K. Mondal and 1♀, Dhalwal, (Rishikesh), district Tehri Garhwal, 8.10.2001, coll. S. K. Mondal.

Distribution : Throughout India.

Elsewhere : Bangladesh, Combodia, China, Indo-China, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

8. *Enallagma parvum* Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.*, **41** : 537.

1933. *Enallagma parvum*, Fraser, *Fauna Brit. India, Odonata*, **1** : 376-378.

Material examined : 1♀, Jeolikot, district Nainital, 11.11.2000, coll. S. K. Mondal.

Distribution : Throughout India.

Elsewhere : Myanmar, Nepal, Pakistan, Sri Lanka and Thailand.

Genus *Himalagrion* Fraser

9. *Himalagrion exclamationis* Fraser

1919. *Himalagrion exclamationis* Fraser, *Rec. Indian Mus.*, **16** : 453.

1933. *Himalagrion exclamationis*, Fraser, *Fauna Brit. India, Odonata*, **1** : 331-333.

Distribution : India (Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Nepal.

Genus ***Ischnura*** Charp.

Key to the species of Ischnura Charp

1. Species with ground colour of males and isochrome females blue or pale grass green 2
- Species with ground colour of both sexes bright orange red; abdominal segments 8 to 10 only black .... *I. rufostigma rufostigma* Selys
2. Abdominal segments 3 to 6 citron yellow; inferior anal appendages shorter than superiors ..... *I. aurora aurora* (Brauer)
- Abdominal segments 3 to 6 black on dorsum 3
3. 10th abdominal segment with blue spot on dorsum, pterostigma of forewing has shorter costal side ..... *I. forcipata* Morton
- 10th abdominal segment without blue marking on dorsum, pterostigma of forewing not with shortest costal side .... *I. senegalensis* (Rambur)

10. ***Ischnura aurora aurora*** (Brauer)

1858. *Agrion delicatum* Hagen, *Verh. zool. bot. Ges. Wien.*, **8** : 479.

1965. *Agrion aurora*, Brauer, *Verh. zool. bot. Ges. Wien.*, **15** : 510.

1915. *Ischnura aurora*, Ris, *Nova caledonia, Zool.*, **2** : 4,67.

1991. *Ischnura aurora aurora*, Tsuda, *A distributional list of World Odonata*, : 34.

Material examined : 1♂, Chunoti, district Nainital, 13.11.2000, coll. S. K. Mondal and 1♂, Dholwar (Rishikesh) district Tehri Garhwal, 8.10.2001, coll. S. K. Mondal.

Distribution : Throughout India.

Elsewhere : Afghanistan, Australia, Bangladesh, China, Laos, Indonesia, Iran, Japan, Malaysia, Micronesia, Myanmar, Nepal, New Ziland, Pakistan, Philippines, Sri Lanka, Thailand and Taiwan.

11. ***Ischnura forcipata*** Norton

1907. *Ischnura forcipata* Morton, *Trans. ent. Soc. Lond.*, : 306.

1933. *Ischnura forcipata*, Fraser, *Fauna Brit. India, Odonata*, **1** : 354-357.

Material examined : 2♀♀, Around Nakuchiatal, district Nainital, 9.10.1974, coll. P. K. Maiti.

Distribution : India (North India, Orissa and West Bengal).

Elsewhere : Afghanistan, Bangladesh, Iran, Nepal and Pakistan.

12. ***Ischnura rufostigma rufostigma*** Selys

1876. *Ischnura rufostigma* Selys, *Bull. Acad. Belg.*, (2) **41** : 283.

1991. *Ischnura rufostigma rufostigma*, Tsuda, *A distributional List of world Odonata*, : 36.

Distribution : India (Assam, Bihar, Madhya Pradesh, Manipur, Meghalaya, West Bengal and Western Himalaya).

Elsewhere : China and Myanmar.

13. ***Ischnura senegalensis*** (Rambur)

1842. *Agrion senegalensis* Rambur, *Ins. Neurop.* : 276.

1933. *Ischnura senegalensis*, Fraser, *Fauna Brit. India, Odonata*, **1** : 348-351.

Material examined : 1♂, 1♀, Chunoti, district Nainital, 13.11.2000, coll. S. K. Mondal and 1♀, Farkot, (chamba), district Tehri Garhwal, 14.9.2002, coll. A. Bal.

Distribution : Throughout India.

Elsewhere : Africa, Afghanistan, Bangladesh, China, Egipt, Hong-Kong, Japan, Kampuchea, Madagascar, Indonesia, Japan, Laos, Malaysia, Myanmar, Oman, Pakistan, Philippines, Sri Lanka, Syria, Tangania, Thailand, Taiwan, Vietnam, Zambia and Zimbabwe.

Genus ***Pseudagrion*** Selys

Key to the species of Pseudagrion Selys

1. Face frons and vertex bright redish orange or ochreous, thorax golden green on dorsum, azure blue on sides..... ..... *P. rubriceps rubriceps* Selys

Face frons, vertex and occiput blue or green marked with black 2

2. Thorax palest blue, three fine black line on mid dorsal carina and a thicker black humeral stripe present ..... *P. decorum* (Rambur)

- Thorax not palest blue, but azure blue on dorsum and sides three fine black line on mid dorsal carina lacking 3

3. Superior anal appendages with a long robust spine near base ..... *P. spencei* Fraser

Superior anal appendages without a long robust spine near base .... *P. laidlawi* Fraser

14. ***Pseudagrion decorum*** (Rambur)

1842. *Agrion decorum* Rambur, *Ins. Neurop.*, : 258.

1933. *Pseudagrion decorum* Fraser, *Fauna Brit. India, Odonata*, **1** : 286-289.

Material examined : 1♀, Jeolikot, district Nainital, 11.11.2000, coll. S. K. Mondal; 1♂, Chunoti, district Nainital, 13.11.2000, coll. S. K. Mondal and 1♀, Badrabad, district Hardwar, 15.11.2000, coll. B. C. Das.

Distribution : Widely distributed throughout continental India.

Elsewhere : Bengladesh, Nepal, Myanmar, Pakistan and Sri Lanka.

15. ***Pseudagrion laidlawi*** Fraser

1922. *Pseudagrion laidlawi* Fraser, *Mem. Dept. Argic. India (Ent.)*, **7** (7) : 48-50.

1933. *Pseudagrion laidlawi* Fraser, *Fauna Brit. India, Odonata*, **1** : 294-296.

Distribution : India (Uttarakhand).

Elsewhere : Pakistan (Lower Sind and Karachi).

16. ***Pseudagrion rubriceps rubriceps*** Selys

1876. *Pseudagrion rubriceps* Selys, *Bull. Acad. Belg.*, (2) **42** : 510.

1933. *Pseudagrion rubriceps* Fraser, *Fauna Brit. India, Odonata*, **1** : 296-299.

1991. *Pseudagrion rubriceps rubriceps* Tsuda, *A distributional list of world Odonata*, : 46.

Distribution : Throughout India.

Elsewhere : Bangladesh, Palon, Hong-Kong, Indo-China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand and Taiwan.

17. ***Pseudagrion spencei*** Fraser

1922. *Pseudagrion spencei* Fraser, *Mem. Dep. Agric. India ent. Ser.*, **7** (7) : 47-48.

1933. *Pseudagrion spencei*, Fraser, *Fauna Brit. India, Odonata*, **1** : 292-294.

Distribution : India (Assam, Bihar, Central India, Chandigarh, Meghalaya, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Hong-Kong, Nepal and Pakistan.

Genus ***Rhodischnura*** Laidlaw

18. ***Rhodischnura nursei*** (Morton)

1907. *Ischnura nursei* Morton, *Trans. Ent. Soc. Lond.*, : 306-307.

1933. *Rhodischnura nursei*, Fraser, *Fauna Brit. India, Odonata*, **1** : 367-371.

Material examined : 1♂, Pantnagar University Campus, district Nainital, 4.10.1974, coll. P. K. Maiti.

Distribution : India (Bihar, Gujarat, Madhya Pradesh, Rajasthan, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Pakistan.

Family PLATYCNEMIDIDAE

Key to the genera of Platycnemididae

1. Costal side of discoidal cell in forewing one fifth or shorter than the posterior 2

- Costal and posterior sides of fiscoidal cell equal or nearly so; second segment of antennae as long as the third .... *Copera* Kirby

2. Wings petiolated to the level of ac, ie., ab ends at the level of ac ..... *Coeliccia* Kirby

Wings petiolated short of ac, ie., ab ends some distance proximal to ac; only 3 cells between the discoidal cell and nervure descending from the subnode .... *Calicnemia* Strand

Genus ***Calicnemia*** Strand

Key to the species of Calicnemia Strand

1. Recurved terminal lobe of ligula ending in a pair of narrow, ribbon-like branches, frequently curved and embranching the stem of the organ to form curled filaments 2

- Recurved terminal lobe of ligula much broader in ventral view, either undivided, forming one shield or cup-shaped whole; its hind margin most shallowly emarginate, or distinctly bilobed and ending in a pair of broad, outwardly convex lamellae separated by a deep V or U shaped incision 3

2. Superior Anal appendages subequal in length to inferior pair, slightly longer than 10th abdominal segment ..... *C. eximia* (Selys)

- Superior Anal appendages distinctly shorter than inferior pair, ante-alar triangle deep black or at most with minute orangist central spot or point .... *C. carminea pyrrhosoma* Lieftinck

3. Body and legs of adult largely black, lacking any red colouring; large size species .... *C. pulverulan* Selys

- Body of adult not so dark; at least first two basal segments of abdomen with some bright yellow and or red colour marking; anal appendages black; small size species .... *C. mortoni* (Laidlaw)

19. ***Calicnemia carminea pyrrhosoma*** Lieftinck

1984. *Calicnemia carminea pyrrhosoma* Lieftinck, *Odonatologica*, **13** (3) : 363.

1991. *Calicnemia carminea pyrrhosoma*, Tsuda, *A distributional list of world Odonata*, : 51.

Distribution : India (Dehra Dun Uttarakhand).

20. ***Calicnemia eximia*** (Selys)

1936. *Calicnemia eximia* Selys, *Bull. Acad. Belg.*, (2) **16** : 160.

1984. *Calicnemia eximia*, Lieftinck, *Odonatologica*, **13** : 361.

Material examined : 1 ♀, Bhaniawala, district Tehri Garhwal, 19.10.2001, coll. S. K. Mondal.

Distribution : India (Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Afghanistan, Bangladesh, China, Nepal, Taiwan and Vietnam.

21. ***Calicnemia mortoni*** (Laidlaw)

1917. *Calicnemia mortoni* Laidlaw, *Rec. Indian Mus.*, **13** : 526-527.

1991. *Calicnemia mortoni*, Tsuda, *A distributional list of world Odonata*, : 51.

Distribution : India (Sikkim, West Bengal and Uttarakhand).

Elsewhere :Bhutan and Nepal.

22. ***Calicnemia pulverulance*** Selys

1886. *Calicnemia pulverulance* Selys, *Mem. Cour.*, **38** : 133.

1995. *Calicnemia pulverulance*, Prasad and Varshney, *Oriental Ins.*, **29** : 392.

Distribution : India (Meghalaya, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Bangladesh, Myanmar and Nepal.

Genus ***Coeliccia*** Kirby

23. ***Coeliccia renifera*** (Selys)

1836. *Trichocnemis renifera* Selys, *Mem. Cour.*, **38** : 119.

1933. *Coeliccia renifera*, Fraser, *Fauna Brit. India, Odonata*, **1** : 156-159.

Distribution : India (Assam, Himachal Pradesh, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Nepal.

Genus ***Copera*** Kirby

Key to the species of Copera Kirby

1. The two hind pairs of tibiae white and widely dilated; hind femora extending nearly to end of segment 2; 2nd abdominal segment wholly black on dorsum; inferior anal appendages strongly arched, black at apices .... *Copera ciliata* (Selys)

   The two hind pairs of tibiae yellow, reddish or brownish; only moderately dilated or not at all 2

2. Superior anal appendages only $^1/_4$ the length of inferiors; female with posterior lobe of prothorax without spines .... *C. marginipes* (Ramb.)

Superior anal appendages at least half the length of inferiors; posterior lobe of prothorax of female with a pair of divergent slender forwardly directed spines .... *C. vittata serapica* (Selys)

24. *Copera ciliata* (Selys)

1863. *Psiocnemis annulata* Selys, *Bull. Acad. Belg.*, (2) **16** : 172-173.

1933. *Copera annulata*, Fraser, *Fauna Brit. India, Odonata*, **1** : 203-206.

1991. *Copera ciliata*, Tsuda, *A distributional list of world Odonata*, : 52.

Distribution : India (Assam, Himachal Pradesh, Manipur, Meghalaya, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, China, Japan, Hong-Kong, Indo-China, Indonesia, Malaysia, Myanmar, Thailand, Taiwan and Vietnam.

25. *Copera marginipes* (Rambur)

1842. *Platycnemis marginipes* Rambur, *Ins. Neurop.*, : 240.

1933. *Copera marginipes*, Fraser, *Fauna Brit. India, Odonata*, **1** : 192-197.

Distribution : India (Assam, Bihar, Chandigarh, Manipur, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, South Adnaman, Is., West Bengal, Western Ghats and Western Himalaya).

Elsewhere : China, Hong-Kong, Malacca, Malaysia, Myanmar, Nepal, Thailand, and Taiwan.

26. *Copera vittata serapica* (Selys)

1863. *Psilocnemis vittata* Selys, *Bull. Acad. Belg.*, (2) **16** : 170.

1933. *Copera vittata*, Fraser, *Fauna Brit. India, Odonata*, **1** : 198-201.

1991. *Copera vittata serapica*, Tsuda, *A. distributional list of world Odonata*, : 53.

Distribution : India (Arunachal Pradesh, Assam, Meghalaya, Nicobar Is., Uttarakhand and West Bengal).

Elsewhere : Myanmar.

Family PLATYSTICTIDAE

Key to the genera of Platystictidae

1. The nervure ab entirely absent .... *Protosticta* Selys

- The nervure ab present ....*Drepanosticta* Laidlaw

Genus *Drepanosticta* Laidlaw

27. *Drepanosticta carmichaeli* (Laidlaw)

1915. *Protosticta carmichaeli* Laidlaw, *Rec. Indian Mus.*, **11** : 341-342.

1981. *Drepanosticta carmichaeli*, Kumar and Prasad, *Rec. zool. Surv. India., Occ. Pap.*, No. **20** : 32.

Distribution : India (Sikkim, Uttarakhand and West Bengal).

Elsewhere : Nepal.

Genus *Protosticta* Selys

28. *Protosticta davenporti* Fraser

1931. *Protosticta davenporti* Fraser, *J. Bombay nat. Hist. Soc.*, **35** : 70-71.

1933. *Protosticta davenporti*, Fraser, *Fauna Brit. India, Odonata*, **1** : 105-107.

Distribution : India (Uttarakhand and Western Ghats).

Family PROTONEURIDAE

Key to the genera of Protoneuridae

1. ab present and complete; Cuii extending distally to beyond the middle of wing .... *Elattoneura* Cowley

- ab present but incomplete and vestigial; cuii extending to middle of wing .... *Prodasineura* Cowley

Genus *Elattoneura* Cowley

29. *Elattoneura campioni campioni* (Fraser)

1922. *Disparoneura campioni* Fraser, *Mem. Dept. Agric. India (Ent.)* **7** : 43-44.

1991. *Elattoneura campioni campioni*, Tsuda, *A distributional list of world Odonata*, : 9.

Distribution : India (Assam and Uttarakhand).

Elsewhere : Myanmar.

Genus *Prodasineura* Cowley

30. *Prodasineura autumanalis* (Fraser)

1922. *Caconeura autumanatis* Fraser, *Mem. Dept. Agric. India (Ent.)* **7** : 43.

1995. *Prodasineura autumanalis*, Prasad and Vershney, *Orientlal Ins.*, **29** : 394.

Distribution : India (Haryana, N. E. India and Western Himalaya).

Elsewhere : China, Hong-Kong, Indonesia, Laos, Malaysia West, Myanmar, Nepal, Thailand and Vietnam.

Superfamily LESTOIDEA
Family LESTIDAE
Genus ***Lestes*** Leach

Key to the genera of Lestidae

1. Discoidal cell of hindwing longer and much narrower than of forewing; a almost at the level of the distal antenodal nervure .... *Indolestes* Fraser
- Discoidal cell of hindwing shaped similar to that of forewing ..... *Lestes* Leach

Genus ***Indolestes*** Fraser

31. ***Indolestes cyaneus*** (Selys)

1862. *Lestes cyanea* Selys, *Bull. Acad. Belg.*, (2) **13** : 335.

1933. *Ceylonolestes cyanea*, Fraser, *Fauna Brit. India, Odonata*, **1** : 74-77.

1991. *Indolestes cyaneus*, Tsuda, *A distributional list of world Odonata*, : 60.

Distribution : India (Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Uttarakhand and West Bengal).

Elsewhere : Bhutan, Nepal and Taiwan.

Genus ***Lestes*** Leach

Key to the species of Lestes Leach

1. Thorax without metallic markings 2
- Thorax with green metallic antehumeral stripe 3
2. Vertex of head pale brown .... *L. umbrinus* Selys
- Vertex of head mat black .... *L. thoracicus* Laidlaw
3. Thorax with a uniform narrow antehumeral stripe on each side, vertex of head pale brown ..... *L. viridulus* Rambur
- Thorax with antehumeral stripes deeply scalloped or crenulate on the outer side; mesothorax without metallic or other markings .... *L. praemorsus decipiens* (Kirby)

32. ***Lestes praemorsus decipiens*** (Kirby)

1862. *Lestes praemorsus* Selys, *Bull. Acad. Belg.*, (2) **13** : 320.

1991. *Lestes praemorsus decipiens*, Tsuda, *A distributional list of world Odonata*, : 62.

Distribution : India (Andaman, Islands, West Bengal and Western Himalaya).

Elsewhere : China, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

33. ***Lestes thoracicus*** Laidlaw

1920. *Lestes thoracica* Laidlaw, *Rec. Indian Mus.*, **19** : 152.

1933. *Lestes thoracica*, Fraser, *Fauna Brit. India, Odonata*, **1** : 56-57.

1991. *Lestes thoracicus*, Tsuda, *A distributional list of world Odonata*, : 63.

Distribution : India (Bihar, Gujarat, Orissa, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Pakistan and Thailand.

34. ***Lestes umbrinus*** Selys

1891. *Lestes umbrina* Selys, *Ann. Mus. Civ. Genova*, (2) **10** : 497-498.

1933. *Lestes umbrina*, Fraser, *Fauna Brit. India, Odonata*, **1** : 53-55.

1991. *Lestes umbrinus*, Tsuda, *A distributional list of world Odonata*, : 63.

Material examined : 1♂, Kherna, district Nainital, 12.11.2002, coll. S. K. Mondal.

Distribution : India (Andhra Pradesh, Bihar, Chandigarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh, China, Myanmar, Iran and Yunan.

35. ***Lestes viridulus*** Rambur

1842. *Lestes viridula* Rambur, *Ins. Neurop.*, : 252-253.

1933. *Lestes viridula*, Fraser, *Fauna Brit. India, Odonata*, **1** : 45-46.

1991. *Lestes viridulus*, Tsuda, *A distributional list of world Odonata*, : 64.

Distribution : Throughout India.

Elsewhere : Myanmar and Thailand.

Family SYNLESTIDAE
Genus ***Megalestes*** Selys
36. ***Megalestes major*** Selys

1862. *Megalestes major* Selys, *Bull. Acad. Belg.*, (2) **13** : 293.

1933. *Megalestes major*, Fraser, *Fauna Brit. India, Odonata*, **1** : 21-23.

Distribution : India (Arunachal Pradesh, Himachal Pradesh, Meghalaya, Mizoram, Punjab, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Bhutan, Malaysia, Myanmar, Nepal, Tonkin and Thailand.

Superfamily CALOPTERYGOIDEA
Key to the families of Calopterygoidea

1. The primary antenodals easily identified from the secondaries; base of discoidal cell connected to radius by the arculus, no basal antenodals present ..... CHLOROCYPHIDAE
- The primary antenodals in distinguishable from the secondaries; base of discoidal cell connected to radius by the arculus 2
2. The vein Rii + Riii not fused with Ri shortly after its origin; discoidal cell short, entire or traversed by very few veins; 1st lateral thoracic suture incomplete ..... EPALLAGIDAE
- The vein Rii + Riii fused with Ri near its origin; discoidal cell longer and traversed by many veins; 1st lateral thoracic suture complete ..... CALOPTERYGIDAE

Family CALOPTERYGIDAE
Genus ***Neurobasis*** Selys
37. ***Neurobasis chinensis chinensis*** (Linn.)

1758. *Libellula chinensis* Linnaeus, *Syst. nat.*, **1** : 545.

1995. *Neurobasis chinensis chinensis*, Prasad and Varshney, *Oriental Ins.*, **29** : 397.

Material examined : 4♂♂, 4♀♀, Hawalbag, district Almora, 8.10.2001, coll. P. Mukhopadhayay.

Distribution : India (Arunachal Pradesh, Assam, Bihar, Manipur, Mizoram, Nagaland, Maharashtra, Orissa, West Bengal, Western Ghats and Western Himalaya).

Elsewhere : Bangladesh, China, Celebes, Hong-Kong, Indo-China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam and Yunnan.

Family CHLOROCYPHIDAE
Key to the genera of Chlorocyphidae

1. Sectors of are, separated at origin; pterostigma present in all forewings of both sexes; wing (at least hindwings, except in *R. immaculata* coloured in male ..... ***Rhinocypha*** Ramb
- Sectors of are arising from a common point; forewing of male without a pterostigma ..... *Libellago* Selys

Genus ***Libellago*** Selys
38. ***Libellago lineata lineata*** (Burmeister)

1839. *Calopterya lineata* Burmeister, *Handb. Ent.*, **2** : 826.

1934. *Libellago lineata lineata*, Fraser, *Fauna Brit. India Odonata*, **2** : 60-63.

Distribution : India (Andaman Islands, Arunachal Pradesh, Assam, Manipur, Maghalaya, North India, Tripura, Uttarakhand and West Bengal).

Elsewhere : China, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Taiwan, Thailand and Vietnam.

Genus ***Rhinocypha*** Rambur
Key to the species of Rhinocypha Rambur

1. Wings uncoloured in both sexes ..... *R. immaculata* Selys

   Wings coloured at least partly in male 2
2. Dorsal mesothoracic triangle extending as far as root of wings 3
- Dorsal mesothoracic triangle either absent, uncoloured, or extending not more than half-way upto root of wings 5
3. Hindwings of male with apical, medial and nodal opaque bands separated ..... *R. trifasciata* (Selys)

   Hindwings of male opaque with vitreous spots 4

4. Apical vitreous spot large, lying almost entirely proximal to line of pterostigma; mid row of vitreous spots more or less confluent; large species; hindwing 27-28 mm .... *R. spuria* (Selys)

- Apical vitreous spot moderately large, lying partly proximal to line of pterostigma; mod-row of vitreous spots always well separated; costal spot extending much nearer to node than middle spot, small species, hindwing 20 mm ..... *R. quadrimaculata* Selys

5. Hindwing with a large subquadrate violet green vitreous spot at its centre, very large species ..... *R. unimaculata* Selys

- Only apical third of hindwing opaque, a single row of vitreous spots, small species..... ..... *R. biforata biforata* Selys

39. ***Rhinocypha biforata biforata*** Selys

1922. *Rhinocypha biforata beesoni* Fraser, *Mem. Dept. Agric. India (Ent.)*, **7** : 61-62.

1991. *Rhinocypha biforata biforata*, Tsuda, *A distributional list of world Odonata*, : 76.

Distribution : India (Uttarakhand).

Elsewhere : China, Indonesia, Laos, Malaysia, Nepal and Thailand.

40. ***Rhinocypha immaculata*** Selys

1879. *Rhinocypha immaculata* Selys, *Bull. Acad. Belg.* (2) **42** : 385.

1972. *Rhinocypha immaculata*, Sahni, *Bull. Ent.*, **12** (2) : 681.

Distribution : India (Arunachal Pradesh, Assam, Manipur, Meghalaya and Uttarakhand).

Elsewhere : Bangladesh.

41. ***Rhinocypha quadrimaculata*** Selys

1853. *Rhinocypha quadrimaculata* Selys, *Syn. Cat.*, : 60.

1934. *Rhinocypha quadrimaculata*, Fraser, *Fauna Brit. India, Odonata*, **2** : 14-17.

Material examined : 1♂, Sahashradhara, district Dehra Dun, 25.10.2000, coll. P. Mukhopadhayay; 2♂♂, Sahashradhara, district Dehra Dun, 6.11.2000, coll. B.C. Das; 9♂♂, Almora district Almora, 2.10.2001, coll. A. Bal; 2♂♂, Kathi, district Almora, 4.10.2001, coll. A. Bal; 2♂♂, 1♀, Hawalbag, district Almora, 8.10.2001, coll. P. Mukhopadhayay and 1♀ Kausani, district Bageshwar, 18.10.2001, coll. R.C. Basu.

Distribution : India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Bangladesh, Myanmar, Nepal, Tennaserim and Thailand.

42. ***Rhinocypha spuria*** Selys

1879. *Rhinocypha spuria* Selys, *Bull. Acad. Belg.*, (2)**47** : 388.

1934. *Rhinocypha spuria*, Fraser, *Fauna Brit. India, Odonata*, **2** : 12-14.

Distribution : India (Assam, Meghalaya, Mizoram, Nagaland and Uttarakhand).

Elsewhere : Myanmar.

43. ***Rhinocypha trifasciata*** Selys

1853. *Rhinocypha trifasciata* Selys, *Bull. Acad. Belg.*, **20** (Annexe) *Syn. Calopt.*, : 61.

1934. *Rhinocypha trifasciata*, Fraser, *Fauna Brit. India, Odonata*, **2** : 31-33.

Material examined : 1♂, Manan (Kausani), district Bageshwar, 2.10.2001, coll. A. Bal; 1♂, Kathi (Kausani), district Bageshwar, 4.10.2001, coll. A. Bal; 3♂♂, 1♀, Kausani district Bageshwar, 6.10.2001, coll. P. Mukhopadhyay; 1♀, Kausani district Bageshwar, 6.10.2001, coll. R.C. Basu and 1♂, Basu and 1♂, Hawalbagh, district Almora, 8.10.2001, coll. P. Mukhopadhayay.

Distribution : India (Assam, Chhatishgarh, West Bengal and Western Himalaya).

Elsewhere : Nepal.

44. ***Rhinocypha unimaculata*** Selys

1853. *Rhinocypha unimaculata* Selys, *Bull. Acad. Belg.*, **20** (Annexe) *Syn. Calopt.*, : 61.

1934. *Rhinocypha unimaculata*, Fraser, *Fauna Brit. India, Odonata*, **2** : 27-29.

Distribution : India (Chandigarh, Himachal Pradesh, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Nepal.

Family EUPHAEIDAE

Key to the genera of Euphacidae

1. R_{2+3} fused with R_1 near its origin .... *Bayadera* Selys

   R_{2+3} not fused with R_1 near its origin..... ..... *Anisopleura* Selys

Genus ***Anisopleura*** Selys

Key to the species of Anisopleura Selys

1. Several cubital nervures present, superior anal appendages without spine ..*A comes* Hagen

Usually only one cubital nervure in all wings; superior anal appendages with short spine at base.....*A. lestoides* Selys

45. ***Anisopleura comes*** Hagen

1880. *Anisopleura comes* Selys, *C. R. Soc. Ent. Belg.*, **23** : 43.

1934. *Anisopleura comes*, Fraser, *Fauna Brit. India, Odonata*, **2** : 87-89.

Distribution : India (Assam, Mizoram, Nagaland, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Bangladesh, China and Nepal.

46. ***Anisopleura lestoides*** Selys

1853. *Anisopleura lestoides* Selys, *Syn. Cal.*, : 48.

1995. *Anisopleura lestoides*, Prasad and Varshney, *Oriental Ins.*, **29** : 398.

Material examined : 1 ♀, Manan, district Bageshwar, 2.10.2001, coll. A. Bal.

Distribution : India (Assam, Sikkim, Uttarakhand and West Bengal) Nepal and Vietnam.

Genus ***Bayadera*** Selys

47. ***Bayadera indica*** (Selys)

1853. *Epallage indica* Selys, *Bull. Acad. Belg.*, **20** (Annex) *Syn. Calopt.*, : 49.

1934. *Bayadera indica*, Fraser, *Fauna Brit. India, Odonata*, **2** : 79-81.

Distribution : India (Arunachal Pradesh, Maghalaya, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Bangladesh, China and Nepal.

SUMMARY

Suborder Zygoptera (Odonata) fauna of Uttarakhand State has been studied and a total of 47 species/subspecies belonging to 24 genera and 9 families are recorded from the State. Of these, *Lestes umbrinus* Selys is recorded for the first time from Uttarakhand State. Two species/ subspecies *viz., Agriocnemis corbeti* Kumar and Prasad and *Calicnemia carminea pyrrhosoma* Lieftinck are endemic to the State. *Rhinocypha biforata biforata* Selys is so far known only from the Uttarakhand.

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REFERENCES

Fraser, E.C. 1920 Notes on Indian dragonflies. *Rec. Indian Mus.*, **19** : 31-33.

Fraser, F.C. 1921. A list of dragonflies recorded from Mahabaleshwar. *J. Bombay nat. Hist. Soc.* **27** 540-544.

Fraser, F.C. 1924. A survey of the Odonata (Dragonfly) fauna of Western India with special remarks on the genera *Macromia* and *Idionyx* and description of thirty new species, with Appendices I & II. *Rec. Indian Mus.*, **26** : 423-522.

Fraser, F.C. 1933. *Fauna of British India including Ceyln and Burma, Odonata.* Vol. 1. pp. 1-423, Taylor & Francis Ltd., London.

Fraser, F.C. 1934. *Fauna of British India including Ceylon and Burma, Odonata.* Vol. 2. pp. 1-398, Taylor & Francis Ltd., London.

Fraser, F.C. 1936. *Fauna of British India including Ceylon and Burma, Odonata.* Vol. 3. pp. 1-461, Taylor & Francis Ltd., London.

Kulkarni, P.P. and Prasad, M. 2002. Insecta : Odonata. In : *Fauna of Ujani, Wetland Ecosystem Series*, Zool. Surv. India, No. **3** : 91-104.

Laidlaw, F.F. 1917. A list of the dragonflies recorded from the Indian Empire with special reference to the collection of the Indian museum. Part II. The family Agrionidae. *Rec. Indian Mus.*, **13** : 321-348.

Mitra, T.R. 1988. Note on the Odonata fauna of Central India. *Rec. zool. Surv. India*, **83** : 69-81.

Mitra, T.R. 2002. Geographical distribution of Odonata (Insecta) of Eastern India. *Memoirs of the Zoological Survey of India*, **19**(1) : 1-208.

Prasad, M. 1998. Odonata. In : *Faunal Diversity in India*, (eds. Alfred, J.R.B., Das, A.K. and Sanyal, A.K.), *Zool. Surv. India*, pp. 171-178.

Prasad, M. and Varshney, R.K. 1995. A check-list of the Odonata of India, including data on larval studies. *Oriental Insects*, **29** : 385-428.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 29-52.

ODONATA : ANISOPTERA

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INTRODUCTION

As we known that odonata (damselfly and dragonfly) are one of the most common and beautiful coloured insects. Odonata fly swiftly around waterbodies, whether permanent or temporary. They are cornivorous in habit and help in controlling noxious insects of aquatic and aerial habitat. Odonata are found almost all over the world in varied ecosystems, extending from the sea level to over 3,600 mtrs. altitude and from brackish marshy areas to desert lands.

Uttarakhand is the terrian of western Himalaya. It is separated from Uttar pradesh and born a new state with its Headquarters at Dehra Dun. Uttarakhand lies between 28°.48' to 31°.30' north longitude and 77°.30' to 81°.06' east latitude (Approx.). It has an area of 72,000 Sq. Km. and constitute 17.04% of Himalayan domain. Uttarakhand is bounded by Himachal Pradesh in north west, China in north, Haryana in West, Nepal in east and Uttar Pradesh in the south. Uttarakhand State is divided into two major hill ranges i.e., Garhwal and Kumaon. Garhwal hills comprises of 7 districts *viz.*, Dehra Dun, Gopeshwar (Chamoli), Haridwar, Pauri, Rudraprayag, Tehri and Uttar Kashi. Kumaon Hills also comprises of 6 districts *viz.*, Almora, Bageshwar, Champawat, Nainital, Pithoragarh and Udhamsingh Nagar.

Physically the Himalayan range is of intricate nature and diverse character and in some places highly deformed or in the form of a flat alluvial valley. Generally it is rugged and deeply dissected by rivers and eroded by glaciers exposing all kinds of rocks. This State is bounded by splendid combination of both fauna and flora. The arverage temperature varies during summer from 45°C to 11°C and in winter from 32°C to 2°C. At higher elevation it remains cold throughout the year. Rainfall is related to the monsoon rainfall of India and is on the average about 2,000 mm/annum in most of the Uttarakhand.

Uttarakhand State is the undisputed paradise for both damsel and dragonflies, has already been taxonomically and bioecologically invaded by several eminent Odonatologists *viz.*, Fraser (1933, 1934 and 1936), Bhasin (1953), Singh (1955 and 1963), Singh and Baijal (1954), Singh *et. al.*, (1995), Asahina (1960, 1962 and 1981), Sahni (1964a, 1964b, 1965a, 1965b, 1970, 1972a and 1972b), Kiauta (1972), Atkinson (1974), Tyagi (1982 and 1983), Tyagi *et. al.*, (1986), Kumar (1984 and 1995), Kumar and Prasad (1981), Kumar and Khanna (1983), Kumar and Mitra (1998), Cafri *et. al.*, (1983), Lieftinck (1984), Prasad (1988 and 2002), Prasad and Singh (1994), Prasad and Varshney (1995), Hamalainen (1989a and 1989b), Mitra, T. R. (1995) and Mitra, A. 1999 for more than three decades. Consequent to these study so far 71 species and subspecies are reported, alongwith some interesting informations.

Recently Zoological Survey of India has undertaken a project to study the fauna of the State. In this connection reassesment of fauna of the State is being made. In this study odonata material brought by various parties of Zoological Survey of India covering various districts of the Uttarakhand are studied. Materials present in the National Zoological Survey of India were also studied and included in the present study.

In the light of the present study, the Anisoptera (Dragonflies) fauna of Uttarakhand State comprises of 75 species/subspecies under 40 genera and 5 families. Of these 4 species *viz.*, *Anotogaster nipalensis* Selys, *Cordulegaster parvistigma* (Selys), *Hemicordulia asiatica* Selys and *Sympetrum fonscolombi* (selys) are recorded for the first time from Uttarakhand.

In case of species and subspecies geographical distribution have been cited with authorities i.e.,

Fraser (1933, 1934 and 1936), Davies and Tobin (1984 and 1985), Tsuda (1991 and 2000) and Prasad and Varshney (1995). In case of distribution it is divided into India and outside India. Davies and Tobin (1984 and 1985) and Tsuda (1991 and 2000) has reported approx. 6,000 species/subspecies of Odonata belonging to 630 genera under 28 families from all over the world. Out of these approx. 500 species and subspecies belonging to 139 genera under 17 families are known from India. In Uttarakhand State approx. 120 species/subspecies of Odonata are known so far. Out of these suborder Anisoptera component of Uttarakhand comprises of 75 species/ subspecies under 40 genera and 5 families. This is 1/1.62 of known Odonates of Uttarakhand State. Reported 5 families of anisopterans are Gomphidae, Aeshnidae, Cordulegasteridae, Corduliidae and Libellulidae. Last family Libellulidae is having largest species component and represented by 42 species/subspecies from Uttarakhand.

CLASSIFIED LIST

A comprehensive list of the Odonates known from Uttarakhand is given below, arranged systematically.

Order ODONATA
Suborder ANISOPTERA
Superfamily AESHNOIDEA
Family GOMHIDAE
Genus ***Anisogomphus*** Selys

1. *Anisogomphus bivittatus* (Selys)
2. *Anisogomphus caudalis* Fraser
3. *Anisogomphus occipitalis* (Selys)

Genus ***Anormogomphus*** Selys

4. *Anormogomphus heteropterus* Selys
5. *Anormogomphus kiritschenkoi* Bartenef

Genus ***Burmagomphus*** Williamson

6. *Burmagomphus hasimaricus* Fraser
7. *Burmagomphus sivalikensis* Laidlaw

Genus ***Davidius*** Selys

8. *Davidius aberrans aberrans* (Selys)
9. *Davidius kumaonensis* Fraser

Genus ***Ictinogomphus*** Cowley

10. *Ictinogomphus rapax* (Rambur)

Genus ***Nepogomphus*** (Selys)

11. *Nepogomphus modestus* (Selys)

Genus ***Onychogomphus*** Selys

12. *Onychogomphus biforceps* (Selys)
13. *Onychogomphus bistrigatus* (Hagen in Selys)
14. *Onychogomphus duaricus* Fraser
15. *Onychogomphus risi* (Fraser)

Genus ***Paragomphus*** Cowly

16. *Paragomphus lineatus* (Selys)

Family AESHNIDAE
Genus ***Anax*** Leach

17. *Anax guttatus* (Burmeister)
18. *Anax immaculifrons* Rambur
19. *Anax imperator imperator* Leach
20. *Anax nigrofasciatus nigrolineatus* Fraser
21. *Anax parthenope parthenope* (Selys)

Genus ***Gynacantha*** Rambur

22. *Gynacantha khasiaca* Maclachlan

Genus ***Gynacanthaeschna*** Fraser

23. *Gynacanthaeschna sikkima* (Karsch)

Genus ***Hemianax*** Selys

24. *Hemianax ephippiger* (Burmeister)

Superfamily ORDULEGASTEROIDEA
Family CORDULEGASTERIDAE
Genus ***Anotogaster*** Selys

25. *Anotogaster basalis basalis* Selys
26. *Anotogaster nipalensis* Selys

Genus ***Chlorogomphus*** Selys

27. *Chlorogomphus atkinsoni* (Selys)

Genus ***Cordulegaster*** Leach

28. *Cordulegaster brevistigma brevistigma* (Selys)
29. *Cordulegaster brevistigma folia* Fraser
30. *Cordulegaster pervistigma* (Selys)

Superfamily LIBELLULOIDEA
Family CORDULIIDAE
Genus ***Epopthalmia*** Burmeister

31. *Epopthalmis vittata vittata* Burmeister

Genus ***Hemicordulia*** Selys

32. *Hemicordulia asiatica* Selys

Genus ***Macromia*** Rambur

33. *Macromia moorei* Selys

Family LEBELLULIDAE

Genus ***Acisoma*** Rambur

34. *Acosoma panorpoides panorpoides* Rambur

Genus ***Brachidiplax*** Brauer

35. *Brachidiplax sobrina* (Rambur)

Genus ***Brachythemis*** Brauer

36. *Brachythemis contaminata* (Fabricius)

Genus ***Bradinopyga*** Kirby

37. *Bradinopyga geminata* (Rambur)

Genus ***Cratilla*** Kirby

38. *Cratilla lineata calverti* Foerster

Genus ***Crocothemis*** Brauer

39. *Crocothemis erythreae erythreae* (Brulle)
40. *Crocothemis sevrilia servilia* (Drury)

Genus ***Diplacodes*** Kirby

41. *Diplacodes lefebvrei* (Rambur)
42. *Diplacodes nebulosa* (Fabricius)
43. *Diplacodes trivialis* (Rambur)

Genus ***Hylaeothemis*** Ris.

44. *Hylaeothemis gardeneri* Fraser

Genus ***Neurothemis*** Brauer

45. *Neurothemis falvia* (Drury)
46. *Neurothemis intermedia intermedia* (Rambur)
47. *Neurothemis tullia tullia* (Drury)

Genus ***Orthetrum*** Newman

48. *Orthetrum anceps* (Schneider)
49. *Orthetrum brunneum brunneum* (Fonscolombe)
50. *Orthetrum glaucum* (Brauer)
51. *Orthetrum japonicum internum* Maclachlan
52. *Orthetrum luzonicum* (Brauer)
53. *Orthetrum pruinosum neglectum* (Rambur)
54. *Orthetrum sabina sabina* (Drury)
55. *Orthetrum taeniolatum* (schneider)
56. *Orthetrum triangulare triangulare* (Selys)

Genus ***Palpopleura*** Rambur

57. *Palpopleura sexmaculata sexmaculata* (Fabr.)

Genus ***Pantala*** Hagen

58. *Pantala flavescens* (Fabricius)

Genus ***Potamarcha*** Karsch

59. *Potamarcha congener* (Rambur)

Genus ***Rhyothemis*** Hagen

60. *Rhyothemis variegata variegata* (Linn.)

Genus ***Sympetrum*** Newman

61. *Sympetrum commixtum* (Selys)
62. *Sympetrum haematoneura* Fraser
63. *Sympetrum fonscolombi* (Selys)
64. *Sympetrum hypomelas* (Selys)

Genus ***Tetrathemis*** Brauer

65. *Tetrathemis platyptera* Selys

Genus ***Tholymis*** Hagen

66. *Tholymis tillarga* (Fabricius)

Genus ***Tramea*** Hagen

67. *Tramea basilaris burmeisteri* Kirby
68. *Tramea virginia* (Rambur)

Genus ***Trithemis*** Brauer

69. *Trithemis aurora* (Burmeister)
70. *Trithemis festiva* (Rambur)
71. *Trithemis kirbyi kirbyi* Selys
72. *Trithemis pallidinervis* (Kirby)

Genus ***Urothemis*** Brauer

73. *Urothemis signata signata* (Rambur)

Genus ***Zygonyx*** Hagen

74. *Zygonyx torridus isis* Fraser

Genus ***Zyxomma*** Rambur

75. *Zyxomma petiolatum* Rambur

SYSTEMATIC ACCOUNT

Odonata comprises of three suborders, *viz.*, Zygoptera, Anisozygoptera and Anisoptera. Out of these suborder Anizozygoptera is not found in Uttarakhand State.

Key to the suborders of ODONATA

1. Distance between inner margins of eyes greater than their own diameters; in males inferior anal appendages paired and placed below the anal opening; discoidal cell in both

wings simple, entire or traversed by nervures, closely similar in both pairs of wings .... ZYGOPTERA

Distance between inner margins of eyes always less than their own diameters; in males inferior anal appendages single and placed above anal opening; discoidal cell is subdivided into a triangle plus supratriangle ..... ANISOPTERA

Suborder ANISOPTERA

Key to the superfamilies of the suborder ANISOPTERA

1. Eyes meeting only at a point; discoidal cell of fore and hind wings equal in size and shape; or if dissimilar, then the median space traversed by one or more veins .... CORDULEGASTEROIDEA

- Eyes widely separated or more or less broadly confluent on vertex 2

2. Discoidal cells approximately of the same size and shape in fore and hind wings and situated equally distant from the arc; costal and subcostal antenodal nervures not coinciding with the two robust primary antenodals present; middle lobe of labium large and fissured ..... AESHNOIDEA

- Discoidal cells differing in size and shape in fore and hind wings; that of fore wing situated far distal of the arc; middle lobe of labium very small, not fissured, broadly overlapped by the lateral lobes; costal and subcostal antenodal nervures coinciding, the robust primary antenodals absent .... LIBELLULOIDEA

Superfamily AESHNOIDEA

Key to the family of Superfamily AESHNOIDEA

1. Eyes broadly confluent above .... AESHNIDAE

2. Eyes separated, ovipositor absent .... GOMPHIDAE

Family GOMPHIDAE

Key to the genera of family Gomphidae

1. Discoidal cell, hypertrigone and subtrigone of forewing traversed or reticulated, superior anal appendages acute at apex .... ***Ictinogomphus*** Cowley

- Discoidal cell, hypertrigone and subtrigone of forewing always entire 2

2. Disocidal cell of hindwing traversed by a nervure running from costal to distal side; 1A and cuii in hindwing widely divergent at the border of wing ..... ***Davidius*** Selys

Discoidal cell in hindwing never traversed; 1A and cuii rarely, or but slightly divergent at margin of hindwing 3

3. Hindwing not excavated at base with tornus rounded in the male .... ***Anormogomphus*** Selys

- Hindwing more or less excavated at base; with tornus more or less angulated 4

4. Anal loop absent; first postnodal cell not extending proximal to base of subtrigone in hindwing, anal triangle nearly always 3 celled 5

- Anal loop present, although often rudinentary; first postnodal cell extending more or less proximal to base of trigone in hindwing; anal triangle nearly always 4 celled 7

5. Superior anal appendages and branches of interior appendages of equal length and equal divericate; only two rows of cells between 1A and border of forewing .... ***Burmagomphus*** Williamson

- Superior anal appendages variable, usually much longer than branches of appendages; or, if not, then furnished with a ventral process or spine beneath 6

6. Superior anal appendages as long as branches of inferior appendages and furnished beneath with a black robust spine or process .... ***Anisogomphus*** Selys

Superior anal appendages longer than branches of inferior appendages; simple and without spines or processes beneath; segments 8 and 9 with lateral foliated dilations ..... ***Paragomphus*** Cowley

7. Anal triangle 3 celled; only two rows of cells between 1A and margin of forewing; lobe of penis swollen and markedly vesiculate .... ***Nepogomphus*** Fraser

- Anal triangle 4 celled; three or more rows of cells between 1A and margin of forewing; lobe of penis not vesiculate; Superior anal appendages enormously curled only at apices ..... ***Onychogomphus*** Selys

Genus ***Anisogomphus*** Selys
Key to the species of genus *Anisogomphus* Selys

1. An incomplete basal antenodal nervure always present; rarely more than a single cubital nervure present in the forewings, A sinuous humeral stripe present not concluent above with the antehumeral stripe..... .....*A. bivittatus* (Selys)
- An incomplete basal antenodal nervure very rarely present; nearly always two cubital nervures in forewing 2
2. Only an upper humeral spot present; antehumeral stripe confluent with the middles of each half of the mesothoracic collar, so as to form inverted T-shaped figures..... .....*A. occipitalis* (Selys)
- An upper humeral spot and a stripe present, antehumeral stripes confluent with the outer ends of the mesothoracic collar, so as to form L-shaped figures ....*A. caudalis* Fraser

1. ***Anisogomphus bivittatus*** (Selys)

1854. *Gomphus bivittatus* Selys, *Bull. Acad. Belg.*, **21** : 46.

1934. *Anisogomphus bivittatus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 192-194.

Distribution : India (Eastern and Western Himalaya).

Elsewhere : Nepal.

Remarks : It can easily be separated from other species of the genus by the presence of alternating three black bands and three bright yellow once on the face; dilated terminal segments and incomplete antenodal nervures in both pairs of wings.

2. ***Anisogomphus caudalis*** Fraser

1926. *Anisogomphus caudalis* Fraser, *J. Bombay nat. Hist. Soc.*, **31** : 423-424.

1934. *Anisogomphus caudalis*, Fraser, *Fauna Brit. India, Odonata*, **2** : 196-197.

Distribution : India (Meghalays and Uttarakhand) and Myanmar.

Remarks : This species is included here on the basis of literature review.

3. ***Anisogomphus occipitalis*** (Selys)

1854. *Gomphus occipitalis* Selys, *Bull. Acad, Belg.*, **21** : 45.

1934. *Anisogomphus occipitalis*, Fraser, *Fauna Brit. India, Odonata*, **2** : 190-192.

Distribution : India (Assam, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Nepal.

Remarks : It is found between 600 to 1000 mtrs. Adults do not found near the larval habitats. It is found near hill streams in between May to October.

Genus ***Anormogomphus*** Selys
Key to the species of the genus *Anormogomphus* Selys

1. Head and thorax with pale brown markings *A. heteropterus* Selys

   Head and thorax without markings ....*A. kiritschenkoi* Bart.

4. ***Anormogomphus heteropterus*** Selys

1854. *Anormogomphus heteropterus* Selys, *Bull. Acad, Belg.*, **21**(2) : 61.

1934. *Anormogomphus heteropterus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 174-176.

Distribution : India (Arunachal Pradesh, Bihar, Himachal Pradesh, Orissa, Punjab and Uttarakhand).

Elsewhere : Pakistan.

5. ***Anormogomphus kiritschenkoi*** Bartenef

1913. *Anormogomphus kiritschenkoi* Bartenef, *Revue Russe d'Ent.*, **31** : 179.

1934. *Anormogomphus kiritschenkoi*, Fraser, *Fauna Brit India, Odonata*, **2** : 176-177.

Distribution : India (Arunachal Pradesh, and Uttarakhand), Afganistan, Iran, Iraq, Pakistan and Persian Gulf.

Genus ***Burmagomphus*** Williamson

Key to the species of genus *Burmagomphus* Williamson

1. Only upper and lower halves antehumeral and humeral thoracic stripes respectively present, the two halves joined obliquely to form a sinuous stripe on each side of dorsum of thorax; middle lobe of labium black segment 5 without a yellow mid-dorsal stripe ..... *B. hasimaticus* Fraser

- Antenumeral and humeral stripes separated; humeral stripe complete; three lateral black stripe on thorax .... *B. sivalikensis* Laidlaw

6. *Burmagomphus hasimaricus* Fraser

1926. *Burmagomphus hasimaricus* Fraser, *J. Bombay nat. Hist. Soc.*, **31** : 411.

1934. *Burmagomphus hasimaricus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 216-217.

Distribution : India (Meghalaya, Uttarakhand and West Bengal).

Elsewhere : Nepal.

7. *Burmagomphus sivalikensis* Laidlaw

1922. *Burmagomphus sivalikensis* Laidlaw, *Rec. Indian Mus.*, **24** : 401-402.

1934. *Burmagomphus sivalikensis*, Fraser, *Fauna Brit. India, Odonata*, **2** : 217-219.

Distribution : India (Himachal Pradesh, Meghalaya, Uttarakhand and West Bengal).

Remarks : Specimens of this species occurs between May to october near small hill streams with steep gradient and rocky substratum.

Genus ***Davidius*** Selys

Key to the species of the genus *Davidius* Selys

1. Superior anal appendages simple and unbranch, labrum and face entirely yellow .....*D. a. aberrans* (Selys)

   Superior anal appendages branched; labrum black, face and frons glossy black .... *D. kumaonensis* Fraser

8. *Davidius aberrans aberrans* (Selys)

1873. *Hagujius aberrans* Selys, *Bull. Acad. Belg.*, (2)**36** : 506.

1934. *Davidius aberrans aberrans*, Fraser, *Fauna Brit. India, Odonata*, **2** : 165-167.

Distribution : India (Assam and Uttarakhand).

Elsewhere : Nepal.

9. *Davidius kumaonensis* Fraser

1926. *Davidius kumaonensis* Fraser, *J. Bombay nat. Hist. Soc.*, **36** : 170-171.

1934. *Davidius kumaonensis*, Fraser, *Fauna Brit. India, Odonata*, **2** : 171-172.

Material examined : 1♂, Naggoochotti, district Pauri Garhwal, 20.5.1958, coll. B. S. Lamba.

Distribution : India (Uttarakhand).

Genus ***Ictinogomphus*** Cowley

This genus is represented by a single species in Uttarakhand, therefore no key is provided.

10. *Ictinogomphus rapax* (Rambur)

1842. *Diastatomma rapax* Rambur, *Ins. Neurop.*, : 169.

1934. *Ictinus rapax*, Fraser, *Fauna Brit. India, Odonata*, **2** : 373-376.

1991. *Ictinogomphus rapax*, Tsuda, *A distributional list of World Odonata*, : 99.

Distribution : Throughout India

Elsewhere : Bangaladesh, China, Myanmar and Nepal.

Remarks : It is found during June to October near the bank of permanent or temporary water body. Emergence occurs between May to June.

Genus ***Nepogomphus*** Fraser

This genus is reporesented by a single species in Uttarakhand, hence no key is provided.

11. *Nepogomphus modestus* (Selys)

1878. *Onychogomphus modestus* Selys, *Bull. Acad. Belg.*, (2)**46** : 423.

1934. *Nepogomphus modestus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 285-286.

Material examined : 1♀, Katrauri, dist. Almora, 3.10.2001, coll. Animesh Bal and 1♂, Kotti, dist. Almora, 4.10.2001, coll. Animesh Bal.

Distribution : India (Bihar, Himachal Pradesh, Meghalaya, Nagaland, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Myanmar and Nepal.

Remarks : Adults are found near the hill streams during emergence period. Some times it could be observed petroling over hill streams in the forest.

Genus ***Onychogomphus*** Selys

Key to the species of the genus *Onychogomphus* Selys

1. Ground colour preponderatingly black; superior anal appendages enormous curled hooks, which enclose a broad cordate or oval space by meeting the similarly curled branches of inferior appendage, which slightly overlap the superiors 2
- Ground colour preponderatingly yellow; superior anal appendages much straighter and curled only at apices; branches of inferior appendage slightly shorter than superiors, between which they may project 3
2. Humeral stripe present and complete; abdominal segments 3 to 6 with yellow oval mid-dorsal spots ..... *O. biforceps* (Selys)
- Humeral stripe present or represented only by a tiny upper spot; superior and inferior anal appendages markedly curled, so as to enclose together a broad cordate space; superior humeral spot present ..... *O. risi* (Fraser)
3. Yellow humeral stripe present, but vestigial or interrupted, inferior anal appendages with distinct but obtuse upper basal spine ..... *O. duaricus* Fraser
- The humeral stripe present and complete; many of the transverse nervures proximal to node and on anterior part of wings bright yellow..... *O. bistrigatus* (Hagen in Selys)

12. ***Onychogomphus biforceps*** (Selys)

1878. *Onychogomphus biforceps* Selys, *Bull. Acad. Belg.*, (2)**46** : 420.

1890. *Lindenia biforceps*, Kirby, *Cat. Odon.*, : 60.

1934. *Lamelligomphus biforceps*, Fraser, *Fauna Brit. India, Odonata*, **2** : 271-272.

1995. *Onychogomphus biforceps*, Prasad and Varshney, *Oriental Ins.*, **29** : 401.

Distribution : India (Uttarakhand and West Bengal).

Elsewhere : Nepal, Myanmar and Vietnam.

Remarks : Adults are found hovering over vegetation away from the larval habitats. It can easily be seen during May to october.

13. ***Onychogomphus bistrigatus*** (Hagen in Selys)

1854. *Gomphus bistrigatus* Selys, *Bull. Acad. Belg.*, **21** : 46.

1934. *Onychogomphus bistrigatus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 247-249.

Material examined : 1♀, Garhwal ghat, dist. Chamoli, 20.8.2002, coll. S. K. Mandal; 1♀, August Muni, dist. Rudraprayag, 29.8.2002, coll. S. K. Mandal and 1♂ August Muni, dist. Rudra Prayag, 30.8.2002, coll. S. K. Mandal.

Distribution : India (Assam, North India and West Bengal).

Elsewhere : China, Nepal and Vietnam? (Tsuda, 1991).

14. ***Onychogomphus duaricus*** Fraser

1924. *Onychogomphus duaricus*, Fraser, *J. Bombay nat. Hist. Soc.*, **29** : 1001-1003.

1934. *Onychogomphus duaricus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 245-247.

Distribution : India (Meghalaya, Uttarakhand and West Bengal).

Elsewhere : Bangladesh, Malaysia, Myanmar, Nepal and Thailand.

15. ***Onychogomphus risi*** (Fraser)

1922. *Gomphus risi*, Fraser, *Mem. Dept. Agric. India*, 7(7) : 73-74.

1934. *Lamelligomphus risi*, Fraser, *Fauna Brit. India, Odonata*, **2** : 273-275.

1995. *Onychogomphus risi*, Prasad and Varshney, *Oriental. Ins.*, **29** : 402.

Distribution : India (Arunachal Pradesh, Meghalaya, Uttarakhand and West Bengal).

Elsewhere : Nepal.

Remarks : Adults can easily be seen near the small marshy hill streams during May to October.

Genus ***Paragomphus*** Cowley

16. ***Paragomphus lineatus*** (Selys)

1850. *Gomphus lineatus* Selys, *Rev. Odon.*, : 386.

1934. *Mesogomphus lineatus*, Fraser, *Fauna Brit. India, Odonata*, **2** : 230-234.

1985. *Paragomphus lineatus*, Davies & Tobin, *Soc. int. Odonatol. rapid comm.*, (Suppl.), No. **5** : 47.

Material examined : 1♀, Manan (Kausani), dist. Almora, 2.10.2001, coll. Animesh Bal; 1♂, Lachhiwala, dist. Dehra Dun, 22.10.2002, coll. M. Prasad and 1♂, Satnarayan, dist. Dehra Dun, 26.10.2002, coll. M. Prasad.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Meghalaya, Nilgiris, Orissa, Sikkim, Uttarakhand, Tamil Nadu, Tripura and West Bengal).

Elsewhere : Afghanistan, Bangladesh, Iran Myanmar, Nepal, Sri Lanka, Syria and Turkey.

Remarks : Adults are commonly seen near the hill stream as well as in the forests resting on aquatic and other vegetation during February to October.

Family AESHNIDAE

Genus *Anax* Leach

Key to the species of genus *Anax* Leach

1. Thorax turquoise-blue on sides, broadly barred with Jet black .... *A. immaculifrons* Rambur

   Thorax pale green, bluish green or pale brown without any broad black-markings 2

2. Frons marked with black T-shaped spot..... ..... *A. nigrofasciatus nigrolineatus* Fraser

- Frons without a black T- shaped spot..... 3

3. Abdomen with orange coloured markings... ..... *A. guttatus* (Burm.)

   Abdomen with blue coloured markings 4

4. Wings uncoloured, a small crown shaped spot on upper surface of frons; thorax pale bluish green ..... *A. i. imperator* Leach

   Wings tinted with yellow on outer three fourths; frons pale blue stripe above, thorax palest brown ..... *A. p. parthenope* (Selys)

17. *Anax guttatus* (Burmeister)

1839. *Aeshna guttatus* Butmeister, *Handb. Ent.*, **2** : 840.

1936. *Anax guttatus*, Fraser, *Fauna Brit. India, Odonata*, **3** : 140-142.

Distribution : Thoughout India.

Elsewhere : Africa, Australia, Indonesia, Taiwan, Thailand and Queensland.

Remarks : Adults were observed petroling high over the permanent or temporary water bodies.

18. *Anax immaculifrons* Rambur

1842. *Anax immaculifrons* Rambur, *Ins. Neurop.* P. 189.

1936. *Anax immaculifrons*, Fraser, *Fauna Brit. India, Odonata*, **3** : 145-146.

Distribution : India (Bihar, Chandigarh, Eastern Ghats, Maharashtra, Sikkim, West Bengal and Western Himalaya).

Elsewhere : Hong Kong and Sri Lanka.

19. *Anax imperator imperator* Leach

1815. *Anax imperator* Leach, *Edinb. Encycl.*, **9** : 137.

1936. *Anax imperator*, Fraser, *Fauna Brit. India, Odonata*, **3** : 136-138.

1995. *Anax imperator imperator*, Prasad and Varshney, *Oriental. Ins.*, **29** : 403.

Distribution : India (Uttarakhand and West Bengal).

Elsewhere : Afghanistan, Africa, Austria, Belgium, Central Asia, Czechoslovakia, Europe, France, Germany, Great Britain, Greece, Hungary, Hong Kong, Iran, Moroccan Sahara, Madagascar, Netherlands, N. W. Provinces of Pakistan, Spain, Somaliland, Sri Lanka, Switzerlands, Thailand, Turkey and Vietnam.

20. *Anax nigrofasciatus nigrolineatus* Fraser

1935. *Anax nigrolineatus* Fraser, *J. Darieeling nat. Hist. Soc.*, **10** : 23-25.

1962. *Anax nigrofasciatus nigrolineatus*, Asahina, *Jap. J. Zool.*, **13** (2) : 249-255.

Distribution : India (Sikkim, Uttarakhand and West Bengal).

Elsewhere : China, Japan, Korea, Nepal Philippines and Taiwan.

Remarks : Adults could be observed during the summer and monsoon seasons over the mountain lakes at high elevation.

21. ***Anax parthenope parthenope*** (Selys)

1839. *Aeshna (Anax) parthenope* Selys, *Bull. Acad. Belg.*, **6** : 389.

1921. *Anax parthenope parthenope*, Fraser, *J. Bombay nat. Hist. Soc.*, **28** : 110, 119-121.

Distribution : India (Assam, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and Western Ghats).

Elsewhere : Afghanistan, Asia Minor, Iraq, North Africa, Nepal and South Europe.

Genus ***Gynacantha*** Rambur

22. ***Gynacantha khasiaca*** MacLachlan

1896. *Gynacantha khasiaca* LacLachlan, *Ann. Mag. Nat. Hist.* (6) **17** : 411.

1936. *Gynacantha khasiaca*, Fraser, *Fauna Brit. India, Odonata*, **3** : 113-114.

Distribution : India (Assam, Meghalaya, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Annam, Bangladesh, Myanmar and Nepal.

Genus ***Gynacanthaeschna*** Fraser

23. ***Gynacanthaeschna sikkima*** (Karsch)

1891. *Cephalaeschna sikkima* Karsch, *Ent. Nachr.*, **17** : 6-7.

1934. *Gynacanthaeschna sikkima*, Fraser, *Fauna Brit. India, Odonata*, **3** : 77-79.

Distribution : India (Assam, Meghalaya, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Bangladesh and Nepal.

Remarks : Specimens found under thick thorny bushes around the hill stream during September to November.

Genus ***Hemianax*** Selys

24. ***Hemianax ephippiger*** (Burmeister)

1839. *Aeshna ephippiger* Burmeister, *Handb. Ent. Band.*, **2** : 480.

1936. *Hemianax ephippiger*, Fraser, *Fauna Brit. India, Odonata*, **3** : 147-149.

Distribution : India (Assam, Cochin, Coorg, Deccan, Gujarat, Kanara, Maharashtra, Malabar, Orissa, Rajasthan, Tamil Nadu, Uttarakhand and West Bengal).

Elsewhere : Angola, Baluchistan, China, Corcia, Ethiopea, Garamba National Park, Germany, France, Iraq, Kimbe, Kusunga, Macambique, Madagascar, Malawi, Mauretania, Moroccan Sahara, Nagamiland, Nyasaland, Spain, Switzerland, Tanzania and Zimbezi river.

Superfamily CORDULEGASTEROIDEA
Family CORDULEGASTERIDAE
Genus ***Anotogaster*** Selys

Key to the species of genus *Anotogaster* Selys

1. The costal and first antenodal nervures, arc, costal and distal sides of discoidal cell and basal portion of 1A and MA bright yellow ..... *A. nipalensis* Selys

   The costal and all other nervures of wings black; abdominal segments 8 to 10 black marked with yellow .... *A. basalis basalis* Selys

25. ***Anotogaster basalis basalis*** Selys

1854. *Anotogaster basalis* Selys, *Bull. Acad. Belg.*, (2) **21** : 102.

1936. *Anotogaster basalis basalis*, Fraser, *Fauna Brit. India, Odonata*, **3** : 46-49.

Distribution : India (Himachal Pradesh, Uttarakhand and West Bengal).

Elsewhere : Banglandesh and Nepal.

26. ***Anotogaster nipalensis*** Selys

1850. *Anotogaster nipalensis* Selys, *Bull. Acad. Belg.*, (2) **21** : 102.

1936. *Anotogaster nipalensis*, Fraser, *Fauna Brit. India, Odonata*, **3** : 50-51.

Material examined : 1 ♀, Pankhat, dist. Tehri Garhwal, 21.4.1958, coll. B. S. Lamba and 1 ♀ Mandoli, dist. Pauri Garhwal, 1.6.1958, coll. B. S. Lamba.

Distribution : India (Assam, Sikkim and West Bengal).

Elsewhere : Banglandesh and Nepal.

Genus ***Chlorogomphus*** Selys

27. ***Chlorogomphus atkinsoni*** (Selys)

1878. *Orogomphus atkinsoni* Selys, *Bull. Acad. Belg.*, (2) **46** : 682.

1936. *Chlorogomphus atkinsoni*, Fraser, *Fauna Brit. India, Odonata*, **3** : 26-28.

Distribution : India (Assam, Meghalaya, Uttarakhand and West Bengal).

Elsewhere : Nepal.

Genus ***Cordulegaster*** Leach

Key to the species of the genus *Cordulegaster* Leach

1. Frons elevated markedly above level of occiput; face, broader than long; abdomen 50 mm length, hindwing 40 mm in length, anal triangle 3 celled .... *Cordulegaster parvistigma* (Selys)
- Frons not elevated above level of occiput; face only as broad as long 2
2. The mid-dorsal black spot on segment 2 very narrowly confluent with the lateral black markings ofsegment in the male quite isolated in the female .... *C. brevistigma folia* Fraser
- The mid-dorsal black spot on segment 2 broadly confluent with the lateral black markings of segment .... *C. brevistigma brevistigma* (Selys)

28. ***Cordulegaster brevistigma brevistigma*** (Selys)

1854. *Thecagaster brevistigma* Selys, *Bull. Acad. Belg.*, (2) **21** : 103.

1936. *Cordulegaster brevistigma brevistigma*, Fraser, *Fauna Brit. India, Odonata*, **3** : 32-35.

Distribution : India (Himalaya from Kashmir to Arunchal Pradesh).

Elsewhere : Nepal and Pakistan.

29. ***Cordulegaster brevistigma folia*** Fraser

1929. *Cordulegaster brevistigma folia* Fraser, *Mem. Indian Mus.*, **9** : 73, 98, 120-121.

1936. *Cordulegaster brevistigma folia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 35-37.

Distribution : India (Uttarakhand).

30. ***Cordulegaster parvistigma*** (Selys)

1873. *Thecagaster parvistigma* Selys, *Bull. Acad. Belg.* (2)**36** : 508.

1936. *Allogaster parvistigma*, Fraser, *Fauna Brit. India, Odonata*, **3** : 41-43.

Material examined : 1♂, Pankhat, dist. Tehri, 21.4.1958, coll. B.S. Lamba; 1♂, Augustmuni dist. Rudrprayag, 30.4.1958, coll. B.S. Lamba; 1♂, Ghamgrha, dist. Pauri Garhwal, 12.6.1958, coll. B.S. Lamba and 1♂, Dhakwari, dist. Pauri Garhwal, 5.8.1958, coll. B.S. Lamba.

Distribution : India (Himachal Pradesh).

Superfamily LIBELLULOIDEA
Family CORDULIIDAE
Genus ***Epopthalmia*** Burmeister

31. ***Epopthalmia vittata vittata*** Burmeister

1839. *Epopthalmia vittata* Burmeister, *Handb. Ent.*, **2** : 845.

1936. *Epopthalmia vittata vittata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 194-196.

Distribution : India (Bihar, Peninsular India, Uttarakhand and West Bengal).

Elsewhere : Tibet.

Genus ***Hemicordulia*** Selys

32. ***Hemicordulia asiatica*** Selys

1878. *Hemicordulia asiatica* Selys, *Bull. Acad. Belg.*, (2)**45** : 186.

1936. *Hemicordulia asiatica*, Fraser, *Fauna Brit. India, Odonata*, **3** : 213-215.

Material examined : 1♂, Kalpeshwar, dist. Chamoli, 22.10.1989, coll. S.K. Gupta and M. Prasad.

Distribution : India (Assam, Maharashtra, Meghalaya, West Bengal and Western Ghats).

Elsewhere : Malawi, Myanmar and Sri Lanka.

Remarks : It is recorded for the first time from Uttarakhand.

Genus ***Macromia*** Rambur

33. ***Macromia moorei*** Selys

1874. *Macromia moorei* Selys, *Bull. Acad. Belg.*, **37** : 28.

1936. *Macromia moorei*, Fraser, *Fauna Brit. Ind. Odon.* **3** : 164-166.

Material examined : 2♂♂, Pankhat, dist. Tehri, 22.4.1958, coll. B.S. Lamba and 1♀, Maldeata, dist. Dehra Dun, 2.11.2002, coll. M. Prasad.

Distribution : India (Assam, Deccan, Himachal Pradesh, Meghalaya, Uttarakhand, and West Bengal).

Elsewhere : Myanmar and Nepal.

Remarks : It can easily be observed during April to November near larval habitats. Adults fly high above the larval habitats in postmonsoon period.

Family LIBELLULIDAE

Key to the genera of family LIBELLULIDAE

1. Base of discoidal cell in hindwing widely distal to the level of arc (except in *Nannophya* and *Phyllothemis);* Costal side of discoidal cell in forewing markedly angulated, so that the cell is four sided (the angulation) very distal and slight in *Phyllothemis);* anal loop absent or very small, consisting of not more than 6 cells; discoidal field begining with only 1 row of cells 2

- Base of discoidal cell in hindwing at level of arc or but a shade distal (except in *Nesoxemia* and *Agrionoptera);* costal side of discoidal cell in forewing not angulated; anal loop elongate, made up of more than 6 cells; discoidal field begining with 2 or more rows of cells 3

2. No supplementary nervures to bridge, discoidal cell in hindwing entire; not more than 9 antenodal nervures in forewing ..... TETRATHEMIS Brauer

- Supplementary nervures to bridge, discoidal cell in hindwing traversed; not less than 14 antenodals in forwing ..... HYLAEOTHEMIS Ris

3. Claw-hooks equal in length to claws, which thus appear bifid; thorax metallic ..... ZYGONYX Selys

- Claw-hooks shorter than claw and arising from about middle of latter; thorax but rarely metallic 4

4. Borders of anal loop running on to meet posterior of wing; apex of anal loop open 5

- Borders of anal loop converging and meeting before posterior broder of wing; apex of loop closed 6

5. Abdomen broad at base, then tappering gradually to the end; male with an opalescent white spot in centre of hindwing ..... THOLYMIS Hagen

- Abdomen very tumid at base, then abruptly narrowed and very slim and cylindrical to the end; wings broadly tipped with dark brown and without an opalescent white spot in the centre of hindwing ....ZYXOMMA Rambur

6. Distal antenodal nervures in forewing complete 7

- Distal antenodal nervures in forewing incomplete 11

7. Lobe of prothorax large and fringed with long hairs 8

Lobe of prothorax small, inconspicuous and usually marked 10

8. Frons metallic above ..... BRACHYDIPLAX Bruer

Frons nonmetallic above 9

9. Only 6 antenodal nervure in forewing; abdominal segments 1 to 6 dilated, 7 to 10 slim and cylindrical ..... ACISOMA Rambur

Never less than 12 antenodal nervure in forewing; shape of abdomen variable ..... ORTHETRUM Newman

10. Sectors of arc in forewing arising from a common and rather long stalk; frons metallic above; discoidal field begining with 3 rows of cells ..... CRATILLA Kirby

Sectors of arc in forewing separated at their origin; frons non-metallic discoidal cell begining with 2 rows of cells ..... UROTHEMIS Brauer

11. Lobe of prothorax large and fringed with long hairs 12

Lobes of prothorax small, usually naked 14

12. Borders of discoidal field (nervures MA and Cuii) converging strongly at wing border ....SYMPETRUM Newman

Borders of discoidal field in forewing diverging widely at wing border 13

13. Eyes contiguous for a short space; discoidal cell in hindwing entire; costal border of forewing straight; frons non-metallic above; discoidal field in forewing begining with at least 3 rows of cells ..... DIPLACODES Kirby

- Eyes more broadly contiguous; discoidal cell in hindwing traversed; costal border of forewing sinuous near base; frons metallic above; discoidal field begining with at least 3 rows of cells ..... POLPOPLEURA Rambur

14. Sectors of arc in forewing separated and diverging at origin; body very dark metallic; frons metallic above ..... RHYOTHEMIS Hagen

Sectors of arc in forewing arising from a common and rather long stalk 15

15. Discoidal field with borders converging strongly at wing margin 16

Discoidal field with borders parallel or widely divergent at wing margin 17

16. Discoidal cell in forewing very narrow, its costal side only one-fourth to one-third the length of basal; a conspicuous no supplementary nervure (IRiii) present between Rii and Riii ..... PANTALA Hagen

Discoidal cell in forewing broader, its costal side about one half the length of basal, no suplementary nervure (IRiii) present between Rii and Riii ..... TRITHEMIS Brauer

17. Genital hamules small and inconspicuous in profile, hindwing not markedly tapered ... 18

Genital hamules very long projecting and conspicuous in profile; hindwing very broad at base and rather tapered at apex; pterostigma smaller in hindwing than the forewing; apical angle of anal loop much acute than the distal ..... TRAMEA Hagen

18. Pterostigma bicolorous, black with white ends; 2 rows of cells between IRiii and Rspl ..... BRADINOPYGA Kirby

Pterostigma unicolorus; one or rarely two rows of cells between IRiii and Rspl 19

19. Wings coloured amber-yellow at base or more broadly dark reddish-brown, and often with a development of close secondary reticulation; especially proximal to node; more than 1 cubital nervures in all wings ..... NEUROTHEMIS Brauer

Wings usually uncolourd or with a small basal yellow marking in hindwing (a broader medial fascia in *Brachythemis*); no secondary reticulation in the wings; only one cubital nervure in all wings 20

20. Red or ochreous species with basal or medial yelow markings to wings 21

- Variably coloured and darker species; never or only partly red or ochreous; are situated between the first and second antenodal nervures; two rows of cells between IRiii and Rspl ..... POTAMARCHA Karsch

21. Wings with small basal yellow marking; eyes but shortly contiguous; face and frons red; $9^1/_2$ to $10^1/_2$ antenodal nervures in forewing ... . CROCOTHEMIS Brauer

- Wings with broad reddish yellow medial fascia; face and abdomen never red; eye broadly contiguous; only $6^1/_2$ to $7^1/_2$ antenodal nervures in forewing ..... BRACHYTHEMIS Brauer

Genus ***Acisoma*** Rambur

34. ***Acisoma panorpoides panorpoides*** Rambur

1842. *Acisoma panorpoides* Rambur, *Ins. Neurop.*, : 28.

1936. *Acisoma panorpoides panorpoides*, Fraser, *Fauna Brit. India, Odonata*, **31** : 330-331.

Distribution : India (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Great Nicobar Islands, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, South India, Tripura, Uttar Pradesh, Uttarakhand, and West Bengal).

Elsewhere : Bangladesh, Celebes, China, Indonesia, Japan, Molucca, Myanmar, Nepal, Palon, Philippines, Sri Lanka, Taiwan, Thailand and Toungo.

Remarks : Adults can easily be seen among vegetations around perennial or temporary ponds during March to september.

Genus ***Brachydiplax*** Brauer

35. ***Brachydiplax sobrina*** (Rambur)

1942. *Libellula sobrina* Rambur, *Ins. Neurop.*, : 114.

1936. *Brachydiplax sobrina*, Fraser, *Fauna Brit. India, Odonata*, **3** : 325-327.

Distribution : India (Andhra Pradesh, Assam, Bihar, Chandigarh, Himachal Pradesh, Maharashtra, Meghalaya, Nagaland, Orissa, Punjab, Rajasthan, Tripura, Uttar Pradesh, Uttarakhand, West Bengal and Western Ghats).

Elsewhere : Bangladesh, Myanmar, Nepal, Palon, Sri Lanka, Teinzo, Toungoo and Thilland.

Genus ***Brachythemis*** Brauer

36. ***Brachythemis contaminata*** (Fabricius)

1793. *Libellula contaminata* Fabricius, *Ent. Syst.*, **2** : 382.

1936. *Brachythemis contaminata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 365-366.

Material examined : 1♂, 1♀, Nanak Sagar, district Nainital, 9.8.1989, coll. R.K. Varshny and 1♀, Motipur, district Nainital, 11.8.1989, coll. R.K. Varshey.

Distribution : Throughout India.

Elsewhere : Bangladesh, China, Hong Kong, Indo-China, Indonesia, Japan, Laos, Malayasia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : Adults found in large number flying or resting near permanent are temporary waterbodies. Adults are very active during April to October.

Genus ***Bradinopyga*** Kirby

37. ***Bradinopyga geminata*** (Rambur)

1842. *Libellula geminata* Rambur, *Ins. Neurop.*, : 90.

1936. *Bradinopyga geminata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 349-350.

Material examined : 1♂, 1♀, Kirtinagar (Srinagar), dist. Pauri Garhwal, 21.9.2002, coll. Animesh Bal.

Distribution : India (Andhra Pradesh, Bihar, Chhattisgarh, Delhi, East Himalaya, Madhya Pradesh, Maharashtra, Orissa, Peninsular India, Tripura, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Sri Lanka and Thiland.

Remarks : Membrane white at the margins, discoidal field begins with 2 rows of cells. Found near clear water, cemented tank, bark of the tree and big boulders. Adults are very common near the larval habitats from March to October.

Genus ***Cratilla*** Kirby

38. ***Cratilla lineata calverti*** Foerster

1878. *Orthemis lineata* Brauer, *Sitzungsber, Akad. Wien.*, **77** : 9.

1936. *Cratilla lineata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 286-288.

1995. *Cratilla lineata calverti*, Prasad and Varshey, *Oriental Ins.*, **29** : 408.

Distribution : India (Andamans South and Middle), Arunachal Pradesh, (Mitra, 2002), Orissa, Uttarakhand, West Bengal and Western Ghats).

Elsewhere : China, Formosa, Indonesia, Kampuchia, Malaysia, Myanmar, Mindanao, Nepal, New Guinea, Perak, Palon, Philippines, Singapore and Thailand.

Remarks : Adults are rare and found near seasonal monsoon ponds in the forests during June to October.

Genus ***Crocothemis*** Brauer

Key to the species of genus *Crocothemis* Brauer

1. Abdominal segments 8 and 9 without black marking on mid dorsal carina .... *C. erythreae erythreae* (Brulle).

   Abdominal segments 8 and 9 marked with black on mid dorsal carina .... *C. servilia servilia* (Drury).

39. ***Crocothemis erythreae erythreae*** (Brulle)

1825. *Libellula ferruginea* Vander Linden, *Mon. Lib. Eur.*, : 13.

1832. *Libellula erythreae*, Brulle, *Exped. Morec*, **3** : 102.

1936. *Crocothemis servilia erythreae*, Fraser, *Fauna Brit. India, Odonata*, **3** : 347.

1991. *Crocothemis erythreae erythreae*, Tsuda, *A distributional list of world Odonata*, : 149.

Distribution : India (Assam, North West India and West Bengal) and widely distributed in the old world.

40. *Crocothemis servilia servilia* (Drury)

1770. *Libellula servilia* Drury, *Ill Ex. Ins.*, **1** : 112-113.

1936. *Crocothemis servilia servilia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 345-347.

Material examined : 1♂, Malta, dist. Dehra Dun, 5.8.1956, coll. K.K. Tiwari; 1♀, Binayak, dist. Almora, 27.9.1958, coll. B.S. Lamba; 1♂, Lalkua, dist. Nainital, 1.10.1974, coll. P.K. Maity; 1♂, Lalkua, dist. Nainital, 3.10.1974, coll. P.K. Maity; 1♂, around Naukuchiatal, dist. Nainital, 9.10.1974, coll. P.K. Maity; 1♀, Kaladhungi, dist. Nainital, 2.8.1989, coll. R.K. V.; 1♂, Khairana, dist. Nainital, 3.8.1989, coll. R.K. Varshney; 1♂, Jaspur, dist. Nainital, 6.5.1989, coll. R.K. Varshry; 2♀♀, Uttar Kashi, dist. Uttar Kashi 1.111.1989, coll. S.K. Gupta;1♂, Nakuri, dist. Uttar Kashi, 2.11.1989, coll. S.K. Gupta; 1♀, Byasi, dist. Tehri, 11.11.1989, coll. S.K. Gupta; 1♀, Roorkee, dist. Hardwar, 10.11.2000, coll. P. Mukhopadhyay; 3♂♂, Zeolikote, dist. Nainital, 11.11.2000, coll. S.K. Mandal; 1♂, Swarga Ashram, dist. Hardwar, 12.11.2000. coll. P. Mykhopadhyay; 1♀, Porulla, dist. Almora, 4.4.2002, coll. S. Roy Chowdhury; 1♂, Dharara, dist. Uttar Kashi, 5.5.2002, coll. S.K. Chakraborty; 1♂, 2♀♀, Rishikesh, Baysi, dist. Tehri, 1.9.2002. coll. S.K. Mondal; 1♂, 3♀♀, Chandighat, dist. Tehri, 6.9.2002, coll. S.K. Mondal; 1♀, Rishikesh, dist. Tehri, 24.10.2002. coll. M. Prasad; 8♂♂, 2♀♀, Satnarayan, dist. Dehra Dun, 26.10.2002, coll. M. Prasad; 2♀♀, Lachhiwala, dist. Dehra Dun, 27.10.2002, coll. M. Prasad; 2♀♀, Maldeata, dist. Dehra Dun, 2.11.2002. coll. M. Prasad; 1♀, Dehra Dun, dist. Dehra Dun, 3.11.2002, coll. M. Prasad; 2♂♂, 1♀, Dhanalti, dist. Dehra Dun, 4.11.2002, coll. M. Prasad; 2♀♀, Beriwara forest, dist. Dehra Dun, 5.11.2002, coll M. Prasad and 1♂, 2♀♀, Dholkhand forest, dist. Dehra Dun, 5.11.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Africa, Afghanistan, America, Bangladesh, Basara, China, Florida, Indonesia, Iran Iraq, Japan, Korea, Laos, Malaysia, Myanmar, Nepal Philippines, Rockhampton, Singapore, Sri Lanka, Taiwan, Thailand, Titayavan, Turkey and Yunnan.

Remarks : It is most common species and found near side pools of slow running streams, perennial and seasonal monsoon ponds and paddy fields etc.

Genus *Diplacodes* Kirby

Key to the species of the genus *Diplacodes* Kirby

1. Apices of wings tipped with black .... *D. nebulosa* (Fabr.)

   Apices of wings hyaline 2

2. Adults entirely black, without markings; wings palely enfumed with brown towards apices; anal appendages black..... ..... *D. lefebvrei* (Rambur)

   - Adults black marked with yellow or pruinosed dark blue throughout; wings uncoloured except at base; anal appendages yellow..... ..... *D. trivialis* (Rambur)

41. *Diplacodes lefebvrei* (Rambur)

1842. *Libellula lefebvrei* Rambur, *Ins. Neurop.*, : 112.

1936. *Diplacodes lefebvrei*, Fraser, *Fauna Brit. India, Odonata*, **3** : 333-335.

Material examined : 1♀, Zeolikote, dist. Nainital, 11.11.2000, coll. S. K. Mondal and 1♀, Kotti (Kausani), dist. Almora, 4.10.2001, coll. Animesh Bal.

Distribution : India (Chandigarh, Rajasthan, South India Uttarakhand and Uttar Pradesh).

Elsewhere : Nepal.

42. *Diplacodes nebulosa* (Fabricius)

1793. *Libellula nebulosa* Fabricius, *Ent. Syst.*, **2** : 379.

1933. *Diplacodes nebulosa*, Fraser, *Fauna Brit. India, Odonata*, **3** : 335-336.

Material examined : 1♂, chandighat, dist. Tehri, 6.9.2002, coll. S. K. Mondal.

Distribution : India (Andhra Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : Australia, China, Indonesia, Kampuchea, Malayasia, Myanmar, Nepal, Palon, Papua region, Philippines, Sri Lanka, Tennasserim, Thailand and Toungoo.

Remarks : Adults are not very common and found near the ponds in between April to September.

43. *Diplacodes trivialis* (Rambur)

1842. *Libellula trivialis* Rambur, *Ins. Neurop.*, : 115.

1936. *Diplacodes trivialis*, Fraser, *Fauna Brit. India, Odonata*, **3** : 336-338.

Material examined : 1♂, Around Nakuchiatal, district Nainital, 9.10.1974, coll. P. K. Maity.

Distribution : Throughout India.

Elsewhere : Australia, Bangladesh, Bao, China, Fiji, Hong-Kong, Indonesia, Iraq, Japan, Laos, Malaysia, Micronesia, Myanmar, Nepal, New Gunea, Pacific Islands, Papua, Philippines, Ryukyu, Scychelles, Sri Lanka, Taiwan, Thailand, Tenuasserim and Vietnam.

Remarks : Adults are found commonly near perennial and monsoon ponds during March to September.

Genus *Hylaeothemis* Ris

44. *Hylaceothemis gardeneri* Fraser

1927. *Hylaeothemis gardeneri* Fraser, *Rec. Indian Mus.*, **29** : 66-67.

1936. *Hylaeothemis gardeneri*, Fraser, *Fauna Brit. India, Odonata*, **3** : 262-263.

Distribution : India (Uttarakhand).

Genus *Neurothemis* Brauer

Key to the species of genus *Neurothemis* Brauer

1. Base of wings of male broadly black .... *N. tullia tullia* (Drury)
- Base of wings of male may be reddish-brown or golden yellow ..... 2.
2. Apex of wings also narrowly opaque brown to partly enclose a clear windo in each wing at apex ..... *N. fulvia* (Drury).
- Apex of wings not narrowly opaque brown to partly enclose a clear windo in each wing of apex .... *N. intermedia intermedia* (Ramb.).

45. *Neurothemis fulvia* (Drury)

1773. *Libellula fulvia* Drury, *Ill. Exot. Ins.*, **2** : 84-85.

1936. *Neurothemis fulvia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 353-354.

Material examined : 3♂♂, 2♀♀, Rishikesh, Tehri, 24.10.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Bangladesh, China, Hong-Kong, Indonesia, Kampuchea, Malaysia, Myanmar, Nepal, Palon, Taiwan, Teonzo and Thailand.

Remarks : Adults very conspicuous because of their rusty wings. It is common around larval habits during April to October in the forest areas.

46. *Neurothemis intermedia intermedia* (Rambur)

1842. *Libellula intermedia* Rambur, *Ins. Neurop.*, : 91.

1936. *Neurothemis intermedia intermedia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 357-358.

Distribution : Throughout India, Bangladesh, China, Myanmar, Malaysia, Nepal, Sri Lanka and Thailand.

47. *Neurothemis tullia tullia* (Drury)

1773. *Libellula tullia* Drury, *Ill. Exot. Ins.*, **2** 85.

1936. *Neurothemis tullia tullia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 360-362.

Distribution : India, (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Orissa, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand and West Bengal).

Elsewhere : China, Hong-Kong, Indo-China, Malaysia, Myanmar, Sri Lanka,Taiwan and Thailand.

Remarks : Adults are commonly found in large numbers in vegetations in marshy areas of lakes and perennial ponds in between March to October.

Genus *Orthetrum* Newman

Key to the species of genus *Orthetrum* Newman

1. Males violaceous red, due to a thin over lying pruinescence .... *O. pruinosum neglectum* (Rambur)

   Males coloured brown or black with yellow markings, often pruinosed 2
2. Abdomen enormously swollen at base and then abruptly slimmed and compressed

laterally to the end; black marked with greenish yellow; not pruinosed .... *O. sabina sabina* (drury)

Abdomen variable but never very slim nor compressed laterally; mostly with pruinosed abdomen and thorax 3

3. Base of hindwing with a large black triangular marking .... *O. triangulare triangulare* (Selys)

Base of hindwing without a black triangular marking 4

4. Cuii in hindwing arising from the distal side of discoidal cell well away from its posterior angle ..... *O. luzonicum* (Brauer)

- Cuii in hindwing arising from the posterior angle of discoidal cell 5

5. Only a single row of cells between IRiii and Rspl ..... *O. anceps* (Schneider)

Two or more rows of cells between IRiii & Rspl 6

6. Abdomen short and broad, almost white with pruinescence; thorax with broad greenish or bluish stripes more or less obscured by pruinescence .... *O. japonicum internum* MacLachlan

Abdomen long and rather narrow; often blue with pruinescence; thorax with very narrow whitish or creamy stripes 7

7. Smallest species of the genus, with face and frons grayish green or bluish membrane dark brown bordered with black .... *O. taeniolatum* (Schneider)

Moderately large species, with face black or brown 8

8. Membrane black ..... *O. glaucum* (Brauer)

Membrane pure white .... *O. brunneum brunneum* (Fons.)

48. *Orthetrum anceps* (Schneider)

1845. *Libellula anceps* Schneider, *Stett. Ent. Zeit.*, **6** : 111.

1936. *Orthetrum anceps*, Fraser, *Fauna Brit. India, Odonata*, **3** : 295-296.

Material examined : 1 ♀, Khumura, dist. Pauri Garhwal, coll. B.S. Lamba.

Distribution : India, (Arunachal Pradesh, Himachal Pradesh, Maharashtra, Mizoram, Sikkim, Uttarakhand and West Bengal).

Elsewhere : Algeria, Asia Minor, Beirut, Egypt, Morocco, Pakistan (Quetta), Rumania and Sicily.

49. *Orthetrum brunneum brunneum* (Fons.)

1837. *Libellula brunnea* Fonscolombe, *Ann. Soc. Ent. France*, **6** : 141.

1936. *Orthetrum brunnea brunnea*, Fraser, *Fauna Brit. India, Odonata*, **3** : 294-295.

Distribution : India, (Assam, Arunachal Pradesh, Bihar, Manipur, Tripura, Uttar Pradesh, Uttarakhand, amd Western Himalaya).

Elsewhere : Afghanistan, Albania, Algeria, Asia Minor, Austria, Belgium, Bavaria, Bulgaria, Cyprus, Czechoslovakia, Egypt, Germany, Holland, Italy, Madrid, Myanmar, Polland, Portugal, Samarkhand, Sicily and Tashkent.

Remarks : Adults are found on the rocky bed of hill streams during June to November.

50. *Orthetrum glaucum* (Brauer)

1865. *Libellula glauca* Brauer, *Verh. zool. bot. Ges. Wein.*, **15** : 1012.

1936. *Orthetrum glauca*, Fraser, *Fauna Brit. India, Odonata*, **3** : 307-309.

Material examined : 1 ♂, Jeolikote, dist. Nainital, 11.11.2000, coll. S.K. Mandal, 3 ♂ ♂, Bhowali, Pitta, dist. Nainital, 13.11.2000, coll. S.K. Mandal; 1 ♂, 1 ♀, Pithoragarh Ghat, dist. Pithoragarh, 22.11.2000, coll. S.K. Mandal; 1 ♂, Ranibagh, dist. Nainital, 8.10.2001, coll. Animesh Bal; 1 ♀, Ganchar, Chamoli, 21.8.2002, coll. S.K. Mandal; 1 ♀, Augustmuni, dist. Rudraprayag, 30.8.2002, coll. S.K. Mandal; 1 ♀, Rishikesh, Baysi, dist. Tehri, 1.9.2002, coll. S.K. Mandal; 1 ♂, Pouri (srinagar), dist. Pauri Garhwal, 16.9.2002, coll. Animesh Bal; 1 ♀, Baysi (Nurvikiriti), dist. Tehri, 24.9.2002, coll. Animesh Bal; 1 ♂, Karnaprayag, dist. Chamoli, 29.10.2002, coll. P. Mukhopadhyay, 1 ♀, Sahasradhara, Dehra Dun, 1.11.2002, coll. M. Prasad and 1 ♂, 1 ♀, Maldeata, Dehra Dun, 2.11.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Afghanistan, China, Hong Kong, Indonesia, Japan, Laos, Leito, Malaysia, Mayanmar, Nepal, Philippines, Sri Lanka, Taiwan, Tennaserim, Thailand and Vietnam.

Remarks : Adults are found during June to November in the side pools of the hill streams perching on bushes.

51. ***Orthetrum japonicum internum*** MacLachlan

1894. *Orthetrum japonicum* MacLachlan, *Ann. Mag. nat. Hist.*, **13** : 431.

1936. *Orthetrum japonicum internum*, Fraser, *Fauna Brit. India, Odonata*, **3** : 304-305.

Distribution : India, (Assam, Arunachal Pradesh, Meghalaya, Nagaland, West Bengal and Western Himalaya).

Elsewhere : Bangladesh, China, Japan, Korea, Mayanmar, Nepal, Pakistan, Thailand, Taiwan, Tibet and Vietnam.

Remarks : Adults are found near hill streams perching on bushes during June to January.

52. ***Orthetrum Luzonicum*** (Brauer)

1868. *Libellula luzonica* Brauer, *Verh. zool. bot. Ges. Wien.*, **18** : 169-732.

1936. *Orthetrum chrysostigma luzonicum*, Fraser, *Fauna Brit. India, Odonata*, **3** : 298-300.

1991. *Orthetrum lizonicum*, Tsuda, *A distributional list of world Odonata*, : 171.

Distribution : Throughout India.

Elsewhere : Afghanistan, Bangladesh, China, Hong Kong, Indonesia, Japan, Luzon, Malaysia, Mayanmar, Nepal, Philippines, Sri Lanka, Thailand, Tennesserium, Taiwan and Vietnam.

Remarks : Adults common on bushes and marshy bed around streams in between May to November.

53. ***Orthetrum pruinosum neglectum*** (Rambur)

1842. *Libellula neglecta* Rambur, *Ins. Neurop.*, : 86.

1936. *Orthetrum pruinosum neglectum*, Fraser, *Fauna Brit. India, Odonata*, **3** : 311-313.

Material examined : 1 ♀, Tipli, dist. Tehri, 12.4.1958, coll. B.S. Lamba; 3 ♂♂, Ombala, dist. Tehri, 9.4.1959, coll. B.S. Lamba; 1 ♂, Shahasradhara, dist. Dehra Dun, 25.10.2000, coll. P. Mukhopadhyay; 2 ♂♂, Jeolikote, dist. Nainital, 11.11.2000, coll. S.K. Mandal; 1 ♀, Pithoragarh, dist. Pithoragarh, 22.11.2000, coll. S.K. Mandal; 1 ♂, Kotti (Kausani), dist. Almora, 4.10.2001, coll. Animesh Bal; 1 ♂, Dharasa, dist. Uttarkashi, 5.5.2002, coll. S.K. Chakraborty; 1 ♀, Agustmuni, Rudraprayag, 29.8.2002, coll. S.K. Mandal; 1 ♂, Bhaniyawala, dist. Tehri, 2.9.2002. coll. S.K. Mandal; 1 ♂, 1 ♀, Rishikesh, dist. Tehri, 24.10.2002, coll. M. Prasad; 4 ♂♂, Satnarayan, dist. Dehra Dun, 26.10.2002, coll. M. Prasad; 1 ♀, Sahashradhara, dist. Dehra Dun, 1.11.2002, coll. M. Prasad and 1 ♂, Maldeata, dist. Dehra Dun, 2.11.2002, coll. M. Prasad.

Distribution : India, (Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Manipur, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Rajasthan, Sikkim, Uttar Pradesh, Uttarakhand, Tripura, Tamil Nadu, West Bengal and Western India).

Elsewhere : Afghanistan, Annam, Bangladesh, China, Hong Kong, Indo-China, Indonesia, Japan, Laos, Mayanmar, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Tibet, Vietnam and Yunnan.

Remarks : Adults are found throughout the year near marshy side pools of slow running streams, perennial and seasonal monsoon ponds, pady fields etc.

54. ***Orthetrum sabina sabina*** (Drury)

1770. *Libellula sabina* Drury, *Ill. Exotic Ins.*, **1** : 114-115.

1954. *Orthetrum sabina sabina* Lieftinck, *Treubia*, **22** (Suppl.).

Material examined : 1 ♀, Khama, dist. Nainital, 11.11.2000, coll. S. R. Mandal; 1 ♂, Rishikesh, dist. Dehra Dun, 15.10.2002, coll. M. Prasad and 1 ♂, 1 ♀, Satnarayan, dist. Dehra Dun, 26.10.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Afghanistan, Algeria, Angola, Australia, Asia Minor, Bangladesh, China, Celebes, Cyprus, Egypt, Hong Kong, Indonesia, Iran, Iraq, Laos, Malaysia, Micronesia, Papua, Philippines, Samoa, Singapore, Sri Lanka, Sudan, Taiwan, Thailand, Tunisia, Turkey, Yunnan and Vietnam.

Remarks : Adults are found almost throughout the year near marshy side pools of slow running streams, perennial and monsoon ponds, and perching on bushes in submontaneous forests.

55. ***Orthetrum taeniolatum*** (Schneider)

1845. *Libellula taeniolatum* Schenider, *Stett. Ent. Zeit.*, **6** : 111.

1936. *Orthetrum taeniolatum*, Fraser, *Fauna Brit. India, Odonata*, **3** : 296-298.

Material examined : 1♂, Rudraprayag, 12.8.2001, coll. G.K. Srivastava; 1♂, Rishikesh, dist. Tehri, 31.8.2002, coll. S.K. Mandal; 1♂, Chila, Haridwar. 8.9.2002, coll. S.K. Mandal; 1♀, August Muni, Rudraprayag, 29.9.2002, coll. S.K. Mandal; 1♂, Pashulok, Rishikesh, Dehra Dun, 25.10.2002, coll. M. Prasad; 1♂, Sahashradhara, dist. Dehra Dun, 1.11.2002, coll. M. Prasad and 1♀, Beriwara forest, Dehra Dun, 5.11.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Baluchistan, Dabar Goolis Mts. Greece, Iran, Myanmar, Nepal, Samoli and Turkey.

Remarks : Found near slow running marshy streams with mud and algal growth. Some times found near open rocky and sandy beds of the streams.

56. ***Orthetrum tria ngulare triangulare*** (Selys)

1878. *Libellula triangularis* Selys, *Mitth. Mus. Dre:den.*, : 314.

1936. *Orthetrum triangularis triangularis*, Fraser, *Fauna Brit. India, Odonata*, **3** : 305-307.

Material examined : 2♂♂, Shahashra of hara, dist. Dehra Dun, 25.10.2000, coll. P. Mukhopadhyay; 1♂, Shahashradhara, dist. Dehra Dun, 6.11.2000, coll. B.C. Das; 1♂, Khema, dist. Nainital, 12.11.2000, coll. S.K. Mandal; 1♂, Katramri, dist. Almora, 3.10.2001, coll. Animesh Bal; 2♂♂, Dharasa, dist. Uttarkashi, 5.5.2002, coll. S.K. Chakraborty, 2♂♂, Ganchar, dist. chamholi, 21.8.2002, coll. S.K. Mandal; 2♂♂, 4♀♀, August Muni, Rudra Prayag, 29.8.2002, coll. S.K. Mandal; 1♀, August Muni dist. Rudra Prayag, 30.8.2002, coll. S.K. Mondal; 1♂, Kaddulchal, dist. Tehri 18.9.2002, coll. Animesh Bal, 1♂, Srinagar, Pauri Garhwal, 29.10.2002 coll. M. Prasad; 1♂, Deopraya Pauri Garhwal, 30.10.2002, coll. M. Prasad; 1♂, Sahashradhara, dist. Dehra Dun, 1.11.2002, coll. M. Prasad and 1♂, Moldeata, dist., Dehra Dun, 2.11.2002, coll. M. Prasad.

Distribution : India, (Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, South Indian Hills, Sikkim Tamil Nadu, West Bengal, Western Himalaya).

Elsewhere : Afghanistan, China, Laos, Myanmar, Nepal, Sri Lanka, Tennasserim, Thailand and Vietnam.

Remarks : Adults are very common during June to October near marshy pools and hill streams.

Genus ***Palpopleura*** Rambur

57. ***Palpopleura sexmaculata sexmaculata*** (Fabricius)

1887. *Libellula sexmaculata* Fabricius, *Mont. Ins.*, **1** : 338.

1936. *Palpopleura sexmaculata sexmaculata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 318-320.

Material examined : 2♂♂, Koti, dist. Tehri, 6.4.1958, coll. B.S. Lamba; 1♂, on pati dist. Tehri, 9.4.1958, coll. B.s. Lamba; 1♂, 1♀, Porulla, dist. Almora, 4.4.2002, coll. S. Roy Chowdhury; 1♂, Dharasu, dist. Uttarkashi, 5.8.2002, coll. S.K. Chakraborty and 1♀, Lachhiwala, dist. Dehra Dun, 27.10.2002, coll. M. Prasad.

Distribution : India, (Arunachal Pradesh, Assam, Coorg, Himachal Pradesh, Jharkhand, Manipur, Madhya Pradesh, Malabar, Meghalaya, Nagaland, Nilgiris, Sikkim, Tamil Nadu, Travencore, Uttarakhand, and West Bengal).

Elsewhere : Afghanistan, Annan, China, Hong-Kong, Indo-China, Laos, Leito, Malaysia, Monts Carin, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam and Yunnan.

Remarks : Adults commonly occurs on hills away from, streams or sheltering in vegetations, during May to October.

Genus ***Pantala*** Hagen

58. ***Pantala flavescens*** (Fabricius)

1798. *Libellula flavescens* Fabricius, *Ent. Syst. Suppl.*, : 285.

1936. *Pantala flavescens*, Fraser, *Fauna Brit. India, Odonata*, **3** : 414-416.

Material examined : 1♀, Hotel Chandra Nivas, Haridwar, dist. Haridwar, 12.9.2002, coll. Animesh Ball.

Distribution : Cosmopolitan.

Remarks : Adults are commonly observed during May to October, near larval habitats. Adults are obligatory migrants and could be seen in Uttarakhand during monsoon period flying in large number high above the cultivated fields.

59. *Potamarcha congener* (Rambur)

1842. *Libellula obscura* Rambur, *Ins. Neurop.*, : 64.

1848. *Libellula congener*, Rambur, *Hist. nat. Ins. Neurop.*, : 70.

1891. *Potamarcha congener*, Selys. *Anal. Soc. Esp. Hist. nat.*, **20** : 221.

Distribution : India (Arunachal Pradesh, Assam, Andhra Pradesh, Himachal Pradesh, Kerala, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Maharashtra, Nagaland, Orissa, South Andaman Islands, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, and West Bengal).

Elsewhere : Australia, Bangladesh, China, Hong-Kong, Indonesia, Kampuchea, Laos, Malayasia, Myanmar, Nepal, New Guinia, Papua, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : Adults found during April to October near Larvae habitats, sometimes occur perching on vegetation around small slow running streams and commonly at seasonal monsoon ponds.

Genus *Rhyothemis* Hagen

60. *Rhyothemis variegata variegata* (Linn.)

1763. *Libellula variegata* Linnaeus, *Amoenitates, Acad.*, **6** : 412.

1936. *Rhyothemis variegata variegata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 423-424.

Distribution : India (Andhra Pradesh, Assam, Chhattishgarh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Uttar Pradesh, Uttarakhand, and West Bengal).

Elsewhere : Annam, Bangladesh, Bhamo, China, Indonesia, Myanmar, Nepal, Sri Lanka, Teinzo, Vietnam and Yunnan.

Genus *Sympetrum* Newman

Key to the species of the genus *Sympetrum* Newman

1. Upper or flexor surface of femora and tibiae yellow; base of hindwing with well defined yellow markings .... *S. fonscolombei* (Selys)

   Legs entirely black or only anterior femora yellow on inner side 2

2. Only $6^1/_2$ to $7^1/_2$ antenodal nervures in forewing ..... *S. commixtum* (Selys)

   At least $8^1/_2$ to $10^1/_2$ antenodal nervures in forewing 3

3. Basal reticulation of wings red; thorax blood red without yellow markings .... *S. haematoneura* Fraser

- Basal reticulation of wing black; thorax reddish with sides broadly marked with yellow extending to wings; anterior femora yellow on inner side .....*S. hypomelas* (Selys)

61. *Sympetrum commixtum* (Selys)

1884. *Diplax commixta* Selys, *Ann. Soc. Ent. Belg.*, : 38.

1936. *Sympetrum commixtum*, Fraser, *Fauna Brit. India, Odonata*, **3** : 372-373.

Material examined : 1♂, 1♀, Nagrasu, district Rudraprayag, 7.11.2002, coll. P. Mukhopadhyay and 2♀♀, Pithoragarh, district Pithoragarh, 22.11.2002, coll. S.K. Mondal.

Distribution : India (Arunachal Pradesh, Gujarat, N. W. India and West Bengal).

Elsewhere : Nepal and Sri Lanka.

Remarks : Adults occur around hill stream in October to December.

62. *Sympetrum fonscolombei* (Selys)

1840. *Libellula fonscolombei* Selys, *Mon. Libr. Eur.*, **21** : 29, 208.

1936. *Sympetrum fonscolombei*, Fraser, *Fauna Brit. India, Odonata*, **3** : 377-379.

Material examined : 1♂, Binsar wild life sanc, dist. Almora, 17.11.2000, coll. A.K. Mandal and 6♀♀, Pithoragarh, dist. Pithoragarh, 22.11.2000, coll. S.K. Mondal.

Distribution : India (Jammu & Kashmir, Nilgiris Hills and Western Ghat).

Elsewhere : Afghanistan, Africa, British Isles, Europe, Japan, Middle Asia, Morocco, Nepal and Sri Lanka.

63. *Sympetrum haematoneura* Fraser

1934. *Sympetrum haematoneura* Fraser, *Mem. Dept. Agric. India (Ent.)* **8** : 70-71.

1936. *Sympetrum haematoneura*, Fraser, *Fauna Brit. India, Odonata*, **3** : 379-380.

Distribution : India (Jammu & Kashmir and Uttarakhand).

Elsewhere : Nepal.

64. *Sympetrum hypomelas* (Selys)

1884. *Diplax hypomelas* Selys, *Ann. Soc. Ent. Belg.*, **28** : 37.

1936. *Sympetrum hypomelas*, Fraser, *Fauna Brit. India, Odonata*, **3** : 373-374.

Distribution : India (Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipuir, Meghalaya, Mizoram, Sikkim, Uttarakhand, West Bengal and Western Ghats).

Elsewhere : Bangladesh, China, Myanmar, Nepal and Tibet.

Genus *Tetrathemis* Brauer

65. *Tetrathemis platypera* Selys

1878. *Tetrathemis platyptera* Selys, *Mitt. Mus. Dresden.*, : 316.

1936. *Tetrathemis platyptera*, Fraser, *Fauna Brit. India, Odonata*, **3** : 250-251.

Distribution : Throughout India.

Elsewhere : China, Indonesia, Malacca, Malaysia, Myanmar, Taiwan and Thailand.

Remarks : Adults are found near larval habitats i.e. stagnent pools of small marshy streams in thick forests.

Genus *Tholymis* Hagen

66. *Tholymis tillarga* (Fabricius)

1798. *Libellula tillarga* Fabricius, *Suppl. Est. Syst.*, : 285.

1936. *Tholymis tillarga*, Fraser, *Fauna Brit. India, Odonata*, **3** : 411-413.

Distribution : Throughout India.

Elsewhere : Africa, Australia, Bangladesh, Bhamo, Camaroon, China, Ethiopea, Indonesia, Japan, Kampuchea, Laos, Madagascar, Malaur, Malaysia, Mauritius, Micronesia, Myanmar, Nepal, Philippines, Somali, Sri Lanka, South America, North America, Tanzania, Taiwan, Tibet and Vietnam.

Remarks : Commonly found from June to October near larval habitats. Adults are migratory in nature and could be seen at seasonal as well as perennial ponds during monsoon.

Genus *Tramea* Hagen

Key to the species of genus *Tramea* Hagen

1. Two large black spots at the base of hindwing surrounded by a golden-yellow areola..... ..... *T. basilaris burmeisteri* Kirby
- Only a single large reddish-brown spot at the base of hindwing .....*T. virginia* (Rambur)

67. *Tramea basilaris burmeistri* Kirby

1839. *Libellula chinensis* Burmeister, *Handb. Ent.*, **2** : 852.

1862. *Libellula basilaris* Hagen, *peters. Reise n. Mossambique zool.*, **5** : 105.

1889. *Tramea burmeistri* Kirby, *Trans. zool. Soc. Lond.*, **12** : 316.

1936. *Tramea basilaris burmeistri*, Fraser, *Fauna Brit. India, Odonata*, **3** : 461.

Distribution : India, (Andhra Pradesh, Bihar, Central India, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Nilgiri Hills, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengar).

Elsewhere : Indo-Malaya, Japan, Myanmar, Nepal, Sri Lanka, Tibet, Thailand and Vietnam.

Remarks : Adults common around larval habitats from June to October. Some times adults were observed far away from the water body.

68. *Tramea virginia* (Rambur)

1773. *Libellula chinensis* De Geer, *Mem. Ins.*, **3** : 556.

1842. *Libellula virginia*, Rambur, *Ins. Neurop.*, : 33.

1936. *Tramea virginia*, Fraser, *Fauna Brit. India, Odonata*, **3** : 435-436.

Distribution : India (Bihar, Himachal Pradesh, Jammu & Kashmir, Mizoram, Tamil Nadu and Uttarakhand).

Elsewhere : Bangladesh, China, Micronesia, Hong-Kong, Indonesia, Kampuchea, Myanmar, Nepal, South Japan, Taiwan, Thailand and Vietnam.

Remarks : Adults are very common from April to November. They could be seen petrolling over the water surface of perenial ponds during summer seasons.

Genus ***Trithemis*** Brauer

Key to the species of genus *Trithemis* Brauer

1. Legs very long and spidery; prerostigma bicolorous; body yellow marked with black ..... *T. pallidinervis* (Kirby)
- Legs ordinary length; pterostigma unicolorous; body colour variable 2
2. Thorax and abdomen bright vermilion-red; base of hindwing bright orange; neuration yellow ..... *T. kirbyi kirbyi* Selys
- Thorax and abdomen may be violaceous black or violaceous crimson 3
3. Base of hindwing with a small dark brown spot; neuration black ..... *T. festiva* (Rambur)
- Base of hindwing with small reddish-brown spot; neuration crimson ..... *T. aurora* (Burm.)

69. ***Trithemis aurora*** (Burmeister)

1839. *Libellula aurora*, Burmeister, *Handb. Ent.*, **2** : 859.

1936. *Trithemis aurora*, Fraser, *Fauna Brit. India, Odonata*, **3** : 383-385.

Material examined : 3♂♂, Jeolikote, dist. Nainital, 11.11.2000, coll. S.K. Mandal; 3♂♂, 1♀, Chunoti, dist. Nainital, 13.11.2000, coll. S.K. Mandal; 1♂, Bhimtal, dist. Nainital, 7.10.2001, coll. Animesh Bal; 1♂, Ranibagh, dist. Nainital, 8.10.2001, coll. Animesh Bal; 2♂♂, 2♀♀, Satnarayan, dist. Dehra Dun, 26.10.2002, coll. M. Prasad and 1♂, 2♀♀, Maldeata, dist. Dehra Dun, 2.11.2002, coll. M. Prasad.

Distribution : Throughout India.

Elsewhere : Bhamo, Celebes, China, Hong-Kong, Indonesia, Japan, Kampuchiea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri lanka, Taiwan, Thailand, Timor and Vietnam.

Remarks : Adults fly in large number from May to November around larval habitats. Some times adults were observed perching with spread wing wither on vegetation or on sun exposed rocks.

70. ***Trithemis festiva*** (Rambur)

1842. *Libellula festiva* Rambur, *Ins. Neurop.*, : 92.

1936. *Trithemis festiva*, Fraser, *Fauna Brit. India, Odonata*, **3** : 387-389.

Material examined : 1♂, Sahashra dhara, dist. Dehra Dun, 6.11.2000, coll. B.C. Das; 1♂, Chunobi, dist. Nainital, coll. S.K. Mandal; yeolikote, 11.11.2000, coll. S.K. Mandal; Bhowali, Pitta, dist. Nainital, 13.11.2000, coll. S.K. Mandal; 1♀ Manan (Kausani), dist. Almora, 2.10.2001, coll. Animesh Bal; 1♂, Katramri, dist. Almora, 3.10.2001, coll. Animesh Bal; 1♂, Hamalbag, dist. Almora, 8.10.2001, coll. P. Mukhopadhyay; 1♀, Fakat (Chamba), dist. Tehri, 14.9.2002, coll. Animesh Bal; 1♂, Kirtinagar (Srinagar), dist. Pouri, 21.9.2002, coll. Animesh Bal; 1♀, Rishikesh, dist. Tehri, 24.10.2002, coll. M. Prasad; 1♂, 1♀, Sahashradhara, dist. Dehra Dun, 1.11.2002, coll. M. Prasad; 2♂♂, 1♀, Maldeata, dist. Dehra Dun, 2.11.2002, coll, M. Prasad and 1♂, Raniwala, dist. Dehra Dun, 1.11.2002, coll. P. Mukhopadhyay.

Distribution : India (Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Manipur, Maharashtra, Mizoram, Orissa, Rajasthan, Uttarakhand, Uttar Pradesh, Western India and West Bengal).

Elsewhere : Afghanistan, Hong-Kong, Indonesia, Kampuchea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Singapore, Sri lanka, Taiwan, Thailand and Vietnam.

Remarks : Adults common around larval habitats i.e., slow running marshy streams.

71. ***Trithemis kirbyi kirbyi*** Selys

1891. *Trithemis kirbyi* Selys, *Ann. Mus. Civ. Genour.*, **30** : 465.

1976. *Trithemis kirbyi kirbyi*, Singh and Prasad, *Rec. Indian Mus.*, **70** : 35-36.

Distribution : India (Himachal Pradesh, Maharashtra, South India and Uttarakhand) and Sri lanka.

72. ***Trithemis pallidinervis*** (Kirby)

1889. *Sympetrum pallidinervis* Kirby, *Trans. zool. Soc. India*, **12** : 327.

1936. *Trithemis pallidinervis*, Fraser, *Fauna Brit. India, Odonata*, **3** : 389-391.

Distribution : Throughout India.

Elsewhere : Bhamo, China, Indonesia, Malaysia, Myanmar, Nepal, Palon, Philippines, Singapore, Sri lanka, Taiwan, Tennalserim, Thailand, Toungoo and Tibet.

Remarks : It is found near marshy vegetation around streams and perennial ponds.

Genus ***Urothemis*** Brauer

73. ***Urothemis signata signata*** (Rambur)

1842. *Libellula signata* Rambur, *Ins. Neurop.*, : 117.

1936. *Urothemis signata signata*, Fraser, *Fauna Brit. India, Odonata*, **3** : 442-444.

Distribution : India (Assam, Meghalaya, Orissa, South India, Uttar Pradesh, Uttarakhand, West Bengal and Western India), Bangladesh, China, Indo-China, Malaysia, Myanmar, Nepal, Sri lanka, Taiwan, Thailand and Vietnam.

Genus ***Zygonyx*** Hagen

74. ***Zygonyx torrida isis*** Fraser

1924. *Zygonyx isis* Fraser, *Rec. Indian Mus.*, **26** : 426, 440-451.

1976. *Zygonyx torrida isis*, Singh and Prasad, *Rec. zool. Surv. India*, **70** : 35-36.

1995. *Zygonyx torrida isis*, Prasad and Varshney, *Oriental Ins.*, **29** : 414.

Distribution : India (East India, Karnataka, Madhya Pradesh, Punjab and Uttarakhand).

Remarks : Adults can easily be seen near the hill streams and pady fields during May to September.

Genus ***Zyxomma*** Rambur

75. ***Zyxomma petiolatum*** Rambur

1842. *Zyxomma petiolatum* Rambur, *Ins. Neurop.*, : 30.

1936. *Zyxomma petiolatum* Fraser, *Fauna Brit. India, Odonata*, **3** : 409-410.

Distribution : Throughout India.

Elsewhere : Australia, China, Bangladesh, Hong-Kong, Indonesia, Japan, Myanmar, Malaysia, Philippines, Sri Lanka, Singapore, Thailand, Taiwan and Vietnam.

Remarks : Adults crepucular and frequently visit to the larval habitats from afternoon to late evening till it gets completely dark.

SUMMARY

Anisoptera fauna of present day Uttarakhand has been studied comprehensively. A total of 75 species an subspecies belonging to 40 genera under 5 families and two suborders are recorded from the State. Out of these 4 species are recorded for the first time from the Uttarakhand. Keys, collection data, distributional range in India and out side India have been provided in the text.

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REFERENCES

Asahina, S. 1960. Notes on the relationship between Himalayan and Japanese insect-fauna. *J. Bengal nat. Hist. Soc.*, **31** : 69-75.

Asahina, S. 1962. *Anax nigrofasciatus* oguma and *Anax nigrolineatus* Fraser (Odonata : Aeshnidae). *Jap. J. Zool.*, **13**(2) : 249-255.

Asahina, S. 1981. A revision of the Himalayan Dragonflies the genus *Cephalaeschna* and its allies (Odonata : Aeshnidae). *Bull. natn, Sci. Mus.*, (A), **7**(2) : 57-77.

Atkinson, E.T. 1974. Fauna of the Himalayas containing species of Kumaon, Garhwal, Nepal and Tibet. *Cosmo Publication*, Delhi (Reprint).

Bhasin, G.D. 1953. A systematic catalogue of main identified collections at Forest Research Institute, Dehra Dun, Pt. 12. Order Odonata. *Indian Forest* Leaft. (N. S.). **121**(3) : 63-78.

Cafri, S. Del., Centina, P. and Terzani, F. 1983. Odonati reccolti nel Jammu-Kashmir, Himachal Pradesh, Uttar Pradesh (India). *G. it. Ent.*, **1** : 261-264.

Davies, D.A.L. and Tobin, P. 1984. The dragonflies of the World : A systematic list of the extant species of Odonata, vol. I. *Soc. Internat. Odonatol. Rapid. Comm. (Suppl.)*, No. **3** : 1-127.

Davies, D.A.L. and Tobin, P. 1985. The dragonflies of the World : A systematic list of the extant species of Odonata, Vol. II, *soc. Internat. Odonatol. Rapid Comm.* (Suppl.) No. **5** : 1-151.

Fraser, F.C. 1933. The Fauna of British India, including Ceylon and Burma, Odonate, Vol. I. *Taylor and Francis Ltd., London* : 1-423.

Fraser, F.C. 1934. The Fauna of British India, including Ceylon and Burma, Odonata, Vol. II. *Taylor and Francis Ltd., London* : 1-398.

Fraser, F.C. 1936. The Fauna of British India, including Ceylon and Burma, Odonata, Vol. III. *Taylor and Francis Ltd., London* : 1-461.

Hamalainen, M. 1989a. Systematic notes on some species of the genus *Mortonagrion* (Zygoptera : Coenagrionidae). *Indian Odonatol.*, **2** : 1-4.

Hamalainen, M. 1989b. Odonata from Dehra Dun Valley (Uttar Pradesh, India), with notes on synonymy of some West Himalayan species. *Odonatologica*, **18**(1) : 13-20.

Kiauta, B. 1972. Scientific results of the Yugoslaco, 1969, Himalayan Expedition, Odonata. *Biol. Vest.*, **20** : 109-119.

Kumar, A. 1995. Himalayan Ecosystem Series : Fauna of Western Himalaya, Part I, Uttar Pradesh, Odonata : *Zool. Surv. India*, : 25-33.

Kumar, A. 1984. Hitherto unknown female of *Burmagomphus sivalikensis* Laidlaw (Odonata : Gomphidae). *Ann. Ent.*, **2**(2) : 49-52.

Kumar, A. and Khanna, V. 1983. A review of the taxonomy and ecology of Odonata larvae from India. Oriental Ins., **17** : 127-157.

Kumar, A. and Mitra, A. 1998. Odonata diversity at Sahashradhara (Sulphur springs), Dehra Dun, India, with notes on their habitat ecology. *Fraseria* (N. S.), **5$^{1}/_{2}$** : 37-45.

Kumar, A. and Prasad, M. 1981. Field ecology, zoogeography and taxonomy of the Odonata of Western Himalaya, India. *Rec. zool. Surv. India, Occ. Pap.*, No. **20** : 1-118.

Lieftinck, M.A. 1984. Further notes on the specific characters of *Calicnemia* Strand, with key to the males and remarks on some larval forms. (Zygoptera : Platycnemididae). *Odonatologica*, **13**(3) : 351-375.

Mitra, A. 1999. Two new odonata record from the Western Himalaya, India (Anisoptera : Macrodiplactidae, Libellulidae). *Notul. Odonatol.*, **5**(3) : 39.

Mitra, T.R. 1995. Taxonomic status of four Odonata species described by D. N. Sahni, from Western Himalaya. *J. Bengal nat. Hist. Soc.*, (New Sr.) **14** : 71-72.

Prasad, M. 1988. Introduction to the external morphology of the Odonata male accessory genitalia, with description of sixty three cases in North-West Indian species. *Indian Odonatol.*, **1** : 45-88.

Prasad, M. 2002. Odonata Diversity in Western Himalaya, Inida : Current Trends in Odonatology, (Ed. Arvind Kumar). *Daya Publishing House.*, Delhi : 221-254.

Prasad, M. and Singh, A. 1994. Fauna of Conservation Areas 5. Rajaji National Park : Odonata, *Zool. Surv. India*, : 195-215.

Prasad, M. and Varshney, R. K. 1995. A check-list of the Odonata of India including data on larval studies. *Oriental. Ins.*, **29** : 385-428.

Sahni, D.N. 1964a. Survey of insect fauna of Nainital, Odonata (Anisoptera). *Agra Univ. J. Res. (Sci.),* **13**(2) : 89-98.

Sahni, D.N. 1964b. Some new species of Odonata from Kumaon Hills (India). *Agra Univ. J. Res. (Sci.),* **13**(3) : 79-86.

Sahni, D.N. 1965a. Studies on Odonata (Zygoptera) of Nainital. *Indian J. Ent.*, **27**(2) : 205-216.

Sahni, D.N. 1965b. Srudies on Odonata (Anisoptera) of Nainital. *Indian J. Ent.*, **27**(2) : 277-289.

Sahni, D.N. 1970. Studies on the Odonata of Kumaon Pt. II. Suborder Anisoptera, Family Libellulidae (contd.), Gomphidae and Aeshnidae. *Bull. Ent.*, **11**(2) (1972) : 121-130.

Sahni, D.N. 1972a. Studies on the Odonata of Kumaon Part I. Suborder Anisoptera Family Libellulidae. *Bull. Ent.*, **11** (1970) : 37-54.

Sahni, D.N. 1972b. Srudies on the Odonata of Kumaon Part II. Suborader Zygoptera. *Bull. Ent.*, **12**(2) : 60-84.

Singh, S. 1955. Entomological Survey of Himalaya. Pt. V. on two new species of Odonata. *Agra Univ. J. Res. (Sci.)* **4**(1) : 171-174.

Singh, S. 1963. Entomological Survey of Himalaya Pt. XXIV. Fourth and final annotated check-list of the insects from the North-West (Punjab) Himalayas. *Agra Univ. J. Res. (Sci.),* **12**(1) : 363-393.

Singh, S. and Baijal, H.N. 1954. Entomological Survey of Himalayas. Part II. on a collection of Odonata. *Agra Univ. J. Res. (Sci.),* **3**(2) : 385-400.

Singh, S., Baijal, H.N., Gupta, V.K. and Mathew, K. 1955. Entomological Survey of the Himalayas. Part XIV. Notes on some insects collected by the second Entomilogical Expedition of the North-West Himalaya (1955), with description of three new species of Odonata. *Agra Univ. J. Res. (Sci.),* **4** (Suppl.) : 741-766.

Tsuda, S. 1991. A distributional list of world Odonata, : 1-362. ()saka).

Tsuda, S. 2000. A distributional list of world Odonata, : 1-430 (Osaka).

Tyagi, B.K. 1982. Notes on some dragonflies from the Dehra Dun Valley (Urrar Pradesh, India). *Fraseria,* No. **3** : 9-10.

Tyagi, B.K. 1983. A preliminary list of the little known dragonflies of North-Western India. *Fraseria,* No. **5** : 18-19.

Tyagi, B.K. Tyagi, A. and Sangal, S.K. 1986. An uptodate catalogue and bibilography of dragonfly fauna of the Dehra Dun Valley (India). *Occ. Pub. S. I. O. Nat. off., India,* No. **2** : 1-14.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 53-79.

INSECTA : ORTHOPTERA : ACRIDOIDEA

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INTRODUCTION

Uttarakhand is a lower to high altitude hilly state in the North West of India. Notable workers like, Bolivar (1902), Kirby (1914), Uvarov (1921), Dirsh (1954, 1961, 1975), B7anerjee and Kevan (1960), Hollis (1971), Jago (1971), Singh (1978) have taxonomically studied the group, but no body has yet worked out the fauna of Acridoidea of Uttarakhand state, except Tandon and Shishodia (1995) have recorded a list of Acridoidea from this state.

Present paper is based on recent surveys in Uttarakhand by the scientists of Zoological Survey of India as well as previously published data. This report is as such the first consolidated report of the Superfamily Acridoidea from the state of Uttarakhand.

The present paper reports a total of 64 species distributed under 48 genera and 2 families, along with their systematic account, valid names, species diagnosis and zoogeographical distribution. Six species are new records from this state, these have been by recorded marked with an (*) in the text.

The classification followed here is after Dirsh (1961).

SYSTEMATIC ACCOUNT
CLASSIFID LIST OF ACRIDODIDEA

Order ORTHOPTERA
Super faily ACRIDOIDEA
Family PYRGOMORPHIDAE

1. *Chrotogonus (Chr.) trachypterus trachypterus* (Blanchard)
2. *Atractomorpha crenulata* (Fabricius)
3. *Atractomorpha psittacina* (de Haan)
4. *Pyrgomorpha bispinosa bispinosa* (Walker)
5. *Aularches miliaris miliaris* (Linnaeus)

Family ACRIDIDAE
Subfamily HEMIACRIDINAE

6. *Spathosternum pr. prasiniferum* (Walker)
7. *Hieroglyphus banian* (Fabricius)
8. *Hieroglyphus nigrorepletus* (I. Bolivar)
9. *Parahieroglyphus bilineatus* (Bolivar)
10. *Euthymia finoti* (Kirby)

Subfamily OXYINAE

11. *Oxya japonica japonica* (Thunberg)
12. *Oxya fuscovittata* (Marschall)
13. *Oxya hyla hyla* Serville

Subfamily COPTACRIDINAE

14. *Coptacra foedata* (Serville)
15. *Eucoptacra saturata* (Walker)

Subfamily TROPIDOPOLINAE

16. *Tristria pulvinata* (Uvarov)
17. *Oxyrrhepes obtusa* (de Haan)

Subfamily EYPREPOCNEMIDINAE

18. *Choreodocus illustris* (Walker)
19. *Choreodocus capensis* (Stål)
20. *Eyprepocnemis rosea* Uvarov
21. *Eyprepocnemis al. alacris* (Serville)
22. *Eupreponotus inflatus* Uvarov
23. *Heteracris littoralis* (Ramber)
24. *Heteracris pulchra* (Bolivar)
25. *Tylotropidius varicornis* (Walker)
26. *Cataloipus himalayensis* Singh & Tandon

Subfamily CATANTOPINAE

27. *Paraconophyma scabra* (Walker)
28. *Catantops pinguis innotabilis* (Walker)
29. *Xenocatantops humilis humilis* (Serville)
30. *Xenocatantops karnyi* (Kirby)
31. *Stenocatantops splendens* (Thunberg)

Subfamily CYRTACANTHACRIDINAE

32. *Cyrtacanthacris tatarica* (Linnaeus)
33. *Patanga succincta* (Johanson)
34. *Patatanga japonica japonica* (Johanson)
35. *Pachyacris vinosa* (Walker)
36. *Chondracris rosea* (de Geer)

Subfamily ACRIDINAE

37. *Acrida exaltata* (Walker)
38. *Acrida indica* (Herbst)
39. *Phlaeoba infumata* Brunner
40. *Phlaeoba antennata* Brunner
41. *Phlaeoba pantëlei* Bolivar
42. *Ceracris nigricornis nigricornis* (Bolivar)
43. *Ceracris striata* (Brunner)
44. *Perella insignis* Bolivar
45. *Anaptygus rectus* Ragge
46. *Holopercna darjeelingensis* (Bolivar)

Subfamily GOMPHOCERINAE

47. *Dnopherula (Aulacobothrus) luteipes* (Walker)
48. *Dnopherula (Aulacobothrus) desicus*
49. *Leva indica* Bolivar

Subfamily OEDIPODINAE

50. *Aiolopus thalassinus tamulus* (Fabricius)
51. *Heteropternis respondens* (Walker)
52. *Oedaleus abruptus* (Thunberg)
53. *Oedaleus senegalensis* (Thunberg)
54. *Sphingonotus longipennis* Saussure
55. *Gastrimargus africanus* africanus
56. *Pusana rugulosa* (Uvarov)
57. *Trilophidia annulata* (Thunberg)
58. *Acrotylus humbertianus* Saussure
59. *Morphacris fasciata sulcata* (Thunberg)
60. *Pternoscirta cinctifemur* (Walker)
61. *Dittopternis venusta* (Walker)

Subfamily CALLIPTAMINAE

62. *Peripolus pedarius* (Stål)
63. *Caloptenopsis glaucopsis collina* (Saussure)
64. *Caloptenopsis gl. glaucopsis* (Walker)

Sunfamily ACRIDOIDEA

Size moderate, but range from less than 10mm to 65mm.; antennae filiform; but some time ensiform; pronotum rarely cover a part of abdomen; wings either fully dveloped or reduced or absent; fore wings in the form of leathery tegmina; hind wings membranous, fan like; tympanal organ generally present; strong and well developed hind legs with enlarged femora which are adapted for jumping; all tarsi three segmented; claws provided with an arolium; structure of phallic complex entirely different and epiphallus present.

Key to families

1. Foveolae of vertex contiguous, superior and forming the extremity of the fastigium; stridulatory mechanism absent ..... PYRGOMORPHIDAE
- Foveolae lateral or inferior, never forming the tip of fastigium; stridulatory mechanism present ..... ACRIDIDAE

Family PYRGOMORPHIDAE

Key to genus

1. Anterior margin of prosternum strongly reflexed and dialated ..... ***Chrotogonus*** Serville
- Anterior margin of prosternum neither reflexed nor dialated 2
2. Antennae remote from the eyes, placed in front of the ocelli ..... ***Atractomorpha*** Saussure
- Antennae near the eyes and inserted below the ocelli 3
3. Outer apical spine of posterior tibiae absent or difficult to detect; body small and slender ..... ***Pyrgomorpha*** Serville
- Outer apical spine of posterior tibiae very distinct; body large and robust ..... ***Aularches*** Stål

Genus ***Chrotogonus*** Serville, 1839

1. ***Chrotogous (Chr.) trachypterus trachypterus*** (Blanchard)

1836. *Ommexecha trachypterum* Blanchard, *Annls. Soc. ent. France*, **5** : 618.

1959. *Chrotogonus (Chr.) trachypterus trachypterus* : Kevan, *Publocoes cult. Co. Diam, Angola*, no. **43** : 147.

Material examined : District : Chamoli, 2♂♂, Gangeria, 26.viii.2002, coll. S.K. Mandal, District

: Nainital; 1♂,1♀, Nanak Sagar, 9.viii.1989, coll. R.K. Varshney and S.K. Mandal; 1♂,2♀, Khairna, 3.viii.1989, coll. R.K. Varshney & S.K. Mandal. District : Rudra Prayag; 2♀♀, Augusthamuni, 29.viii.2002, coll. S.K. Mandal. Dist : Pauri Garwal : 8♂♂, Debaprayag, 30.x.2002, coll. M. Prasad. District : Tehri Garwal : 3♂♂, 3♀♀ & 6 nymph, Rishikesh, 8.x.2001, coll. S.K. Mandal; 9♂♂, 22♀♀, Chota sheuta, 18.x.2001, coll. S.K. Mandal; 1♂, 4♀♀, Rishikesh, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Body small in size; flattened; hind wings hyaline or occasionally faintly tinged yellowish brown and extend nearly two-thirds as long as tegmina.

Distribution : India (Uttarakhand, Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Karnataka, Kerala, South east of Maharastra, South of Madhya Pradesh; Orissa; Tamil Nadu; Uttar Pradesh and West Bengal).

Elsewhere : Sri Lanka.

Remarks : This species is the pest of various types of crops.

Genus ***Atractomorpha*** Saussure, 1862

Key to species

1. General body form very slender; fastigium of vertex very long; majority of specimens with a membranous area near the posterior margin of lateral pronotal lobe .... *psittacina* (de Haan)

– Body form not exceptionally slender; fastigium of vertex comparatively rather short; lateral pronotal lobe always with a well developed membranous area near the posterior margin ..... *crenulata* (Fabricius)

2. ***Atractomorpha crenulata*** (Fabricius)

1793. *Truxalis crenulata* Fabricius, *Ent. Syst.*, **2** : 28.

1969. *Atractomorpha crenulata* : Kevan and Chen, *Zool. J. Linn. Soc.*, **48** : 187.

Material examined : District : Almora : 1♂,2♀♀, Kausani, 25.xii.2000, coll. S.K. Mandal, 5♀♀, Ranikhet (Sitalakhet), 25.ix.2001, coll. A. Bal; District : Chamoli, 4♂♂, Gangeria 26.viii.2002, coll. S.K. Mandal. District : Haridwar; 2♂♂,1♀, Haridwar, 6.ix.2002, coll. S.K. Mandal; District : Dehradun : 1♀, Sahasradhara, 1.xi.2002. coll. M. Prasad; 1♂,♀, Dehradun, 3.xi.2002, coll. M. Prasad; 10♂♂, 6♀♀, Dhanalti, 4.xi.2002, coll. M. Prasad. District : Nainital; 1♂,1♀ Lalkuan, 8.viii.1989, coll. R.K. Varshney & S.K. Mandal; 2♂♂,1♀, Tandan, 10.viii.1989, coll. R.K. Varshney; 1♂,1♀, Pathar chatta 10.viii.1989, coll. R.K. Varshney; 2♂♂, Kherna, 12.xi.2000, coll. S.K. Mandal. District : Pauri Garwal : 2♀♀ Srinagar, 29.x.2002, coll. M. Prasad; 1♀ Deoprayag, 30.x.2002, coll. P. Prasad. District : Tehri Garwal; 3♂♂, 1♀, Chamba 19.x.2000, coll. S.K. Mandal.

Diagnosis : Green or pale in colour; body medium and slender; fastigium of vertex short; eyes convex and prominent; lateral pronotal lobes with distinct membranous area, specially in females; hind femora not clearly convex; tegmina pointed, extending one fourth of their length beyond the hind femora; hind wings normally tyrian pink to light mallow purple at base.

Distribution : India (Throughout).

Elsewhere : Bangladesh; Malaya, Myanmar, Pakistan, Sri Lanka, N. Sumatra; Thailand and S. Vietnam.

Remarks : It is a common species, generally found near the marshy land.

*3. ***Atractomorpha psittacina*** (de Haan)

1842. *Acridium (Truxalis) psittacinum* de Haan, *Verh. nat. Gesch. Nederl. Overz. Bezitt.* **18**(zool.7) : 146.

1960. *Atractomorpha psittacina* : Banerjee & Kevan, *Treubia*, **25** : 169, 187.

Material examined : District : Almora : 3♂♂,2♀♀, Kausani, 6.ix.2000, coll. S.K. Mandal.

Diagnosis : Size medium; body form very slender; fastigium of vertex narrow and longer; membranous area present near the posterior margin of lateral lobe; hind wings normally long in relation to the tegmina-colour of the wing magneta purple often rather pale, at extreme base, sometimes colour-less; apex of male abdomen rather acute in profile.

Distribution : India (Uttarakhand, Andaman and Nicobar Island, Arunachal Pradesh, Assam, Manipur, Rajasthan, Tripura).

Elsewhere : Indo-China, South.

Remarks : It is newly recorded from Uttarakhand.

Genus ***Pyrgomorpha*** Serville, 1831

4. ***Pyrgomorpha bispinosa bispinosa*** (Walker)

1870. *Pyrgomorpha bispinosa* Walker, *Cat. Derm. Slat. Brit. Mus.*, **3** : 499.

1975. *Pyrgomorpha bispinosa bispinosa* : Kevan, *Acrida*, **4** : 58.

Material examined : District : Chamoli, 4♂♂, Gangeria, 26.viii.2002, coll. S.K. Mandal, District : Haridwar : 1♂, Haridwar, 6.ix.2000, coll. S.K. Mandal.

Diagnosis : Body medium size and moderately slender; pronotum with lateral carinae broken; tegmina in some cases even in female, extend beyond the abdomen; posterior ventral point of lateral pronotal lobe distinct but generally short.

Distribution : India (Uttarakhand); Peninsular India.

Remarks : In general the species is known from peninsular India and its extension to north-west is of significance.

Genus ***Aularches*** Stål, 1873

5. ***Aularches miliaris*** (Linnaeus)

1758. *Gryllus (Locusta) miliaris* : Linnaeus, *Syst. Nat., (10th ed.)* **1** : 432.

1914. *Aularches miliaris* : Kirby, *Faun. Brit. India, Orth. (Acrididae)* : 168.

Material examined : District : Dehradun, 2♀♀, Kempty, 8.x.1967, coll. Asket Singh; 1♀, Dehradun, 20.vi.1968, coll. Asket Singh; District : Bageshwer : 3♂♂, 1♀, Bageshwar, 30.ix.2005, coll. D. R. Mullick.

Diagnosis : Large size; body stout; head large, smooth, pale or black; pronotum strongly tuberculate above, with two large contiguous humps in front, cut by all the three sulci, front hump black or yellow, the hinder area rugose and deeply pitted at the sides; tegmina light brown, thickly reticulated with yellow nervures; abdomen black with narrow yellow incisions.

Distribution : India (Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Java; Nepal and Sri Lanka.

Remarks : This species is phytophilous.

Family ACRIDIDAE

Key to the subfamily

1. Prosternal process or tubercle present 2
– Prosternal process or tubercle absent 5
2. Radial area of tegmen with a series of regular parallel stridulatory veinlets ..... HEMIACRIDINAE
– Stridulatory veinlets of radial area of tegmen absent 3
3. Lower external lobe of hind knee with spine-like apex ..... OXYINAE
– Lower external lobe of hind knee with apex rounded, angular or subacute but not spine like 4
4. Last abdominal tergite in male (in most of the genera) well developed furcula; supra anal plate mostly with an attenuate or trilobate apex ..... COPTACRIDINAE
– Last abdominal tergite without well developed furcula; supra anal plate variable 5
5. Mesosternal interspace closed ..... TROPIDOPOLINAE
– Mesosternal space mostly open 6
6. Mesosternal lobes rounded or obtuse-angular or acute-angular, but not rectangular 7
– Mesosternal lobes rectangular ..... CYRTACANTHACRIDINAE
7. Dorsum of pronotum flat or weekly tectiform, with median and lateral carinae linear (linear carinae sometimes obliterated); male cercus with strongly compressed, lobiform or subacute, downcurved apex ..... EYPREPOCNEMIDINAE
– Dorsum of pronotum of variable shape; lateral carinae if present, not linear; male cercus variable, but not as mentioned above ..... CATANTOPINAE
8. Stridulatory file absent in posterior femora .. 9
– Stridulatory file present in posterior femora. ..... GOMPHOCERINAE

9. Head more or less acute in profile, and with more acute angle of frons, tegmina without intercalary vein (if present, weak irregular and not serrated even in male) .... ACRIDINAE

– Head rounded in profile; face almost vertical, rarely oblique; tegmina always with intercalary vein in median area ..... OEDIPODINAE

Subfamily HEMIACRIDINAE

Key to subfamily

1. Head short and very broad; face broader than long; pronotum constricted; in prozona; tegmina and wings fully developed .... EUTHYMIA Uvarov

– Head normal; face nor broader than long; prononotum not constricted in prozona; tegmina and wings fully developed or brachypterus 2

2. Tegmina with a patch or densely placed transverse veinlets between the radial and median areas; apex of male cercus spine like; size small ..... SPATHOSTERNUM Krauss

– Tegmina without patches of veinlets; apex of male cercus usually bilobate or trilobate, but not spine like; siz large 3

3. Male supra anal plate narrower than long, with male cercus medium sized; slightly curved and gradually narrowing, apex bifurcate .... HIEROGLYPHUS Krauss

– Male supra anal plate broader than long, with straight sides narrowing to acute apex or trilobate, with large very expanded middle lobe ..... PARAHIEROGLYPHUS Carl

Genus ***Spathosternum*** Krauss, 1877

6. ***Spathosternum pr. prasiniferum*** (Walker)

1871. *Heteracris (?) prasinifera* Walker, *Cat. Derm. Salt. Brit. Mus.*, **5** Suppl. : 65.

1936. *Spathosternum prasiniferum prasiniferum* : Tinkham, *Lingman. Sci. Journ. Canton*, **15** : 51.

Material examined : District : Almora; 5♂♂, 13♀♀, Kausani, 20.x.19.xi.20-21,x. coll. B.C. Das; 2♂♂, 1♀, Kataramoni, 3.x.2001, coll. A. Bal; 4♂♂, 1♀, Ranikhet, 30.xi.2001, coll. A. Bal; 1♂, Ranikhet, 18.xi.2000, coll. S.K. Mandal; 2♂♂, 19.xi.2001, coll. S.K. Mandal. District : Chamoli; 5♂♂, 1♀ Gangeria, 26.viii.2002, coll. S.K. Mandal. District : Dehradun; 3♂♂, Dehradun, 4.x.2001, coll. S.K. Mandal; 5♂♂, 5♀♀, Pasulok, 25.x.2002, coll. M. Prasad; 1♂, 2♀♀, Lachiwala, 27.x.2002, coll. Mahabir Prasad; 3♂♂, 2♀♀ Sahasradhara, 26.x.2002, coll. M. Prasad; 5♂♂, 4♀♀, 13♂♂, 6♀♀, Dhanolti, 4.xi.2002, coll. M. Prasad; District : Haridwar; 1♂, 1♀, Chandighat, 26.viii.2002, coll. S.K. Mandal. District : Nainital; 2♂♂, 1♀, Gajora, 2.viii.1989, coll. R.K. Varshney; 1♂, 1♀, Joshpur, 6.viii.1989, coll. R.K. Varshney; 3♂♂, 5♀♀, Bhowali, 12-13.xi.2000, S.K. Mandal; 5♂♂, 10♀♀, Nainital, 12.xi.2000, coll. S.K. Mandal. District : Pithoragarh; 4♂♂, 5♀♀ Pithoragarh, 22.xi.2000, coll. S.K. Mandal. District : Rudraprayag; 3♂♂, Augusthmuni, 22.xi.2002, coll. S.K. Mandal. District : Tehri Garwal; 2♀♀, Chota-sheuta, 18.xi.2001, coll. S.K. Mandal. District : Tehri Garwal : 2♀♀, Old Tehri, chamba, 19.x.2001, coll. S.K. Mandal.

Diagnosis : Body small in size; head considerably shorter than pronotum; antennae short, not reaching the posterior margin of pronotum; hind femora with a rounded genicular lobe; broad black or dark green stripe running behind the lower part of the eyes and below the lateral carinae of pronotum.

Distribution : India (Uttarakhand, Throughout India).

Elsewhere : Myanmar, S.E. China; Thailand and Vietnam.

Remarks : This species is associated with grass habitation.

Genus ***Hieroglyphus*** Krauss, 1877

Key to the species

1. Male cercus with apex bifurcate, relatively slender with upper branch fork recurved anteriorly towards head and lower branch elongate and acute; lower valves of ovipositor long and slender with external lateral projection well defined and acute .... *banian* Fabricius

– Male cercus with elongate acute apex, straight or downcurved; lower valves as usual ..... *nigrorepletus* Mason

7. *Hieroglyphus banian* (Fabricius)

1798. *Gryllus banian* Fabricius, *Ent. Syst. Suppl.*, : 194.

1973. *Hieroglyphus banian* : Mason, *Bull. Brit. Mus. nat. Hist. (Ent.)*, **28**(7) : 540.

Material examined : District : Almora; 5♂♂, 2♀, Kausani, 4.x.2001, coll. A. Bal; 2♂♂, 1♀, Katromeri, 3.x.2001, coll. A. Bal; 1♂, Binsar, 26.ix.2004, coll. B.G. Kundu.

Diagnosis : Medium in size; pronotum with median carina weak, cross by three sulci, first sulcus present laterally, second centrally, third and posterior sulci entire; prosternal process conical; cerci bifurcate, upper branch recurved anteriorly towards head and lower branch elongate and acute.

Distribution : India (Uttarakhand, Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharastra, Manipur, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh.

Remarks : It is commonly known as a rice grasshopper.

8. *Hieroglyphus nigrorepletus* (I. Boliovar)

1912. *Hieroglyphus nigrorepletus* Bolivar, *Trab. Mus. Cienc. Nat. Madr., No.* **6** : 56.

1973. *Hieroglyphus nigrorepletus* : Mason, *Bull. Brit. Mus. nat. Hist. (Ent.)*, **28**(7) : 340.

Material examined : District : Tehri Garwal : 2♂♂, 1♀, Chota sheuta, 18.x.2001, coll. S. K. Mandal.

Diagnosis : Size large, robust; pronotum with only a weak median carina; posterior margin of metazoan obtuse angular tegmina and wings brachypterus; supra anal plate angular, with subacutle apex; in female subgenital plate with very acute median lobe.

Distribution : India (Uttarakhand, Assam, Kashmir, Karnataka, Maharastra, Orissa, Punjab, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh and Pakistan.

Remarks : It is a serious pest of rice and other agricultural crops.

Genus *Parahieroglyphus* Carl, 1916

9. *Parahieroglyphus bilineatus* (Bolivar)

1912. *Hieroceryx bilineatus* Bolivar, *Trab. Mus. nac. Cienc. Nat. Madr.* No. **6** : 60.

1916. *Parahieroglyphus bilineatus* : Carl, *Revue Suisse Zool.*, **24** : 483.

Material examined : District : Dehradun; 1♀, Barkat, Dehradun, 30.ix.1996, coll. Asket Singh (Regd. no. 3795/H5).

Diagnosis : Large size; frontal ridge parallel sided or may diverge just below median ocellus; cerci very large, divided into 3 lobes; body colour is buff with black markings.

Distribution : India (Uttarakhand, Himachal Pradesh, Maharastra and West Bengal).

Remarks : We have studied the material present in our National Zoological collection.

Genus *Euthymia* Stål

10. *Euthymia finoti* Kirby

1914. *Euthymia finoti* Kirby, *Fauna of British India*, : 197.

Material examined : District : Dehradun; 1♀, Mussori, 5.xii.1961, coll. Asket Singh. (Regd. no. 2987/H5).

Diagnosis : Size medium; body rather short and stout, head short and broad with face broader than long, clothed with grayish pubescence; pronotum thickly and rather finely impress punctuate, pronotum with a slight carina on the metazoan.

Distribution : India (Uttarakhand, and Tamil Nadu).

Remarks : No specimens of this species has been recorded during the present study. We have studied the specimen present in National Zoological Collection.

Subfamily OXYINAE

Key to genus

Genus *Oxya* Audinet – Serville

Key to species (Male)

1. Supra-anal plate with tubercle on each side of a median apical process, making the plate appear weakly triblobate 2

– Supra-anal plate without lateral tubercle..... ..... *japonica japonica* (Thunberg)

2. Cerci laterally compressd, hardly narrowing towards apex, which is weakly bifurcate..... .....*fuscovittata* (Marschall)

– Cerci conical, narrowing towards apex and obtuse or truncate apically .... *hyla hyla* Serville

Key to species (Female)

1. Anterior margin of tegmen with a dense row of short bristle extending from costal buldge, almost apex of abdomen; ovipositor valves with long teeth, the apical ones curved..... 2

– Anterior margin of tegmen weakly or not at all spined or bristled; valves of ovipositor with short teeth .... *japonica japonica* (Thunberg)

2. Ventral surface of subgenital plate almost completely flat or weakly concave and appearing to widen posteriorly ....*fuscovittata* (Marschall)

– Ventral surface of subgenital plate concave only in median posterior half, not widening posteriorly .....*hyla hyla* Serville

11. *Oxya japonica japonica* (Thunberg)

1971. *Oxya japonica japonica* : Hollis, *Bull. Brit. Mus. nat. Hist.* (Ent.), **26**(7) : 302.

Material examined : District : Almora : 2♂♂, Ketrmari, 3.x.2001, coll. A. Bal; 3♀♀, Ranikhet, 30.x.2001. coll. A. Bal.

Diagnosis : Size medium; supra-anal plate rounded or triangular, with very developed basal folds; ventral surface or subgenital plate, in female, with a deep median longitudinal concavity posteriorly which is borde.ed on each side by a well developed lateral longitudinal ridge, lateral unspined except at posterior apex.

Distribution : India (Uttarakhand, Arunachal Pradesh, Tripura).

Elsewhere : Bangladesh; Pakistan; Mayanmar; China; Taiwan; Japan; Thailand; Vietnam; West Malayasia; Singapore; Sumatra; Java; Lombok; Sumba; Timor; Philippine Islands; Palaus Island; Celebes; Hawaii Island.

Remarks : This species is not very common in India.

12. *Oxya fuscovittata* (Marschall)

1836. *Gryllus fuscovittatus* Marschall, *Annln. Wien. Mus. Naturg.*, **1** : 211.

1971. *Oxya fuscovittata* : Hollis, *Bull. Brit. Mus. nat. Hist.* (Ent.) **26**(7) : 289.

Material examined : District : Almora : 1♀, Kausani, 19.xi.2000, coll. S.K. Mandal; 2♂,1♀, Kausani, 20.x.2001. coll. B.C. Das; 1♀, Sitalkhet, 25.ix.2001, coll. A. Bal; 2♂♂, Katbhomra, 3.x.2001, coll. A. Bal; 1♂, Ranikhet, 29.ix.2001, coll. A. Bal. District : Nainital; 1♂,2♀♀, jeolikota, 11.xi.2000, coll. S.K. Mandal; 1♀, Pitta, 13.xi.2000, S.K. Mandal. District : Pithoragarh : 1♀, Pithoragarh, 22.xi.2000, coll. S.K. Mandal.

Diagnosis : Size medium; integument finely pitted and shiny; supra-anal plate with lateral tubercles are more prominent than posterior lobe; male cercus strongly compressed, apex strongly compressed or almost bifid; in female, ventral surface of subgenital plate broadly flattened, posterior margin emarginate medially, straight or with two very small median spines.

Distribution : India (Uttarakhand, Throughout).

Elsewhere : Afghanistan; Pakistan; USSR (South West).

13. *Oxya hyla hyla* Serville

1831. *Oxya hyla* Serville, *Annls. Sci. nat.* (zool), **22** : 287.

1971. *Oxya hyla hyla* : Hollis, *Bull. Brit. Mus. nat. Hist.* (Ent.) **26** : 282.

Material examined : District : Nainital; 1♀ Tandan, 10.viii.1989, coll. R.K. Varshney and S.K. Mandal; 7♂♂,2♀♀, Jeolikota, 11.xi.2000. coll. S.K. Mandal; District : Teheri Garwal; 1♂, Duili, 7.x.2001, coll. S.K. Mandal.

Diagnosis : Body small and finely rugose, shiney; in male supra-anal plate with small tubercle; cercus with subacute apex; in female subgenital plate with two longitudinal ridges extending forwards from posterior margin.

Distribution : India (Uttarakhand, Arunachal Pradesh, Andhra Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Madhya Pradesh Meghalaya, Orissa, Rajasthan, Tamil Nadu Tripura, Uttar Pradesh and West Bengal).

Elsewhere : Afghanistan, Africa, Bangladesh, Madagascar, Nepal, Pakistan, Persia and Sri Lanka.

Subfamily COPTACRIDINAE

Key to genera

1. Frontal costa of ridge parallel sided, not or so wider between antennae than vertex .... ***Coptacra*** Stal

– Frontal costa distinctly widened between antennae and wider than vertex between eyes ..... ***Eucoptacra*** Bolivar

Genus ***Coptacra*** Stal, 1873

Key to species

14. ***Coptacra foedata*** (Serville)

1974. *Coptacra foedata* : Tandon, *Rec. zool. Surv. Indian Mus. Publ. Occ. Paper no.* **3** : 9.

Diagnosis : Size mdium; antennae yellowish brown at apex; pronotum with small rugosities of dark brown or dark colour; wings hyaline, posterior part a little infumated' hind femur brown, area supera with two indistinct brown spots in the middle, area infero externa black, inner area red; hind tibiae red.

Distribution : India (Uttarakhand, Arunachal Pradesh, Sikkim, (Doubtful).

Elsewhere : China; French Indo Cochin; (Cochin China; Cambodia); Japan, Java, Myanmar, Philippines and Taiwan.

Remarks : During the present study we have not fund this species in the present collection. It is reported by Tandon and Shishodia (1995).

Genus ***Eucoptacra*** Bolivar, 1902

15. ***Eucoptacra saturata*** (Walker)

1870. *Acridium saturatum* Walker, *Cat. Derm. Salt. Br. Mus. Pt. III Locustidae* 628.

1921. *Eucoptacra saturata* : Uvarov, *Ann. Mag. nat. Hist.*, (9)7 : 503.

Material examined : District : Almora; 1♂, Pannua-nala, 20.x.2001, coll. S.K. Mandal. District : Dehradun : 1♂, Bibiwala forest, 10.x.2001, coll. S.K. Mandal. District : Uttar Kashi; 1♀, Gangotri, 12.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; body rusty red brown; head short, smooth; tip of vertex flat, punctured; prosternal tubercle, stout, a little acute; hind femur black beneath-hind tibia red, as long as the hind femora; tegmina a little shorter than the body, with numerous small marks; wings hyaline.

Distribution : India (Uttarakhand, Assam, Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Orissa, Sikkim, Tripura, Uttar Pradesh and West Bengal).

Subfamily TROPIDOPOLINAE

Key to genera

1. Size large and slender : prosternal process impressed laterelly, apex slightly bent backwards, not quit reaching the anterior margin of mesostenum, Conical or subtruncate ..... ***Oxyrrhepes*** Stal

– Size medium; prosternal process broad, strongly widened towards apex, with squera, flat or slightly concave spical surface curved backwards, almost touching the anterior margis of mesostemum ..... ***Tristria*** Stal

Genus ***Oxyrrhepes*** Stål

16. ***Oxyrrehepes obtusa*** (de Haan)

1842. *Acridium (Oxya) obtusum* Haan, *Verh. Ned. Overz. Bezit. Orth.*, 155,156.

1929. *Oxyrrehepes obtuse* : Willemse, *Treubia*, **10** : 463.

Material examined : District : Nainital : 1♂, Nainital, 7.iii.1970, coll. Asket Singh (Regd. no.).

Diagnosis : Medium size; body slender; antennae filiform; head reclinate; fastigium of vertex short with elongate concavity; median carina of pronotum well developed; lateral carina indistinct, parallel, principal sulcus place behind the middle; prosternal process compressed laterally, apex a little bent backwards, conical; hind femur knee lobes rounded; supra-anal plate long, triangular apex pointed; cercus only reaching a little behind the supra-anal plate, little curved, apex pointed.

Distribution : India (Uttarakhand, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Orissa, Rajasthan, Sikkim and Tamil Nadu).

Elsewhere : Celebes, China, Indo-China, Indonesia, Java, Lombock, Myanmar, Sri Lanka, Sumatra, Taiwan.

Remarks : This species is limited in distribution in Uttarakhand. We have studied the specimen present in National Zoological Collection.

Genus ***Tristria*** Stål, 1873

17. ***Tristria pulvinata*** (Uvarov)

1921. *Tapinophma pulvinata* Uvarov, *Ann. Mag. Nat. Hist.*, 7(9) : 497.

1929. *Tristria pulvinata* : Uvarov, *Revue Suisse Zool.*, **29** : 559.

Diagnosis : Size medium; fastigium of vertex parabolic, moderately narrow; tegmina and wings extending upto the apex of subgenital plate or shorter; male cercus in apical third incurved, down curved laterally; female subgenital plate with an angular projection on the posterior margin on either side of mid line; male subgenital plate almost linear, compressed knife like.

Distribution : India (Uttarakhand, Andhra Pradesh, Assam, Bihar, Karnataka, Maharastra, Orissa, Tamil Nadu, Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : This species is reported by Tandon and Shishodia (1995).

Subfamily EYEPREPOCNEMIDINAE

Key to genera

1. Male cercus wide, compressed on apical half, apex rounded 2
- Male cercus narrow, may be a little compressed at base acute to subacute at apex 4
2. Apex of abdomen flated; supra-anal plate with some what obtuse rounded at apex 3
- Apex of abdomen inflated; supra anal plate with angular apex ..... ***Heteracris*** Walker
3. Antennae filiform; frontal ridge a little constricted at apex; male cercus long thick, with coriaceous apical portion; subgenital plate conical, compressed to wards apical region, and almost pointed at apex ..... ***Choroedocus*** Bolivar
- Antennae some-what flattened and dialated in middle; frontal ridge almost parallel-sided throughout; male cercus shorter, and more or less entirely coriaceous; subgenital plate transverse and very much obtuse ..... ***Eupreponotus*** Uvarov
4. Posterior femur moderately long; moderately produced beyond abdomen, not inflated basally, not strongly narrowing on apical half; posterior tibiae with sparse spines; prosternal process cylindrical, with rounded or inflated apex ..... ***Eyprepocnemis*** Fieber
- Posterior femur long, produced far beyond end of abdomen, inflated basally and strongly narrowed on apical half; posterior tibiae densely spined, prosternal process almost spathulate, with rounded, some slightly inflated at apex ..... ***Tylotropidius*** Stål

Genus ***Choreodocus*** Bolivar, 1914

18. ***Choroeodocus illustris*** (Walker)

1870. *Heteracris illustris* Walker, *Cat. Derm. Salt. Brit. Muis.*, **4** : 622, 623.

1921. *Choreodocus illustris* : Uvarov, *Trans. R. ent. Soc. London*, **69**(1&2) : 109.

Material examined : District : Chamoli : 1 ♀, Gauchara, 21.viii.2002, coll. S.K. Mandal. District : Nainital; 2 ♂♂, Tandan, 10.viii.1989, coll. R.K. Varshney; 1 ♂,1 ♀, Nainital to Jharmola, 13.x.1972, coll. D.K. Mandal. District : Pithoragarh; 1 ♀ Pithoragarh, 22.xi.2000, coll. S.K. Mandal. District : Tehri Garwal : 1 ♀, Tapovan, 9.x.2001, coll. S.K. Mandal. District : Uttar Kashi : 1 ♀, Gangotri, 12.x.2001, coll. S.K. Mandal.

Diagnosis : Size large; fastigium of vertex distinctly depressed, obtusely and roundly angulate infront; pronotum with lateral carina distinct only upto end of prozona; Prosternal process cylindrical, a little inclined back; subgenital plate conical, upcurved; posterior tibiae with more pilose.

Distribution : India (Uttarakhand, Himachal Pradesh and Tamil Nadu).

Remarks : Previously this species is recorded from south India. The availability of the present series of specimens from Uttarakhand is very interesting from Zoogeographical point of view.

19. ***Choroedocus capensis*** (Stål)

Diagnosis : Tegmina with numbers large brown blackish spots; male subgenital plate with Trncate apex.

Distribution : India (Uttarakhand, Coastal area of Cuttack & Puri district) : China & South-east Assia.

Remarks : It is reported by Tandon and Shishodia (1995).

Genus ***Eyprepocnemis*** Fieber, 1853

Key to species

1. Wings hyaline, often with greenish tinge basally ..... *alacris alacris* Serville
– Wings rose red colour at base .... *rosea* Uvarov

20. ***Eyprepocnemis rosea*** Uvarov, 1942

1942. *Eyprepocnemis rosesus* Uvarov, *Ann. Mag. nat. Hist.*, **9**(11) : 597.

1958. *Eyprepocnemis rosea* : Dirsh, *Proc. R. ent. Soc. London*, (8)**27**(3-4) : 42.

Material examined : District : Almora : 1♀, Kausani, 18.x.2001, coll. B.D. Das. District : Dehradun; 1♂, Jayra forest, 4.vii.1966, coll. Asket Singh. District : Tehri Garwal; 3♂♂, Duili, 7.x.2001, coll. S.K. Mandal; 7♂♂, 4♀♀, Rishikesh, Chotasheuta, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; wings at the base with pinkish tinge in colour; posterior tibiae with red in colour.

Distribution : India (Arunachal Pradesh, Assam, Andhra Pradesh, Himachal Pradesh, Meghalaya and Uttar Pradesh.).

21. ***Eyprepocnemis alacris alacris*** (Serville)

1839. *Acridium alacre* Serville, *Hist. Nat. Ins. Orth.*, 682.

1958. *Eyprepocnemis alacris alacris* : Dirsh, *Proc. R. ent. Soc. London*, (B)**27**(3-4) : 40.

Material examined : District : Almora : 1♂, Kausani, 19.xi.2000, coll. S.K. Mandal; District : Tehri Garwal : 1♂, Rishikesh, 1.ix.2002, coll. S.K. Mandal; 1♀, Bhuniwala, 2.ix.2002, coll. S.K. Mandal; District : Uttar Kashi : 2♀♀, Gangotri, 24.ix.2006, coll. A.K. Sidhu.

Diagnosis : Size medium; concavity of fastigium of vertex distinct, without median carinula; pronotum with lateral carinae converging forwards; prosternal process cylindrical, apex obtusely rounded; in male cercus reaching a little beyond the supra anal plate; in female subgenital plate longer than broad; hind tibiae bluish grey with two whitish rings at base.

Distribution : India (Uttarkhand, Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Manipur, Meghalaya, Orissa, Panjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Afghanistan, Bangladesh, E. Persia, Pakistan, Sri Lanka.

Remarks : This species is a widely distributed in India.

Genus ***Eupreponotus*** Uvarov, 1921

22. ***Eupreponotus inflatus*** Uvarov

1921. *Eupreponotus inflatus* Uvarov, *Ann. Mag. nat. Hist.*, (9)**7** : 508.

Diagnosis : Size medium; deep velvety colour on the head and pronotum; pronotum not punctured; male cercus short, more or less entirely coriaceous; in female supra-anal plate tongue shaped, with medially a longitudinal groove.

Distribution : India (Uttarakhand, Orissa, West Bengal).

Remarks : This species occurs in Uttarakhand, therefore, it is very interesting from Zoogeographical point of view Tandon and Shishodia (1995).

Genus ***Heteracris*** Walker, 1870

Key to species

1. Hind tibiae with 2-3 black, linear line present in the dorso-external carina .... *littoralis* (Rambur)
– Hind femur with 2-3 black, linear line absent on the dorso-external carina .... *pulchra* (Bolivar)

23. ***Heteracris littoralis*** (Rambur)

1828. *Gryllus litteralis* Rambur, *Faune Entomol. Andal., Orthop.*, **2** : 78.

1958. *Heteracris littoralis* : Dirsh, *Tijdschr. Ent.*, **101** : 54.

Diagnosis : Size medium; fastigium of vertex parabolic with obtuse apex and a little depressed; tegmina with numerous medium size dark brown patches; wings base clear; hind femur with 2-3 black, linear line on the dorso-external carina, with white yellow ring before the apex.

Distribution : India (Uttarakhand, Bihar, Rajasthan).

Elsewhere : Azerbaijan, S. Europe, S.W. Asia, Egypt, Greece.

Remarks : This species is limited in distribution in India. It was reported by Asket Singh (19).

24. ***Heteracris pulchra*** (Bolivar)

1902. *E(Uprepocnemis) pulchra* Bolivar, *Annls. Soc. ent. France,* **70** : 630.

1958. *Heteracris pulchra* : Dirsh, *Tijdschr. Ent.,* **101** : 54.

Material examined : District : Nainital : 1♂, Nanak sagar, 9.viii.1989, coll. R.K. Varshney. District : Pauri Garwal : 1♂, 2♀♀, Sainagar, 24.ix.2006, coll. A.K. Sidhu.

Diagnosis : Size medium; fastigium of vertex smooth, a little sulcated; prosternal process subcylindrical, compressed in front, obtuse at apex; cerci compressed and curved; colour olivaceous in general; pronotum with a broad velvety black stripe on the back and distinctly expanded and paler in the middle, borders green.

Distribution : India : (Uttarakhand, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal).

Elsewhere : Sri Lanka.

Remarks : This species is limited in distribution.

Genus ***Tylotropidius*** Stål, 1873

25. ***Tylotropidius varicornis*** (Walker)

1870. *Heteracris varicornis* Walker, *Cat. Derm. Salt. Brit. Mus.,* **4** : 667.

1913. *Tylotropidius varicornis* : Kirby, *Faun. Brit. India, Orthoptera* : 265.

Material examined : District, Almora, 2♀♀, Binsar, 17.xi.2000, coll. S.K. Mandal; 1♂, 1♀, Kausani, 19.xi.2000, coll. S.K. Mandal. District : Nainital : 2♂♂, 3♀♀, Bhimtal, 11.xi.2000, coll. S.K. Mandal; 1♀, Bhowali, 13.xi.2000, coll. S.K. Mandal; District : Pithoragarh; 9♂♂, 7♀♀, Pithoragarh, 22.xi.2000, coll. S.K. Mandal.

Diagnosis : Size medium; fastigium of vertex with 2 depressions at the base; front of head oblique prosternal process compressed, truncate and a little notched in the middle of apex; posterior femora thick at base, very slender and long towards apex; supra-anal plate of male elongato-traingular and sulcated; dorsum of pronotum dark brown, tegmen with a row of triangular strip in costal area.

Distribution : India : (Uttarakhand, Andhra Pradesh, Chattrishgarh, Goa, Himachal Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, West Bengal).

Elsewhere : Myanmar, Sri Lanka.

Remarks : The distribution is very sparse but range of distribution is wide.

Genus ***Cataloipus*** Bolivar, 1890

26. ***Cataloipus himalayensis*** Singh & Tandon

1978. *Cataliopus himalayensis* : Singh & Tandon, *Bull. Zoo. Surv. India,* **1**(i) : 61.

Diagnosis : Size medium large; head smooth, vertex horizontal passing smoothly into the frontal costa; pronotum with a well median carina, cut by three transverse sulci, principal sulcus placed well behind the middle; prosternal process spathulate, with broadly rounded apex, inclined backwards; tegmina slightly shorter than abdomen; in female subgenital plate almost truncated behind.

Distribution : India : (Uttarakhand, Himachal Pradesh, Punjab).

Remarks : We have studied the specimen present in National Zoological Collection Singh and Tandon (1978).

Subfamily CATANTOPINAE

Key to genera

1. Tegmina lateral lobiform, extending beyond first abdominal segment ..... ***Paraconophyma*** Uvarov
– Tegmina and wings well developed, reaching upto or beyond the apex of abdomen 2
2. Prosternal process cylindrical and rounded at apex; pronotum subcylindrical ..... ***Catantops*** Schaum
– Prosternal process neither cylindrical nor with rounded apex; pronotum not subcylindrical .. 3
3. Pronotum not constricted; prosternal process laterally compressed ..... ***Stenocatantops*** Dirsh and Uvarov
– Pronotum constricted; prosternal process conical ..... ***Xenocatantops*** Dirsh and Uvarov

Genus ***Paraconophyma*** Uvarov, 1921

27. ***Paraconophyma scabra*** (Walker)

1870. *Caloptenus scaber* walker, *Cat. Derm. slat. Brit. Mus.*, **4** : 707.

1921. *Paraconophyma scabra* : Uvarov, *Ann. Mag. nat. Hist.*, (9)**7** : 500, 501.

Material examined : District : Almora : 1♀, Binsar, 17.xi.2000, coll. S.K. Mandal; 2♀♀, Ranikhet, 19.ix.2000, coll. S.K. Mandal. District : Chamoli : 5♂♂, 3♀♀ Govindghat, 23 and 28.viii.2002, coll. S.K. Mandal. District : Nainital : 25♂♂, 26♀♀, Bhowali, 12-13.xi.2002, coll. S.K. Mandal. 5♂♂, 8♀♀, Bhimtal, 13.xi.2000, coll. S.K. Mandal; 2♂♂, Jeolikota, 11.xi.2000, coll. S.K. Mandal. District : Pithoragarh : 2♂♂, 3♀♀, Pithoragarh, 22.xi.2000, coll. S.K. Mandal. District : Tehri Garwal; 1♂, 1♀, Chamba, 19.x.2001, coll. S.K. Mandal; District : Uttarkashi : 1♀, Uttarkashi, 14.x.2001, coll. S.K. Mandal.

Diagnosis : Body small in size; dark-brown in colour, with black markings; pronotum with median carina crossed by 2 or even 3 sulci; lateral carinae develop before the first sulcus only and distinctly convergent behind; punctuation of pronotal disc, pleurae, mesonotum, metanotum, and abdominal tergites very coarse and a\strong; hind tibiae muddy green, with a pale sub-basal ring; supra-anal plate of male hind angle straight, sharp.

Distribution : Indiam : (Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Karnataka, Manipur, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Remarks : This species is widely distributed in Uttarakhand.

Catantops Schaum, 1853

Key to species

1. Prosternal tubercle cylindrical and rounded at apex, pronotum subcylindrical .... *Catantops* Schaum

– Prosternal tubercle neither cylindrical nor with rounded apex; Pronotum nor with rounded apex; pronotum not subcylindrical 3

2. Pronotum not constricted in the middle; prosternal tubercle laterally compressed ....*Stenocatantops* Dirsh and Uvarov

– Pronotum constricted in the middle; prosternal tubercle conical .....*Xenocatantops* Dirsh)

28. ***Catantops pinguis innotabilis*** (Walker)

1870. *Acridium innotabile* Walker, *Cat. Derm. Salt. Brit. Mus.*, **4** : 629.

1953. *Catantops pinguis innotabilis* : Dirsh and Uvarov, *Tijdschr. Ent.*, **96**(3) : 233.

Material examined : District : Almora : 6♂♂, 1♀, Binsar W.L.S., 17.xi.200, coll. S.K. Mandal; 1♂, Kausani, 19.xi.2000, coll. S.K. Mandal; District : Chamoli : 1♀, Gangeria West. 26.viii.2002, coll. S.K. Mandal; District : Hardwar : 1♀, Chandighat, 6.ix.2002, coll. S.K. Mandal; 2♂♂, 6♀♀, Jawalapur, 14.ix.2006, coll. A.K. Sidhu; District : Nainital : 1♀, Bhowali, 13.xi.2000, coll. S.K. Mandal. District : Pauri Garwal : 1♂, 3♀♀, Debprayag, 30.x.2002, coll. S.K. Mandal; District : Pithoragarh : 1♂, 4♀♀, Pithoragarh, 22.xi.2000, coll. S.K. Mandal. District : Rudra Prayag : 2♂♂, 1♀, Augusthmuni, 30.viii.2002, coll. S.K. Mandal. District : Tehri-Garwal; 5♂♂, 8♀♀, Rishikesh, 31.ix.2002, coll. S.K. Mandal. 1♂,1♀, Chila, 13.ix.2006, coll. A.K. Sidhu; 6♀♀, 18.x.2001, coll. S.K. Mandal. District : Uttarkashi : 8♂♂, 5♀♀, Gangotri, 12.x.2001, coll. S.K. Mandal; 6♂♂, 3♀♀,, Bhojbasa, 14.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; lateral lobe of pronotum without coloured pattern; external disc of hind femur without black median spot below the upper carinula; male cercus more upcurved, with more broadened apex and projecting upper apical angle.

Distribution : India (Uttarakhand, Throughout).

Genus ***Xenocatantops*** Dirsh and Uvarv, 1953

Key to species

1. Male cercus showing no clear apical bifurcation, but apically bilaterally compressed and a little curved ....***humilis humilis*** (Serville)

– Male cercus clearly bifurcate apically ....***karnyi*** (Kirby)

29. ***Xenocatantops humilis humilis*** (Serville)

1839. *Acridium humile* Serville, *Ins. Orth.*, : 662.

1953. *Xenocatantops humilis humilis* : Dirsh and Uvarov, *Tijdschr. Ent.*, **96** : 237.

Material examined : District : Almora : 3♂♂, 2♀♀, Binsar W.L.S., 17.xi.2000, coll. S.K. Mandal; 1♂, Sitala khet, 25.ix.2001, coll. A. Bal; 1♂, Sitalakhet, 25.ix.2001, coll. A. Bal; 2♂♂, 6♀♀, Binsar WLS, 26.ix.2001, coll. A. Bal; 4♀♀, Ranikhet, 30.ix.2001, coll. A. Bal; 7♀♀, Kausani, 4.x.2001, coll. A. Bal; 2♂♂, 2♀♀, Kausani, 19.x.2001, coll. B.C. Das; District : Dehradun : 1♂, 1♀, Dehradun, 18.v.1958, coll. K.K. Tiwari; 2♂♂, 2♀♀, Kempty falls, 6.x.2001, coll. S.K. Mandal. District : Nainital : 1♂, 2♀♀, Bhowali, 13.xi.2000, coll. S.K. Mandal.

Diagnosis : Medium size; antennae longer than head and pronotum together; pronotal and thoracic markings much lighter with proportionately broader light oblique band on episternum III; Ratio of length to depth of hind femur never less than 3.45; male cercus with rounded apex.

Distribution : India (Uttarakhand, Andaman and Island, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Kerala, Madhya Pradesh, Maharastra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Bangladesh, Borneo, Indo China, Lombock, Malaya, Myanmar, New Guinea, Philippines, Sri Lanka, Sumatra, Thailand, S. Tibet, Vietnam and Yunan.

Remarks : This species is also found in moist forest parts near streams and rivers.

30. ***Xenocatantops karnyi*** (Kirby)

1910. *Catantops karnyi* Kirby, *Syn. Cat. Orthopt.*, **3** : 483.

1982. *Xenocatantops karnyi* : Jago, *Trans. Am. ent. Soc.*, **108**(3) : 455.

Material examined : District : Tehri Garwal : 1♂, 2♀♀, Rishikesh, Tapovan, 9.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; pronotum constricted; prosternal process conical; posterior femur being with a row of black dots on the lower outer carina for the whole length; cercus with apical bifurcation bluntly pointed and subequal; epiphallus with distinct lophi almost square in plane view.

Distribution : India (Uttarakhand, Andamans, Andhra Pradesh, Delhi, Himachal Pradesh, Tamil Nadu, Uttar Pradesh).

Elsewhere : Bangladesh, Sri Lanka, Myanmar, Thailand, Vietnam, Philippines, Indonesia.

Remarks : Specimens are collected from the single locality.

Genus ***Stenocatantops*** Dish and Uvarov

*31. ***Stenocatantops splendens*** (Thunberg)

1815. *Gryllus splendens* Thunberg, *Mem. Acad. Sci. St.-Petersh.*, **5** : 236.

1953. *Stenocatantops splendens* : Dirsh and Uvarov, *Tijschr Ent.*, **96**(3) : 237.

Material examined : District : Almora : 3♀♀ Kausani, 19.xi.2000, coll. S.K. Mandal, District : Tehri Garwal : 1♀, Tehri Garwal, Chota Sheuta, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; body more slender and elongated; middle joint of antennae about twice or three times as long as broad; prosternal tubercle strongly curved and inclined backwards profile; colour brown or brownish testaceous.

Distribution : India (Uttarakhand, Arunachal Pradesh, Andaman and Nicobar Islands, Assam, Madhya Pradesh, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Borneo, Celebes, China, Hainan, Java, Korea, Malaya, Maluccus Islands, Myanmar, Philippines, Sri Lanka, Sumatra, Thailand.

Remarks : This species is newly recorded from Uttarakhand.

Subfamily CYRTACANTHACRIDINAE

Key to genera

1. Prosternal process straight, vertical or slightly inclined backwards in the direction of mesosternum, far from reaching the later, conical or compressed 2

– Prosternal process strongly curved backwards touching or almost touching mesosternum, inflated in middle, with acute or subacute apex 3

2. Tegmina with oblique venation in apical part, transverse vein situated obliquely to principal veins; prosternal process conical, male cercus

elongate conical; male subgenital plate acuminate, apex pointed ..... ***Pachyacris*** Uvarov

– Tegmina with straight venation in apical part, transverse vein; forming almost right angle with principal veins; prosternal process almost cylindrical, with rounded apex ..... ***Patanga*** Uvarov

3. Pronotum strongly tectiform; integument strongly rugose; median carina of pronotum sharp; male cercus incurved at base, about half as wide as its length ..... ***Chondracris*** Uvarov

– Pronotum moderately tectiform, slightly constricted; integument fairly rugose, almost smooth; male cercus with subacute apex .... ***Cyrtacanthacris*** Walker

Cyrtacanthacris Walker, 1870

32. *Cyrtacanthacris tatarica* (Linnaeus)

1758. *Gryllus Locusta tataricus* Linnaeus, *Systema Naturae (10th ed.)* : 432.

1923. *Cyrtacanthacris tatarica* : Uvarov, *Bull. Ent. Res.*, **14** : 39.

Material examined : District : Hardwar : 1♂, Jowalapur, 14.ix.2006, coll. A.K. Sidhu, District : Tehri Garwal : 3♂♂, Chandighat, 5,6.ix.2002, coll. S.K. Mandal.

Diagnosis : Size Large; pronotum on both sides above with a broad velvety blackish brown band; tegmina with thick and dense reticulation and transverse oblique fasciae or irregular spots; wings hyaline or sometimes yellowish at base; hind tibiae bluish or brown with yellow or brown spines, tips black.

Distribution : India (Uttarakhand, Andhra Pradesh, Assam, Bihar, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharastra, Manipur, Orissa, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal).

Elsewhere : Africa (except North Africa) and Sahara, Hainan, Madagascar, Philippines, Seychelles, Sri Lanka, Sumatra and Thailand.

Remarks : Multivorous species.

Genus *Patanga* Uvarov, 1923

33. *Patanga succincta* (Johansson)

1763. *Gryllus Locusta succinctus* Johansson, *Amoen. Acad.* **4** : 398.

1923. *Patanga succincta* : Uvarov, *Ann. Mag. Nat. Hist.*, (9)**11** : 364.

Material examined : District : Almora : 4♂♂, 3♀♀, Binsar, 17.xi.2000, coll. S.K. Mandal; 4♀♀, Binsar, WLS, 26.ix.2001, coll. A. Bal; 2♀♀, Ketramari, 3.x.2001, coll. A. Bal; District : Hardwar : 3♀♀, Jagadish jhil, 15.ix.2006, coll. A.K. Sidhu; District : Tehri Garwal : 1♀, Chota sheuta, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Size Large; pronotum stouter, shorter, hind margin obtuse to rectangulate; tegmina with a straight venation in apical part, transverse veins forming almost right angle with principal veins, wing base rosy violet or colourless, male subgenital plate long, curve upwards conical and apex pointed.

Distribution : India (Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Himachal Pradesh, Jammu and Kashmir, Kerala, Laccadive, Islands, Maharastra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh Tripura and West Bengal).

Elsewhere : South Arabian desert, China, Japan, South East Asia, Sri Lanka, Taiwan.

Remarks : This species can be easily recognized in having tegmina with a straight venation in apical part.

34. *Patanga japonica* (Bolivar)

1998. *Acridium japonicum* Bolivar, *Annali, Mus. Civ. Stov. Giacomo doria*, **39** : 98.

1922. *Patanga japonica* : Uvarov, *Ann. Mag. Nat. Hist.*, **12**(9) : 364.

Diagnosis : Size Large; colour more or less pale varied with grayish and brownish; antennae pale; brownish or darker,; a broad blue black stripe below each eye; pronotum distinctly compressed laterally, punctate, crossed by three sulci; prosternal tubercle cylindrical with rounded apex and a little inclined; cecus short, conical spine like.

Distribution : India (Uttarakhand, West Bengal).

Elsewhere : China, Japan, Pakistan.

Remarks : No specimen of this species has been found during the present study. It is reported by Tandon and Shishodia (1995).

Genus ***Pachyacris*** Uvarov, 1923

35. ***Pachyacris vinosa*** (Walker)

1870. *Acridium vinosum* Walker, *Cat. Derm. Salt. Brit. Mus.*, **3** : 588.

1921. *Pachyacris vinosa* : Uvarov, *Ann. Mag. Nat. Hist.*, (9)**11** : 478.

Material examined : District : Tehri Garwal : 1♀, Tapovan, Rishikesh, 9.x.2001, coll. S.K. Mandal.

Diagnosis : Large in size; fastigium of vertex almost flat; tegmina surpassing the tip of hind femora by a distance distinctly less than the length of pronotum, with oblique venation in apical part and transverse veins situated obliquely to principle vein; wings infumate, rosy at base; male cercus elongate conical with acuminate apex.

Distribution : India (Himachal Pradesh, Assam, Bihar, Goa, Manipur, Meghalaya, Mizoram, Orissa, Tripura, Uttar Pradesh and West Bengal).

Elsewhere : China, Mayanmar, Nepal, Thailand, Tonking.

Remarks : A single specimen is collected from a locality. It is forest in habitat.

Subfamily ACRIDINAE

Key to genera

1. Posterior margin of pronotum rounded or angular 2
– Posterior margin of pronotum straight ..... ***Anaptygus*** Bolivar
2. Head conically ascending; hind femora with a spine on the dorso-external and dorso-internal genicular lobes ..... ***Acrida*** Linnaeus
– Head not ascending; hind femora with rounded dorso-external and dorsointernal genicular lobes 3
3. Antennae filiform ..... ***Ceracris*** Walker
– Antennae ensiform or sword-shaped 4
4. Apex of tegmina and wings usually sharpend ..... ***Parella***
– Apex of tegmina and wings usually rounded of 5
5. Lateral carina of pronotum linear; continuous; fastigium of vertex often with a strong median diving carinula; posterior femora thickened at base ..... ***Phlaeoba*** Stål
– Lateral carina of pronotum diverging in metazonal area; fastigium of vertex with or without indistinct median carinula; posterior femora rather slender at base ..... ***Holopercna*** Karsch

Genus ***Acrida*** Linnaeus, 1758

Key to genera

1. Fastigium of vertex broadly rounded at apex; transverse sulcus a little before the middle of pronotum disc ..... ***exaltata***
– Fastigium of vertex obtuseangulated at apex; transverse sulcus beyond the pronotum disc ..... ***indica*** Dirsh

37. ***Acrida exaltata*** (Walker)

1859. *Truxalis exaltata* Walker, *Ann. Mag. nat. Hist.*, (3)**4** : 222.

1954. *Acrida exalta* : Dirsh, *Bull. Soc. Fouad Ent.*, **38** : 149.

Material examined : District : Dehradun : 1♀, Mussourie, 16.vi.1930, coll. B. N. Chopta; 1♂, Lachiwala, 27.x.2002, coll. M. Prasad. District : Nainital; 2♂♂, Joshpur, 2.viii.1989, coll. R.K. Vershney & S.K. Mandal; 4♂♂ Khairna, 3.viii.1989, coll. R.K. Varshney; 2♂♂ Patharchatta, 10.viii, 1989, coll. R.K. Varshney. District : Rudraprayag; 7♂♂, Augusthmuni, 30.viii.2002, coll. S.K. Mandal. District : Tehri Garwal; 1♂, 2♀♀, Rishikesh, 8.x.2001, coll. S.K. Mandal. 1♂, Chandighat, 6.ix.2002, coll. S.K. Mandal.

Diagnosis : Size medium large size; head conically ascending, basal part narrow, fastigium of vertex broad, laminate and truncate; transverse sulcus of pronotum placed about the middle of disc; hind femora without any peg-like structure on internal surface.

Distribution : India (Uttarakhand, Widely distributed).

Elsewhere : Afghanistan, Aden, Arabia, Bangladesh, S.E. Iran, Nepal, Pakistan, Sri Lanka, S.E. Tibet and Yemen.

38. *Acrida indica* Dirsh

1953. *Acrida indica* : Dirsh, *Bull. Soc. Foud. Ler. Entom.*, **38** : 151.

Diagnosis : Size larger than the preciding species; head robust, strongly broadened at basal part, lateral carinae of pronotum straight and almost parallel, slightly convergent forwards; elytra a little produced beyond the hind knee, broad and short, wings shorter than elytra, broad with obtuse apex.

Distribution : India (Uttarakhand, Arunachal Pradesh, Assam, Gujrat, Kashmir and Maharastra).

Elsewhere : Afghanistan, Arabia, Ceylon S.E. Persia, S.E. Tibet, W. Aden, Yemen.

Remarks : There is no specimens found during the present collection. This species is reported by Tandon and Shishodia (1995).

Genus *Phlaeoba* Stål, 1860

Key to genera

1. Wings more or less fuscous at apex 2
– Wings hyaline at apex, pronotum very rugulose and striated ..... ***panteli*** Bolivar
2. Antennae unicolours ..... ***infumata*** Brunner
2. Antennae unicolours ..... ***infumata*** Brunner
– Antennae ringed or tipped with obscure yellow ..... ***antennata*** Brunner

39. *Phlaeoba infumata* Brunner

1893. *Phlaeoba infumata* Brunner, *Annali Mus. civ. Stor. Nat. Giacomo Doria*, **33** : 124.

1914. *Phlaeoba infumata* : Kirby, *Fauna Brit. India, Orthopt.*, : 103.

Material examined : District : Chamoli, 2♀, Gauchara, 21.viii.2002, coll. S. Mandal. District : Nainital : 1♀, Kaladungi, 2.viii.1989, coll. R.K. Varshney; 5♂♂, 4♀♀, Joshpur, 6.viii.1989, coll. SR.K. Varshney; 2♂♂, 2♀♀, 7.viii.1989, coll. R.K. Varshney; 1♂, Nanak sagar, 9.viii.1989, coll. R.K. Varshney; 8♂♂, 1♀, Patharchatta, 10.viii.1989, R.K. Varshney; District : Rudra Parayag : 1♂, Augusthmuni, 30.viii.2002, coll. S.K. Mandal; District : Tehri Garwal : 1♂, 1♀, Chandighat, 6.ix.2002, coll. S.K. Mandal.

Diagnosis : Size medium; brownish testaceous in colour; antennae ensiform; tegmina and wings longer than abdomen; wings fusco-hyaline, infuscated towards extermity and subgenital plate of male acute at apex.

Distribution : India : Widely distributed.

Elsewhere : S. China, Malacca, Myanmar, E. Nepal.

40. *Phlaeoba antennata* Brunner

1914. *Phlaeoba antennata* : Kirby, *Fauna Brit. India, Orth.*, (Acrididae) : 102.

Diagnosis : Medium in size; oliver-brown colour with a broad band running from the vertex to the end of tegmina, at least in male; antennae ensiform, black, tipped with yellow; pronotum smooth, all the three carinae well marked; wings bluish black at base, infuscated towards the tip; posterior tibiae dirty blue.

Distribution : India (Uttarakhand, Arunachal Pradesh, Assam, Kerala, Orissa, Rajasthan, West Bengal).

Elsewhere : Bangladesh, Borneo, Myanmar, China, Hainan, Malaya, Tonking, Sumatra.

Remarks : From literature of Tandon and Shishodia (1995).

41. *Phlaeoba panteli* Bolivar

1902. *Phlaeoba panteli* Bolivar, *Annls. Soc. ent. France*, **70** : 589.

1914. *Phlaeoba panteli* : Kirby, *Fauna Brit. India, Orthopt.*, (Acrididae) : 104.

Diagnosis : Size medium; antennae ensiform and shorter than head and pronotum together, brown at apex; pronotum truncated in front, obtusely angulated behind; head and pronotum very rugose, the callosities being irregularly striated; wings narrow, bluish hyaline, with many of nervures greenish; colour ferruginous brown with scattered black dots.

Distribution : India (Uttarakhand, Andhra Pradesh Bihar, Himachal Pradesh, Meghalaya, Madhya Pradesh, Tamil Nadu and West Bengal).

Elsewhere : Afghanistan.

Remarks : This species is limited in distribution. This species is reported by Tandon and Shishodia (1995).

Genus ***Ceracris*** Walker, 1870

Key to genera

42. ***Ceracris nigricornis nigricornis*** (Walker)

1870. *Ceracris nigricornis* Walker, *Cat. Derm. Salt. Br. Mus.*, **4** : 791.

1924. *Ceracris nigricornis nigricornis* : Uvarov, *Ent. Mitt. Berl.*, **14** : 13.

Material examined : Nainital district : 2♂♂, Bhowali, 13.x.2001, coll. S.K. Mandal; 1♂, Jharmola, 13.x.1972, coll D.K. Mandal.

Diagnosis : Size medium; face and pronotum coarsely punctured; olive green in colour, black lateral fascia on the head and upper margin of pronotal lobes, not extended on the disc of metazona, tegmina with anal field green or brownish green; hind femora with a narrow pale pre-apical ring; hind knee black, but in female lobes pale; hind tibiae dirty its bluish base black, a pale posterior basal ring, followed by blackish ring.

Distribution : India (Uttarakhand, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Afghanistan, China, Myanmar, Taiwan, Thailand, Vietnam.

Remarks : This species is forest in habitat.

*43. ***Ceracris striata*** (Brunner)

1989. *Ceracris fasciata* : Ingrisch, *Spixiana*, **11**(3) : 235.

Material examined : District : Dehradun : 2♂♂, 2♀♀, Bibiwala, 13.x.2000, coll. S.K. Mandal; District : Tehri Garwal; 5♂♂, 4♀♀, Bhuniyala, 2.ix.2001, coll S.K. Mandal.

Diagnosis : Size medium; lateral carinae of pronotum broken, a little divergent anteriorly in prozona and strongly divergent in metazona; colour dark brown; antennae with white tips; hind femora dark brown with black knee and a pale pre apical ring; hind tibiae black at base, folowed by a white ring, rest blackish blue to dark brown.

Distribution : India (Uttarakhand, Tripura).

Elsewhere : S. China, Myanmar, and Thailand.

Remarks : This species is limited in distribution in Uttarakhand. It is newly recorded from Uttarakhand.

Genus ***Perella*** Bolivar

44. ***Perella insignis*** Bolivar

1914. *Perella insignis* : Bolivar, *Trab. Mus. Cienc. Nat. Madr.*, Madrid, **20** : 87.

Material examined : District : Rudra Prayag : 6♂♂, 1♀, Augusthmuni, 29.viii.2002, coll. S.K. Mandal.

Diagnosis : Body slender; pale green in colour; head minutely punctate, wings hyaline; pronotum with anterior margin a little outcurved; posterior margin rounded; lateral margins of pronotum rugosely punctate; posterior femora on aoral surface infuscated, posterior tilcia libia in appearance.

Distribution : India (Uttarakhand, Tamil Nadu).

Remarks : Previously it has been found from south India.

Genus ***Anaptygus*** Ragge

45. ***Anaptygus rectus*** Ragge

1954. *Anaptygus rectus* : Ragge, *Proc. R. ent. Soc. London*, **23**(B) : 188.

Material examined : District : Almora : 3♂♂, 11♀♀, Zeropoint of Pindari Glacier, 2.ix.1990, coll. PC. Tak; 1♀, Around Dwali, 31.ix.1990, coll. P.C. Tak, District : Chamoli : 4♂♂, 5♀♀, Roopkund area, Nandadevi Biosphere reserve, 8.ix.1991, coll. P.C. Tak, (Regd. no. 8012/H5, 8087/H5, 8484-86/H5).

Diagnosis : Size small; brachypterus; head margin of pronotal disc straight or with slight median indentation; vertex without median carinula foveole poorly developed with rounded ends; pronotum with well developed median and lateral carinae; hind femora four times longer than their maximum width; cerci short, conical; valves of ovipositor robust.

Distribution : India (Uttarakhand).

Remarks : It is endemic to India.

Genus ***Holopercna*** Karsh, 1891

46. ***Holopercna darjeelingensis*** (Bolivar)

1914. *Sjoestedtia darjeelingensis* Bolivar, *Bol. Trab. Mus Cienc. nat. Madr.*, **20** : 77.

1984. *Holopercna darjeelingensis* : Jago, *Trans. Amer. Ent Soc.*, **109** : 78.

Material examined : District : Uttarkashi : 1 ♀, Barkot, 22.ix.2005, coll. A.K. Sidhu.

Diagnosis : Medium size; Lateral carinae of pronotum diverging in metazona; fastigium moderately concave; posterior femora slender; general colour brown, mottled with dark and yellowish spaces and stripes; eyes brownish; posterior femur slender with whitish yellow, with darks spots on carinae and carinulae.

Distribution : India (Uttarakhand Arunachal Pradesh, Assam, Himachal, Sikkim, Uttar Pradesh, West Bengal).

Remarks : Single specimen has been collected from Uttarkashi.

Subfamily GOMPHOCERINAE

Key to Genera

1. Fastigium with acute apex; frontal ridge with obtuse lateral carinae ..... ***Leva*** Bolivar
- Fastigium with truncate apex; frontal ridge without lateral carinulae ..... ***Dnopherula*** Karsch

Genus ***Dnopherula*** Karsch, 1896

Subgenus ***Aulacobothrus*** Bolivar, 1902

47. ***Dnopherula (Aulacobothrus) luteipes*** (Walker)

1871. *Stenobothrus luteipes* Walker, *Cat. Derm. Salt. Brit. Mus.*, **5** Suppl. : 82.

1971. *Dnopherula (Aulacobothrus) Luteipes* : Jago, *Proc. Acad. Sci. Philad.*, **123**(8) : 243.

Material examined : District : Almora : 2♂♂, ♀♀, Binsar WLS, 22.xi.2000, coll. S.K. Mandal. District : Dehradun : 1 ♀, Mussoourie, 19.xi.2001, coll. S.K. Mandal. District : Nainital : 2♂♂, 3♀♀, Bhimtal, 11.xi.2000, coll. S.K. Mandal; 4♂♂, 2♀♀, Bhowali, 13.xi.2000, coll. S.K. Mandal. District. Pithoragarh : 1♂, Pithoragarh, 22.xi.2000, coll. S.K. Mandal; District : Tehri Garwal : 4♀♀, Chota Sheuta, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Size small; hind femur with three black bands on the dorsal surface and with a black distal end; pronotum subcylindrical with nearly parallel lateral carinae which are weakly concave in the middle part; posterior part of pronotum nearly smooth and posterior margin obtusely angulate; median carina distinct; hind tibiae reddish in the apical part.

Distribution : India (Uttarakhand, Assam, Bihar, Delhi, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharastra, Orissa, Tamil Nadu, West Bengal).

Elsewhere : N. America, China, Europe, Japan, Myanmar and Sri Lanka.

Remarks : Widely distributd in India.

48. ***Dnopherula (Aulacobothrus) descisus*** (Walker)

1871. *Stenobothrus decisus* Walker, *Cat. Derm. Salt. Br. Mus.*, **5** : 80.

1971. *Dnopherula (Aulacobothrus) decisus* : Jago, *Proc. Acad. Sci. nat. Philad.*, **123**(8) : 24.

Material examined : District : Almora : 2♀♀, Binsar, 17.xi.2000, coll. S.K. Mandal. District : Nainital : 3♂♂, Kherna, 12.x.2000, coll. S.K. Mandal. District : Pithoragarh : 3♂♂, 7♀♀, Pithoragarh, 22.xi.2000, coll. S.K. Mandal; District. Tehri Garwal : 1♂, 2♀♀, Chota Sheuta, 18.x.2001, coll. S.K. Mandal.

Diagnosis : Size small; general colour brownish; fastigium of vertex almost subtraingular; abdomen carinated above; a pale stripe usually running from fastigium to end of pronotum; tegmen rufo testaceous; tibiae with small black spines on each side.

Distribution : India (Uttarakhand, Arunachal Pradesh, Karnataka, Maharastra).

Remarks : This species is limited in distribution.

Genus ***Leva*** Bolivar, 1909

49. ***Leva indica*** (Walker)

1909. *Gymnobothrus indicus* Bolivar, *Bol. Soc. exp. Hist. nat.*, **9** : 295.

1921. *Leva indica* : Uvarov, *Ann. nat. Hist.*, **7**(9) : 485.

Material examined : District : Almora : 2♂♂, 2♀♀, Binsar WLS, 17.xi.2000, coll. S.K. Mandal. District : Nainital : 2♂♂, Bhowali, 13.xi.2000, coll. S.K. Mandal. District : Pithoragarh : 1♂, Pithoragarh, 22.xi.2000, coll. S.K. Mandal.

Diagnosis : Size small; antennae filiform, basal segments slightly depressed; fastigium of vertex long, angular with acute apex; foveolae not visible from above; lateral carinae of pronotum parallel in prozona and divergent in metazoan; median carina cut by 3rd sulcus in metazoan.

Distribution : India (Uttarakhand, Bihar, Delhi, Orissa, Tamil Nadu, Tripura and West Bengal).

Subfamily OEDIPODINAE

Key to genera

1. Pronotum constricted in prozona; lateral carinae of pronotum not parallel in prozona; foveolae of fastigium long, linear, visible from above ..... ***Aiolopus*** Fieber
- Pronotum not constricted in prozona; lateral carinae of pronotum as usual in prozona; foveolae of fastigium not as above 2
2. Median carina of pronotum complete or cut by one transverse groove 3
- Median carina of pronotum cut by two or three transverse grooves 10
3. Thorax short 4
- Thorax long 9
4. Basal half of tegmina opaque 5
- Basal and apical portion of tegmina subhyaline ..... ***Locusta*** Linnaeus
5. Transverse veins in apical part of tegmina erect, the cells square or oblong 6
- Transverse veins of apical part of tegmina oblique, arranged zig-zag ..... ***Pternoscirta*** Saussure
6. Posterior pair of wings without well marked fascia 7
- Posterior pair of wings with well marked fascia 29
7. Internal calcaria of posterior tibiae not greatly unequal, normal ..... ***Dittopternis*** Saussure
- Internal calcaria or posterior tibiae unequal, the lower one much longer than the upper, apex acute and abruptly hooked ..... ***Heteropternis*** Stål
8. Pronotum with pale marks arranged so as to form 'X' mark ..... ***Oedaleus*** Fieber
- Pronotum without 'X' mark 9
9. Pronotum with well marked median carina, and with numerous longitudinal rugae ..... ***Morphacris*** Walker
- Pronotum with strong crest or acutely tectiform, without rugae; wings without black colour at apex ..... ***Gastrimargus*** Saussure
10. Median carina of pronotum intersected by two transverse grooves ..... ***Trilophidia*** Stal
- Median carina of pronotum intersected by three transverse grooves 11
11. Head much elongate, front strongly reclinate ..... ***Pusana*** Uvarov
- Head not much elongate, front not strongly reclinate ..... ***Sphingonotus*** Fieber

Genus ***Aiolopus*** Fieber, 1853

50. ***Aiolopus thalassinus tamulus*** (Fabricius)

1798. *Gryllus tamulus* Fabricius, *Ent. Syst., Suppl.* : 195.

1968. *Aiolopus thalassinus tamulus* : Hollis, *Bull. Brit. Mus. nat. Hist.* (Ent.), **22**(7) : 347.

Material examined : District : Almora : ♂, Ranikhet, 29.xi.2001, coll. A. Bal; District : Dehradun : 1♂, Molta, 19.v.1956, coll. K.K. Tiwari, (ZSI, Regd. no. 245/H5). District : Nainital : 2♂♂, 2♀♀, Bajpur, 7.viii.1989, coll. R.K. Varshney; District : Rudraprayag : 1♀, Gauchara, 21.viii.2002, coll. S.K. Mandal; District : Pithoragarh : 1♂, 1♀ Pithoragarh, 22.xi.2000, coll. S.K. Mandal. District : Tehri Garwal; 1♀, Rishikesh, 2.ix.2002, coll. S.K. Mandal.

Diagnosis : Size medium; fastigium with front angle more acute; foveolae narrowly trapezoid, about as long as wide; pronotum somewhat saddle-shaped, posterior margin rounded; posterior tibiae usually with red colouration in apical fourth and broadly separated from black band by a wide bluish grey band.

Distribution : India (Uttarakhand, Andaman & Nicobar Islands, Bihar, Delhi, Himachal Pradesh Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Australia, Bangladesh, Borneo, Celebes, China, Hainan, Hong Kong, Japan, Java, Lombok, Malaya, Myanmar, New Guines, Papua, Philippines, Singapore, Sri Lanka, Sumatra, Taiwan, Thailand and Timor.

Remarks : This species is recorded throughout Oriental region and extends upto Australia.

Genus ***Heteropternis*** Stål, 1873

51. ***Heteropternis respondens*** (Walker)

1859. *Acrydium respondens* Walker, *Ann. Mag. nat. Hist.*, **4**(3) : 223.

1915. *Heteropternis respondens* : Kirby, *Faun. Brit. India, Orthoptera* : 141`

Diagnosis : Body medium in size; head smooth or a little granulated; hind margin of pronotum rectangular, rounded at apex; basal half of tegmina opaque, transverse veins in apical part erect, the cells square or oblong; wings without well marked fascia; hind tibiae red unequal internal spines, wings yellow at base and darker towards out-side.

Distribution : India (Uttarakhand, Arunachal Pradesh, Bihar, Himachal Pradesh, Orissa, Tamil Nadu, and Uttar Pradesh).

Elsewhere : China, Java, Myanmar, Malacca, South East Asia, Sri Lanka and Sumatra.

Remarks : From literature of Tandon and Shishodia (1995).

Genus ***Oedaleus*** Fieber, 1853

Key to species

1. Pronotum with posterior margin pointed; wings hyaline at base .....***abruptus*** (Thunberg)

– Pronotum with posterior margin rounded; wings greenish hyaline at base ....***Seregalensis*** (Krauss)

52. ***Oedaleus abruptus*** (Thunberg)

1815. *Gryllus abruptus* Thunberg, *Mem. Acad. Sci, St. Petersb.*, **5** : 233.

1981. *Oedaleus abruptus* : Ritchie, *Bull. Brit. Mus. nat. Hist. (Ent).* **42**(3) : 104-107.

Material examined : District : Tehri Garwal : 4♂♂, 6♀♀, Old Tehri, (Chamba), 19.x.2001, coll. S.K. Mandal. 2♂♂, 3♀♀, Rishikesh, dt.iii.2002, coll. S.K. Mandal : District : Nainital : 5♀♀, Bhawali, 12.x.2000, coll. S.K. Mandal : District : Uttarkashi : 1♀, Uttarkashi, 13.x.2001, coll. S.K. Mandal.

Diagnosis : Size medium; pronotum low tectiform, median carina low acute, not interrupted by posterior sulcus; hind margin obtusely angular; pronotal x marking always with anterior and posterior arms separate-hind tibiae with straw or red coloured with dark basal ring and thicker sub-basal pale ring.

Distribution : India (Himachal Pradesh, Andhra Pradesh, Bihar, Goa, Jammu & Kashmir, Goa, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Afghanisthan, Bangladesh, China, Indo-China, Myanmar, Nepal Pakistan, Sri Lanka and Thailand.

Remarks : It is widely distributed species.

53. ***Oedaleus senegalensis*** (Krauss)

1877. *Pachytylus sengalensis* Krauss, *S ber-Akad. Wis. Wien.*, **76**(1) : 56.

1981. *Oedaleus senegalensis* : Ritchie, *Bull. Br. Mus. nat. Hist.* (Ent), **42**(3) : 94-99.

Diagnosis : Size small; posterior margin of pronotum rounded, subacute, narrow, subhyaline towards the base; hind tibiae dark red.

Distribution : India (Uttarakhand, Kashmir, Punjab and Tamil Nadu).

Elsewhere : Afghanisthan, Middle east, North Africa, West Russia.

Remarks : No specimen of this species has been found during present study. We have studied the specimen present in National Zoological Collection. From literature Tandon and Shishodia (1995).

Genus ***Sphingonotus*** Feiber, 1852

54. ***Sphingonotus longipennis*** Saussure

1884. *Sphingonotus longipennis* Saussure, *Mem. Sox. Phyes. Hist. nat. Geneva*, **28**(9) : 197-203.

Material examined : District : Dehradun : 1♀, Karwapani, 24.xi.1966, coll. Asket Singh.

Diagnosis : Body medium size; wings bluish in the middle, followed by a broad black band, curving from the middle of the costa to above the anal angle; hind femora blue; tibiae alternately banded with blue black.

Distribution : India (Uttarakhand, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Punjab and West Bengal).

Remarks : No specimen has been found during the present study. We have studied the specimen present in National Zoological Collection.

Genus ***Gastrimargus*** Saussure, 1884

55. ***Gastrimargus africanus africanus*** (Saussure)

1888. *Oedaleus (Gastrimargus) marmoratus var. africana* Saussure, *Mem. Soc. Phys. Hist. nat. Geneva,* **30**(9) : 39.

1982. *Gastrimargus africanus africanus* : Ritchie, *Bull. Brit. Mus. nat. Hist. (Ent.).,* **44**(4) : 248.

Material examined : District : Rudraprayag : 1♂, Augusthmuni, 30.viii.2002, coll. S.K. Mandal; District : Tehri Garwal : 1♂, 2♀♀, Bhuniawala, 30.viii.2002, coll. S.K. Mandal.

Diagnosis : Body large size; antennae as long as head and pronotum together or slightly larger; pronotum tectiform with high sharp median carina; metazona of pronotum with X-marking usually effaced and without pale striae; wings with dark brown or black fasciae hind femora brown or blackish.

Distribution : India (Uttarakhand, Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Karnataka, Orissa, Sikkim, Uttar Pradesh and West Bengal).

Elsewhere : Nepal, Saudi Arabia, Sri Lanka, Thailand, Tibet and Yemen A.R.

Genus ***Pusana*** (Uvarov)

56. ***Pusana rugulosa*** (Uvarov)

1923. *Pusana rugulosa* Uvarov, *Ann. Mag. nat. Hist.,* **9**(7) : 491.

1940. *Pusana rugulosa* : Uvarov, *Ann. Mag. nat. Hist.,* **6**(3) : 117.

Material examined : District : Dehradun : 1♂, ♀, Kalapani, 5.v.1967, coll. J.C. Tripathi (Regd. no. 3797-98/H5).

Diagnosis : Size medium; face and body covered with sparse hairs; antennae longer than the head and pronotum together; face smooth; frontal ridge sulcate and parallel between fastigium and ocellus; pronotum feebly constricted anteriorly, metazona almost flat, scarcely raised above the prozona; tegmina extending beyond the hind knees; wings hyaline, veins bluish except the apical part where they are brown; hind tibiae bluish.

Distribution : India (Himachal Pradesh, Bihar, Sikkim).

Elsewhere : Bangladesh.

Remarks : No Specimen has been found in the present collection. We have studied the specimen present in National Zoological Collection.

Genus ***Trilophidia*** Stål, 1873

57. ***Trilophidia annulata*** (Thunber)

1815. *Gryllus annulatus* Thunberg, *Mem. Adad. Sci. St. Petersb.,* **5** : 234.

1965. *Trilophidia annulata* : Hollis, *Trans. R. ent. Soc. London,* **117**(8) : 251.

Material examined : District : Dehradun : 1♂, 1♀, Bhuniawala, 27.x.2002, coll. M. Prasad; District : Nainital : 1♂, Kherna, 12.xi.2000, coll. S.K. Mandal; District : Rudraprayag : 1♀ Gauchara, 21.viii.2002, coll. S.K. Mandal District : Uttarkashi : 6♂♂, 3♀♀, Bhojbasa, 14.x.2002, coll. S.K. Mandal.

Diagnosis : Size medium; body brown to grey with black markings, pubescent beneath; pronotum rugose with a high median carina, forming two teeth in front, and with lateral carina; wings yellow at base and brown or black beyond; hind tibiae brown with a pale band towards the base and with a little pale band beyond the middle.

Distribution : India (Himachal Pradesh, Andhra Pradesh, Bihar, Goa, Karnataka, Madhya Pradesh, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal).

Elsewhere : Afghanistan, Bangladesh, Borneo, South China, Japan, Java, Korea, Malayasia, Mongolia, Myanmar, Nepal, Pakistan, Philippines Sarawak, Singapore, Sri Lanka, Sumatra, Taiwan, Thailand, Vietnam.

Remarks : It is a bare ground species.

Genus ***Acrotylus*** Fieber, 1853

58. ***Acrotylus humbertianus*** Saussure

1884. *Acrotylus humbertianus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve,* **28**(9) : 189.

1914. *Acrotylus humbertianus* : Kirby, *Fauna Brit. India, Orthoptera* : 153.

Material examined : District : Nainital : 1♂ Mailani, 30.iv.1908, coll. R.H. (Mus. colln.).

Diagnosis : Body medium in siz; antennae longer than head and pronotum together; tip of

vertex conical, concave, with a carina on each side; prozona with fuscus fascia, lateral margin white below; tegmina with two oblique white spots or fascia; wings byaline, yellow at base; radial area with a semilumnar fuscus fascia.

Distribution : India (Uttarakhand, Andhra Pradesh, Assam, Delhi, Goa, Himachal Pradesh, Madhya Pradesh, Maharastra, Rajasthan, Tamil Nadu and West Bengal).

Elsewhere : Afghanistan, Bangladesh, Nepal, Pakistan, Sri Lanka.

Remarks : We have studied the specimen from old national collection.

Genus ***Morphacris*** Walker, 1870

59. ***Morphacris fasciata sulcata*** (Thunberg)

1815. *Gryllus fasciatus* Thunberg, *Mem. Acad. Sci. St., Petersb.*, **5** : 230.

1921. *Morphacris fasciata sulcata* : Uvarov, *Ann. Mag. nat. Hist.*, (9)**7** : 488-89.

Diagnosis : Size medium; antennae filliform, longer than head and pronotum together; pronotum tectiform, without lateral carinae; median carina sharp and high; dorsum covered with parallel sharp longitudinal ridges; wings at base light yellowish with dark transverse fascia.

Distribution : India (Uttarakhand, Andhra Pradesh, Bihar, Goa, Kerala, Madhya Pradesh, Maharastra, Tamil Nadu).

Remarks : This species is endemic to India. From literature of Tandon and Shishodia (1995).

Genus ***Pternoscirta*** Saussure, 1884

60. ***Pternoscirta cinctifemur*** (Walker)

1859. *Acrydium respondens* Walker, *Ann. Mag. nat. Hist.*, **4**(3) : 223.

1914. *Pternoscirta cinctifemur* : Kirby, *Faun. Brit. India, Orhopt.*, : 134.

Material examined : District : Dehradun; 1ex., Dehradun, 18.v.1956, coll. K.K. Tewari. (Z.S.I. Regd. no. 2453/H5).

Diagnosis : Size medium; head short and some what rugose; antennae filiform; tegmen brown, varied with paler markings on the basal half, then with a hyaline patch, and more or less varied with brown and subhyaline brown beyond, the cells being arranged in oblique quadrilaterals, angulated towards each other at the longitudinal nervures; wings often rose colour at base, with no central black band; hind tibiae black, banded with yellow at base and blue beyond.

Distribution : India (Uttarakhand, Goa, Manipur, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal).

Remarks : This species is endemic to India.

Genus ***Dittopternis*** Saussure, 1884

61. ***Dittopternis venusta*** (Walker)

1870. *Oedipoda venusta* Walker, *Cat. Derm. Salt. Br. Mus.*, **4** : 740.

1913. *Dittopternis venusta* : Kirby, *Faun British India*, (Orthopt.) Acrididae : 140.

Material examined : Nil.

Diagnosis : Size small; deep brown in colour; pale beneath; vertex with four diverging rows; pronotum rugose, granulated and strongly carinated, cut by principal sulcus before the middle, obtusely angulated behind, with tip rounded; wings hyaline, yellow at base, with broad suffused blackish band beyond; hind tibiae black at base, followed by a light yellow band, then blue.

Distribution : India (Uttarakhand, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu).

Elsewhere : Sri Lanka.

Subfamily CALLIPTAMINAE

Peripolus Martinez, 1902

62. ***Peripolus pedarias*** (Stål)

1878. *Caliptamus pedarius* Stål, *Bih. Svensk. Vel. Akad. Handl.*, **5**(4) : 75.

1914. *Peripolus pedarius* : Kirby, *Faun Brit. India, Orthoptera* **1** : 261.

Material examined : District : Almora; 2♂♂, 2♀♀, Ranikhet, 29.ix.2001, coll. A. Bal; 6♂♂, 4♀♀, Kausani, dt.xi.2000, coll. S.K. Mandal; 6♂♂, 7♀♀, Binsar, dt.xi.2000, coll S.K. Mandal; District : Nainital : 8♂♂, 10♀♀, Bhawali, dt.xi.2000, coll. S.K. Mandal.

Diagnosis : Body medium large size; stout. Head small; fastigium of vertex grooved, almost rounded, sloping forming an obtuse angle with frontal ridge; pronotum obtusely angulated; in male cerci large, laterally compressed; supra anal plate with 3 fine longitudinal furrows.

Distribution : India (Uttarakhand, Assam, Sikkim and West Bengal).

Genus ***Caloptenopsis*** Bolivar, 1889

63. ***Caloptenopsis glaucopsis collina*** Uvarov

1870. *Caloptenopsis glaucopsis* Walker, *Brit. Mus. Nat. Hist.*, : 702.

1950. *Caloptenopsis glaucopsis collina* : Uvarov, *Eos, Madrid, suppl.*, : 387.

Material examined : District : Dehradun : 1 ♀, 22.ix.1966, coll. Asket Singh. (Regd. no. 3802/H5).

Diagnosis : Size medium; prosternal process a little widened forwards the rounded apex laterally districtly compressed; Wings pinkish at base, hindfemur with yellowish inner surface which sometimes has a dark band.

Distribution : India (Uttarakhand).

Remarks : No specimen of this species has been found during present study. However, we have examined the specimen present in National Zoological Collections.

64. ***Caloptenopsis glaucopsis glaucopsis*** (Walker)

1889. *Caloptenus vittatus* Bolivar, *J. Sci. Acad. Lisboa. Lisbia,* (2)1 : 299.

1950. *Caloptenopsis glaucopsis glaucopsis* : Uvarov, *EOS, Madrid, suppl.*, : 387.

Diagnosis : Nil.

Distribution : India (Uttarakhand).

Remarks : This species is reported by Tandon and Shishodia (1995).

SUMMARY

Sixty four species and subspecies of grasshoppers have been reported from Uttarakhand state. They belong to 48 genera and 2 families. Of these 3 species and subspecies are new locality records, key to subfamilies, families, genera and species have been provided.

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REFERENCES

Banerjee, S.K. & Kevan, D.K. McE. 1960. A preliminary revision of the genus *Atractomorpha* Saussure, 1862 (Orthoptera : Acridoidea : (Pygromorphidae). **25** : 165-189.

Bolivar, I. 1902. Les Orthopte res St. Joseph's College, Trichinoply (Sud de I' Inde). 3e partie, *Annls. Soc. ent. France,* **70** : 580-634.

Dirsh, V.M. 1954. Revision of species of genus Acrida Linne (Orthoptera : Acrididae). *Bull. Soc. Fund Entom. Carico.*, **38** : 107-160.

Dirsh, V.M. 1956. Preliminary revision and review of the group Catantopinae (Orthoptera : Acrididae). Publcoes Cult. Diam Angola, **28** : 11-150.

Dirsh, V.M. 1961. A Preliminary revision of the families of Acridoidea (Orthoptera : Insecta). *Bull. Br. Nat. Mus. Hist.*, (Ent.) **10**(9) : 351-419.

Dirsh, 1975. Classification of the Acridomorphid Insects. F. W. Classey Lte. Faringdon. Oxon. Vii + 171.

Hollis, D. 1971. A Preliminary revision of the genus *Oxya* Audinet Serville (Orthoptera) : Acridoidea) : *Bull. Br. Mus. Nat. Hist. (Ent.),* **26**(7) : 269-343.

Jago, N.D. 1971. A review of the Gomphocerinae of the World with a key to the genera (Orthoptera : Acrididae). *Proc. Acad. nat. Sci. Philad.*, **123**(8) : 205-243.

Kirby, W.F. 1914. *The fauna of British India, including Ceylon and Burma. Orthoptera (Acrididae).* Pp. ix + 276.

Singh, A. 1978. A new species of Eupreponotus Uvarov. 1921 (Orthoptera : Acridolidea : Catantopinae) from Dehradun. *Geobios,* **5** : 215-217.

Tandon and Shishodia. 1995. Himalayar Ecosystem series : Founa of Western Himalaya, Uttar Pradesh. *Zool. Surv. India.,* Part-7 : 37-42.

Uvarov, B.P 1921. Records and description of Indian Acrididae. *Ann Mag. nat. Hist.,* (9)**7** : 480-509.

Table - 1 : District wise distribution of species

Name of species	Almora	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garwal	Uttar Kashi	Rudra Prayag	Pithoragarh	Bageswar	Chamoli	Champawat	Udham Singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
Atractomorpha crenulata	+	+		+	+	+		+			+		
Atractomorpha psittacina		+									+		
Pyrgomorpha bispinosa bispinosa				+							+		
Chrotogonus tr. trachypterus		+			+			+			+		
Aularches miliaris miliaris			+							+			
Spathosternum pr. prasiniferum	+	+	+	+	+			+	+		+		+
Hierogpyphus banian	+												
Hieroglyphus nigrorepletus					+								
Parahieroglyphus bilineatus			+										
Euthymia finoti			+										
Oxya japonica japonica	+												
Oxya hyla hyla		+			+								
Oxya fuscovittata		+			+			+					
Eucoptacra saturata	+		+				+						
Coptacra foedata		+											
Oxyrrhepes obtusa		+											
Choreodocus illustris		+			+				+		+		
Exprepocnemis rosea	+		+		+								
Exprepocnemis al. alacris	+			+									
Heteracris pulcher		+				+							

Table - 1 conten

Name of species	Almora	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garwal	Uttar Kashi	Rudra Prayag	Pithoragarh	Bageswar	Chamoli	Champawat	Udham Singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
Tylotropidius varicornis	+	+							+				
Paraconophyma scabra	+	+			+		+		+		+		
Cataloipus himalayensis													
Paraconophyma scabra	+	+			+		+		+		+		
Catantops pinguis innotabilis	+	+	+										
Xenocatantops humili humilis	+	+	+										
Xenocatantops karnyi					+								
Stenocatantops splendens	+												
Cyrtacanthacris tatarica			+										
Patanga succincta	+												
Pachyacris vinosa		+											
Acrida exaltata		+	+		+			+					
Acrida indica													
Phlaeoba infumata		+			+			+	+		+		
Phalaeoba antennata													-
Phlaeoba panteli											-		
Ceracris nigricornis nigricornis		+									-		-
Ceracris striata		+	+				-						-
Perella insignis											-		
Anaptygus rectus	+						-				+		
Halopercna darjeelingensis				-		-							

Table - 1 conten

Name of species	Almora	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garwal	Uttar Kashi	Rudra Prayag	Pithoragarh	Bageswar	Chamoli	Champawat	Udham Singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
Aulacobothrus luteipes	+	+	+						+				
Aulacobothrus desicus	+	+			+				+				
Leva indica	+	+	+				-		+				
Aiolopus th. tamulus	+	+	+		+			+	+				
Heteropternis respondens									-				
Oedaleus abruptus		+			+		+		+				
Oedaleus sengalensis													
Sphingonotus longipennis		+	+					+					
Gastrimargus africanus africanus								+	+				
Trilophidia annulata		+	+				+	+					
Acrotylus humbertianus		+											
Morphacris fasciata sulcata													
Pternoscirta cintifemur			+										
Peripolus pedarias	+	+											
Caloptenopsis glaucopsis colliona			+										

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 81-104.

INSECTA : ISOPTERA

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The newly constituted state of Uttarakhand a sacred territory (Puniya Bhumi) in the Western Himalaya cames into being on 9th November 2000. The State has been formed out of the existing twelve hilly districts of Garhwal and Kumaon Divisions. In addition, one more district Hardwar of Uttar Pradesh has been further been included in the State.

The entire State is predominantly hilly, being part of the western Himalaya running about more than 350 Km, with the terai in the south made up of thick jungles, swamps and tall grasses, and snow clad mountain running upto 8000 m in the north. There lies the State of Himachal Pradesh in the west and Nepal in the east.

Topographically, the State can be classified into five geographical subdivisons, namely, (i) Terai Region (below 900 m), (ii) Lower hilly region (900-1800 m); (iii) Upper hilly region (1800-3000 m); (iv) High altitude region (3000-4500 m); and (v) Upper high altitude region (above, 4,500 m).

Climate : Uttarakhand experiences every grades of climate which varies according to elevations from hot terai to the freezing point in the higher Himalayas. The southern zone has tropical climate marked by sultry heat of the dry summer, followed by rains and less temperature. The middle zone has short mild and wet summers with long and severe winter. The rainfall is the highest as compared to other regions of the state.

Soil : Clay loam and sandy loam soils varies in colour from dark brown to reddish brown and predominate in the area. It has low water holding capacity. The soil of Bhawar and Tarai is referred to as foot hills and swampy soils and covers the foot hill of Dehra Dun and Pauri Garhwal district.

Forest wealth of the State is very rich which can be conveniently classified based on climatic conditions from lower to higher altitudes.

There are (I) Sub-tropical deciduous forests; (ii) Sub-tropical Chir Pine forests; (iii) Temperate and subalpine forest and (iv) Alpine scrubs.

The predominant trees, distributed from the lower to higher altitudes, Sal, Khair, Shishu, Teak, Eucalyptus, etc. (lower alt.); Chir pine mixed with Oak, Birch, Rhododendron, Juniperous, etc. including saome medicinal plants (higher alt.).

Back ground of work : The State is rich in biological resources, reasonably for its contrasting physiography, climate, vegetation, etc. The termite fauna, in the present state of our knowledge, is quite rich as evidenced from the literature. The known fauna was studied generally in and around Doon Valley, predominantly by the Entomologists of the Forest Research Institute, situated in the valley.

However, the present study is based on a fairly good collections of termites both present in the F.R.I. and Z.S.I. which was augumented by the authenticated identified species present in these Institutes. The study has also incorporated the existing fauna of the area.

However, occurrence of a total of 47 species from the area has been dealt in the present report.

Prior to publication of World Catalogue by Snyder (1949) only six species was known from the Uttarakhand, that too newly described by the same author in 1933 (1933a and 1933b). Afterwards, Gardner (1944) described three more new species. As such, there could be mentioned of 9 species from the area as refered to by Snyder (1949). Since then quite a number of species have been described by Roonwal (1953), Mathur and Sen-Sarma (1959), Prasad and Sen-Sarma (1959). Most significant discovery of six species from the area has been made by Roonwal and Sen-Sarma (1960). Subsequently, different workers, namely, Mathur and Sen-Sarma (1960, 1962a), Mathur and

Thapa (1962), Chatterjee and Thakur (1964, 1965), Thakur and Chatterjee (1970), Thakur (1974, 1975, 1978), Sen-Sarma *et al.* (1975), Sen-Sarma and Thakur (1980), Verma (1980, 1984, 1986, 1987, 1989 and 1993).

Most recently, Verma (1995) had made a comprehensive list of termites along with their distribution in the Western Himalaya which included a total of 47 species as shown in the list.

Family TERMOPSIDAE
Genus ***Archotermopsis*** Desneux

1. *Archotermopsis wroughtoni* (Desneux) (Sen-Sarma and Thakur, 1980)

Family KALOTERMITIDAE
Genus ***Neotermes*** Holmgren

2. *Neotermes bosei* Snyder (Snyder, 1933)
3. *N. megaoculatus* Roonwal and Sen-Sarma (Roonwal and Sen-Sarma, 1960)
4. *N. microculatus* Roonwal and Sen Sarma (Roonwal and Sen Sarma, 1960)

Genus ***Glyptotermes*** Froggatt

5. *Glyptotermes almorensis* Gardner (Gardner, 1944)

Genus ***Bifiditermes*** Krishna

6. *Bifiditermes beesoni* (Gardner) (Gardner, 1944)

Genus ***Cryptotermes*** Banks

7. *Cryptotermes bengalensis* Snyder (Verma, 1995)

Family RHINOTERMITIDAE
Subfamily COPTOTERMITINAE
Genus ***Coptotermes*** Wasmann

8. *Coptotermes beimi* (Wasmann)

Subfamily HETEROTERMITINAE
Genus ***Heterotermes*** Froggatt

9. *Heterotermes balwanti* Mathur and Chhotani
10. *H. gertrudae* Roonwal (Roonwal, 1953)
11. *H. indicola* (Wasmann)

Family STYLOTERMITIDAE
Genus ***Stylotermes*** Holmgren and Holmgren

12. *Stylotermes bengalensis* Mathur and Chhotani
13. *S. chakratensis* Mathur and Thapa
14. *S. dunensis* Thakur (Thakur, 1975)

Family INDOTERMITIDAE
Genus ***Indotermes*** Roonwal and Sen-Sarma

15. *Indotermes capillosus* Chatterjee and Thakur

Family TERMITIDAE
Subfamily AMITERMITINAE
Genus ***Speculitermes*** Wasmann

16. *Speculitermes cyclops* Wasmann
17. *S. tringularis* Roonwal and Sen-Sarma

Genus ***Euhamitermes*** Holmgren

18. *Euhamitermes lighti* Snyder

Genus ***Synhamitermes*** Holmgren

19. *Synhamitermes quadriceps* (Wasmann)

Genus ***Eremotermes*** Silvestri

20. *Eremotermes dehraduni* Roonwal and Sen Sarma

Genus ***Microcerotermes*** Silvestri

21. *Microcerotermes beesoni* Snyder
22. *M. fletcheri* Holmgren and Holmgren
23. *M. labioangulatus* Sen Sarma and Thakur

Subfamily TERMITINAE
Genus ***Angulitermes*** Sjostedt

24. *Angulitermes acutus* Mathur and Sen Sarma
25. *A. akhorisainensis* Chatterjee and Thakur
26. *A. dehraensis* (Gardner)

Genus ***Pericapritermes*** Silvestri

27. *Pericapritermes dunensis* (Roonwal and Sen-Sarma)

Subfamily MACROTERMITINAE
Genus ***Odontotermes*** Holmgren

28. *Odontotermes assmuthi* Holmgren
29. *O. bellahunisensis* Holmgren and Holmgren
30. *O. bhagwatii* Chatterjee and Thakur
31. *O. bovini* Thakur
32. *O. brunneus* (Hagen)
33. *O. feae* (Wasmann)
34. *O. giriensis* Roonwal and Chhotani
35. *O. globicola* (Wasmann)
36. *O. guptai* Roonwal and Bose
37. *O. gurdaspurensis* Holmgren and Holmgren
38. *O. horai* Roonwal and Chhotani

39. *O. microdentatus* Roonwal and SenSarma
40. *O. obesus* (Rambur)
41. *O. parvidens* Holmgren and Holmgren
42. *O. redemanni* (Wasmann)

Genus ***Microtermes*** Wasmann

43. *Microtermes obesi* Holmgren
44. *M. unicolor* Snyder

Subfamily NASUTITERMITINAE
Genus ***Nasutitermes*** Dudley

45. *Nasutitermes dunensis* Chatterjee and Thakur
46. *N. thanensis* Prasad and Sen Sarma

Genus ***Trinervitermes*** Holmgren

47. *Trinervitermes biformis* (Wasmann)

Key to the families of Isoptera (Soldiers)

1. Tarsi with 4 segments 2
– Tarsi with 3 segments 5
2. Compound eyes present and pigmented; cersi fairly long with 4-8 segments ..... TERMOPSIDAE
– Compound eyes usually absent (if present, unpigmented); cerci very short, usually with 2 segments 3
3. Fontanelle absent; antennae with 10-18 sements ..... KALOTERMITIDAE
– Fontanelle present; antennae with 12-20 segment 4
4. Pronotum flat, devoid of any anterior lobe.. ..... RHINOTERMITIDAE
– Pronotum saddle-shaped with distinct anterior lobe ..... TERMITIDAE
5. Pronotum flat and devoid of any distinct lobe and fairly hairy ..... STYLOTERMITIDAE
– Pronotum strongly saddle-shaped and densely hairy ..... INDOTERMITIDAE

Family TERMOPSIDAE
Genus ***Archotermopsis*** Desneux

1. ***Archotermopsis wroughtoni*** (Desneux)

1904. *Temopsis wroughtoni* Desneux, *J. Bombay nat. Hist. Soc.*, **15** : 445-446, Im, S. *Type-locality* : Kashmir Valley (India).

1911. *Archotermopsis wroughtoni* (Desneux) : Holmgren, *K. Sv. Vet. Akad. Handl.*, **46**(6) : 36.

1989. *Archotermopsis wroughtoni* (Desneux) : Roonwal and Chhotani, *Fauna of India : Isoptera (Termites)*, **1** : 126-134.

2008. *Archotermopsis wroughtoni* (Desneux) : Roonwal and Chhotani : Mukherjee, Maiti and Saha, *Memoirs Zool. Surv.India*, **21**(2) : 15-17, Fig. 1, a-j.

Material studied : (I) Identified : Present in Z.S.I : 2 S and 4 W. Mundali, Chakrata, J.M. Garder coll, 16.iv.1933, ex. '*Cedrus deodara*'

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. (Jhajra, Chakrata) : Nainital Dist. (Bhowali); Almora dist. (Almora); Garhwal Tehri Dist.; Uttarkashi Dist.; Jammu and Kashmir; Himachal Pradesh.

Elsewhere : West Pakistan, Afganistan.

Remarks : The species is one of the largest and most primitive termite species in India and the only representative of the genus. Its biological information is given by different author especially by Roonwal (1970).

Family KALOTERMITIDAE
Key to genera of Family KALOTERMITIDAE (Soldier)

1. Head truncate in front and phragmotic; mandibles comparatively very short ..... ***Cryptotermes*** Banks
– Head not truncate in front, long and gradually sloping in front; mandibles comparatively long 2
2. Frons bilobed and with a pair of antero-lateral prominence at base of mandibles ..... ***Glyptotermes*** Froggatt
– Frons not bilobed and without any antero-lateral prominences at base of mandibles 3
3. Pronotum with anterior margin deeply incurved; head comparatively thick and sloping anteriorly from in front of middle... ***Bifiditermes*** Krishna
– Pronotum with anterior margin not deeply incurved; head comparatively flat and sloping anteriorly on anterior third ..... ***Neotermes*** Holmgren

Genus *Neotermes* Holmgren

Key to species of genus *Neotermes* Holmgren (Soldiers)

1. Eyes larger, max. diameter of eyes 0.30-0.40 .. *N. megaoculatus* Roonwal and Sen Sarma
– Eyes smaller, max. diameter of eyes 0.10-0.30 2
2. Antennal segment 3 more chitinised and darker; lateral sides of head weakly outcurved; pronotum with anterior margin deeply incurved and posterior margin feebly outcurved; larger species, head-length to base of mandible 3.90-4.00 ..... *N. bosei* Snyder
– Antennal segment 3 not so chitinised and paler; lateral sides of head almost straight; pronotum .. with both anterior and posterior margins feebly incurved; smaller species, head length to base of mandibles 3.20-3.30 ..... *N. microculatus* Roonwal and Sen Sarma

2. *Neotermes bosei* Snyder

1933. *Kalotermes (Neotermes) bosei* Snyder, *Proc. U.S. natn. Mus.*, **82**(16) : 2-3, S., Ny. *Type-locality* : Matharanwala, about 12 Km south of Dehra Dun, Uttarakhand, India.

1949. *Neotermes bosei* (Snyder) : Snyder, *Smiths. Misc. Coll.*, **112** : 22.

1989. *Neotermes bosei* (Snyder) : Roonwal and Chhotani, *Fauna of India : Isoptera (Termites)*, **1** : 214-220.

2008. *Neotermes bosei* (Snyder) : Mukherjee, Maiti and Saha. *Memoirs zool. Surv. India*, **21**(2) : 18-21.

Material studied : Unidentified : 2 Im (deal), 11 S and sev. Psw., from Dehra Dun (F. C No. D6/ 13.xi.1960, coll. P. C. Dhar, 13.xi.1960, ex. "Hard wood portion of mango tree"

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. (Dehra Dun, Matharanwala); Almora Dist. (Bageswar) : Nainital Dist. (Sultan forest). West Bengal.

Elsewhere : Bhutan.

Remarks : The species is quite common in Uttarakhand. Biological information restricts to its host and swarming period (Roonwal and Sen-Sarma, 1955; Mathur and Sen Sarma, 1959; Sen-Sarma *et. al.*, 1975), from February to July in Dehra Dun.

3. *Neotermes megaoculatus* Roonwal and Sen-Sarma

1960. *Neotermes megaoculatus megaoculatus* Roonwal and Sen-Sarma, *Contrib. Syst. Oriental termites (ICAR Ent. Monogr.* 1); 139, 143, 214-217, 271, 380-381, S., Psw. *Type-locality* : Dehra Dun, Uttarakhand, India.

1989. *Neotermes megaoculatus* Roonwal and Sen Sarma, *Fauna of India : Isoptera (Termites)*, **1** : 253-256.

2008. *Neotermes megaoculatus* Roonwal and Sen Sarma : Mukherjee, Maiti and Saha, *Memoirs Zool. Surv. India*, **21**(2) : 18,22-24.

Material studied : Identified : Present in Z.S.I., Calcutta : 1 Parutype S., New Forest (alt. Ca. 2000 m), Dehra Dun, *det.* M.L. Roonwal and P.K. Sen Sarma.

Distributiuon : INDIA : Uttarakhand : Dehra Dun Dist. (Dehra Dun, Kanda, New Forest; Pauri Dist. (Pauri).

Elsewhere : None.

Remarks : This is an endemic wood destroying species of Uttarakhand (Sen Sarma et. al. 1975).

4. *Neotermes microculatus* Roonwal and Sen-Sarma

1960. *Neotermes microculatus* Roonwal and Sen Sarma, *Contrib. Syst. Oriental termites* (*ICAR Ent. Monogr.* 1) : 139, 142, 220-223, 270, 382-383, S., Psw. *Type-locality* : Dehra Dun, Uttarakhand, India.

1989. *Neotermes microculatus* Roonwal and Sen Sarma: Roonwal and Sen-Sarma, *Fauna of India : Isoptera : Termites*, **1** : 258-259.

1995. *Neotermes microculatus* Roonwal and Sen Sarma : Verma, *Himalayan Ecosystem Series* : *Fauna of Western Himalaya*, Part I, U.P. : 47-50.

2008. *Neotermes microculatus* Roonwal and Sen Sarma : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 18, 24.

Material studied : Identified : *Holotype* : S., Dehra Dun, Uttarakhand, coll. G.D. Bhasin, 24.1.1933, ex. "*Salix alba*", *det.* T.E. Snyder as *N. bosei*, *redet.* M.L. Roonwal and P.K. Sen Sarma as *N. microculatus*.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. (Dehra Dun).

Elsewhere : None.

Remarks : Only known from its type-locality.

Genus ***Glyptotermes*** Forggatt

5. ***Glyptotermes almorensis*** Gardner

1944. *Kalotermes (Glyptotermes) almorensis* Gardner, *Indian J. ent.*, **6** : 104-105, 1m., S. *Type-locality* : Bajwala, Almora Dist., Uttarakhand, India.

1949. *Glyptotermes almorensis* Gardner : Snyder, *Smith. misc. colls.*, **112** : 45.

1989. *Glyptotermes almorensis* Gardner : Roonwal and Chhotani, *Fauna of India : Isoptera (Termites)*, **1** : 286-291.

1995. *Glyptotermes almorensis* Gardner : Verma, *Himalayan Ecosystem series : Fauna of Western Himalaya*, Part 1, U.P. : 47-50.

2008. *Glyptotermes almorensis* Gardner : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 25-27.

Material studied : *Identified* : 2 Im, 2 S. and 2 Nym., Garhwal Jakh, Kandar Syum, Paithani, Uttarakhand, coll. B. singh 19.vi.1941, 'dead and heard stump of Rhododendron arboreum' *det.* J.C.M. Gardner.

Distribution : INDIA : Uttarakhand : Almora Dist. (Almora Bajwar, Barachina Range, Bageshwar), Garhwal Dist (Paithani).

Elsewhere : None.

Genus ***Bifiditermes*** Krishna

5. ***Bifiditermes beesoni*** (Gardner)

1944. *Katotermes beesoni* Gardner, *Indian. J. Ent.*, **6** : 103. S., Ny. *Type-locality* : Haldwani, Uttarakhand, India.

1961. *Bifiditermes beesoni* (Gardner) : Krishna, *Bull. Am. Mus. Nat. Hist.*, **122**(Article 4) : 369.

1989. *Bifiditermes beesoni* (Gardner) : Roonwal and Chhotani, *Fauna of India, Isoptera (Termites)*, **1** : 339-343.

1995. *Bifiditermes beesoni* (Gardner) : Verma, *Himalayan Ecosystem series : Fauna of Western Himalaya*, Part 1, U.P. : 47-50.

2008. *Bifiditermes beesoni* (Gardner) : Mukherjee, Maiti and Saha, *Memoirs Zool. Surv. India*, **21**(2) : 31-33.

Material studied : Identified : S. and Psw. from Nainital, coll. S.C. Verma, 26.vi.1976, ex. 'Wood' *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Nainital Dist. (Nainital); Haldwani Dist. (Haldwani). Uttar Pradesh, Haryana.

Elsewhere : Pakistan.

Genus ***Cryptotermes*** Banks

7. ***Cryptotermes bengalensis*** Snyder

1934. *Kalotermes (Cryptotermes) bengalensis* Snyder, *Indian Forest Rec.*, **20**(11) : 4-6, 1m., S., *Type-locality* : Sundarbans, West Bengal, India.

1975. *Cryptotermes bengalensis* Snyder : Sen-Sarma dt al., *Wood destroying Termites of India (Final Tech. Rep.* PL-480) : 10, 19-21.

1989. *Cryptotermes bengalensis* Snyder : Roonwal and Chhotani, *Fauna of India; Isoptera (Termites)*, **1** : 373-377.

1995. *Cryptotermes bengalensis* Snyder : Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part-I, U.P. : 47-50.

2008. *Cryptotermes bengalensis* Snyder : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 33-34.

Material studied : Identified : Sev. S. and Psw, Nainital, coll. S.C. Verma, ex. "tree trunk" *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Nainital Dist. : Nainital; Assam, Andaman and Nicobar Isl., Gujarat, Karnataka, Madhya Pradesh, Orissa, Tripura, West Bengal.

Elsewhere : Bangladesh and Sri Lanka.

Family RHINOTERMITIDAE

Key to the genera of Family Rhinotermitidae (Soldiers)

1. Head subrectangular; tip of labrum with hyaline needle-like projection, fontanella opening small, situated much below on head-dorsum ..... ***Heterotermes*** Froggatt

– Head oval; tip of labrum not needle-like, but somewhat tapering and hyaline; fontanellap opening large, situated almost at base of clypeus or below on head-dorsum .... ***Coptotermes*** Wasmann

Subfamily COPTOTERMITINAE

Genus ***Coptotermes*** Wasmann

8. ***Coptotermes heimi*** (Wasmann)

1902. *Arrhinotermes heimi* Wasmann, *Zool. Jb. (Syst.)*, **17**(1) : 104. 1m. *Type-locality* : Wallon, Maharastra, India.

1911. *Coptotermes heimi* (Wasmann) : Holmgren, *K. Sv. Vet. Akad. Handl.*, **46**(6) : 73.

1989. *Coptotermes heimi* (Wasmann) : Roonwal and Chhotani, *Fauna of India : Isoptera* (Termites), **1** : 449-457.

1995. *Coptotermes heimi* (Wasmann) : Verma, *Himalayan Ecosystem series : Fauna of Western Himalaya*, Part 1, U.P. : 47.

2008. *Coptotermes heimi* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs Zool. Surv. India*, **21**(2) : 35, 37-39.

Material studied : *Identified* : 1 S. & sev. W., Dhikola Dhangarhi Road, Pauri Garhwal Dist., Uttarakhand, Coll. S.C. Verma, 1.vii.1976, *det.* S.C. Verma; (ii) 1 vial, Lalkua, Nainital Dist., coll. P.K. Maiti, 3.xii.1974, ex. "Wood nest on tree trunk" *det.* P. Mukherjee.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. (Dehra Dun); Tehri Garhwal (Tehri); Pauri Garhwal Dist. (Pauri); Nainital Dist. (Nainital and Haldwani), Arunachal Pradesh, West Bengal, Assam, Nagaland, Tripura, Gujarat, Panjab, Madhya Pradesh, Uttar Pradesh, Orissa, Tamil Nadu and Delhi.

Elsewhere : Bangladesh, Indonesia, Nepal, Pakistan and Oman.

Remarks : A very common species in the plains as well as in the Himalaya, found inhabiting in wood, long, under bark, etc. It is associated with nine species of termites (Verma, 1994). It is one of the most destructive species of Uttarakhand attacking felled logs (Mathur and Sen Sarma, 1959, Roonwal, 1970).

Subfamily HETEROTERMITINAE

Genus ***Heterotermes*** Forggatt

Key to the species of *Heterotermes* Frogatt (Soldier)

1. Smaller species; head length to base of mandibles 1.00 mm(1.00-1.10 mm), head width 0.70 mm (0.70-0.75 mm); mandibles slender and weakly incurved apically; mandibles longer in relation to head, mandible head index, 0.73 (0.68-0.78) .... *H. balwanti* Mathur and Chhotani

– Larger species; head length to base of mandibles, 1.25-1.78 mm; head width 0.77-1.05 mm;mandibles thick and more strongly incurved apically; mandibles comparatively shorter in relation to head, mandible-head index, 0.50-0.65 2

2. Head-capsule subrectangular, sides strongly narrowing posteriorly; pronotum width 0.97 mm(0.83-1.00 mm); head length to base of mandibles 1.53 mm(1.50-1.78 mm), head width 1.18 mm(0.97-1.05 mm) .... *H.gertrudae* Roonwal

– Head-capsule rectangular, sides subparallel or weakly converging posteriorly; pronotum width 0.67-0.83 mm; head length to base of mandibles 1.38-1.75 mm, head-width 0.82-1.00 mm ..... *H. indicola* (Wasmann)

9. ***Heterotermes balwanti*** Mathur and Chhotani

1969. *Heterotermes balwanti* Mathur and Chhotani, *J. Timber Dev. Assoc. India*, **15**(4) : 4-8, 10, S. and W. *Type-locality* : Balukhand For. Range near Puri, Orissa, India.

1989. *Heterotermes balwanti* Mathur and Chhotani : Roonwal and Chhotani, *Fauna of India : Isoptera (Termites)*, **1** : 476-479.

1995. *Heterotermes balwanti* Mathur and Chhotani : Verma, *Himalayan Ecosystem series : Fauna of Western Himalaya*, Part 1, U.P. : 47-50.

2008. *Heterotermes balwanti* : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 41-42.

Distribution : INDIA : Uttarakhand : Uttarkashi Dist.; Orissa; Karnataka; Goa.

Elsewhere : None.

Remarks : Verma (1995) reported the species for the first time from Uttarakhand.

10. ***Heterotermes gertrudae*** Roonwal

1953. *Heterotermes gertrudae*, Roonwal, *Indian J. Ent.*, **15**(2) : 115-118, S.W. *Type-locality* : Almora, Uttarakhand, India.

1989. *Heterotermes gertrudae* Roonwal : Roonwal and Chhotani, *Fauna of India* : *Isoptera (Termites)*, **1** :

1995. *Heterotermes gertrudae* Roonwal : Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part 1, U.P. :

2008. *Heterotermes gertrudae* Roonwal : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 41, 42-44.

Material studied : Identified : S., Dhikola, Pauri Garhwal Dist., Uttarakhand, coll. S.C. Verma, 30.v.1977, *det.* M.L. Roonwal.

Distribution : INDIA : Uttarakhand : Nainital Dist., Almora Dist. Almora, Tehri Dist. : Pauri Dist. : Dhikola; Dehra Dun Dist. : Rishikesh; Chamoli Dist. : Chamoli.

Elsewhere : None.

Remarks : It is a wood destroying termite in the sub-Himalayan tracts (Roonwal, 1970) in India.

11. ***Heterotermes indicola*** (Wasmann)

1902. *Leucotermes indicola* Wasmann, *Zool. Jb. (Syst.)*, 17(1) : 118-119, S., W. *Type-locality* : Bombay, India.

1993. *Heterotermes indicola* (Wasmann) : Snyder, *Proc. U.S. natal. Mus.*, **83**(Art.16) : 5.

1989. *Hetrotermes indicola* (Wasmann) : Roonwal and Chhotani, *Fauna of India: Isoptera (Termites)* 1 : 487-491.

2008. *Heterotermes indicola* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 41, 44-46.

Material studied : Unidentified : (i) 3S. and 6W., Kalsi, Dehra Dun Dist., coll. N. Saha, 13.xi.2003, ex. "Unknown rotten wood"; (ii) 4S and 22W., Forest Range Office, Dakpathar, Dehra Dun Dist., coll. N. Saha 14.xi.2003, ex. "Rotten unknown log"; (iii) 8S and 40W, Sahastradhara, Dehra Dun Dist., coll. N. Saha, 6.xi.2003, ex. "Saphada"

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Kalsi, Dakpathar, Sahastradhara; Nainital Dist.; Bhowali, Haldwani; Almora Dist.; Ranikhet; Bageshwar Dist. : Bageshwar, Pithoragarh Dist.; Chamoli Dist.; Pauri Garhwal Dist. : Dhikola, Rishikesh; distributed all over Northern India above 20° N latitude.

Elsewhere : Bangladesh, Nepal, Pakistan, Afganistan.

Remarks : This is the most destructive species that usually attacks and causes severe damage to timber in any form (Roonwal, 1970; Mathur and Sen-Sarma, 1959). It is associated with nine species of termites (Verma, 1994).

Family STYLOTERMITIDAE

Genus *Stylotermes* Holmgren and Holmgren

Key to the species under the genus *Stylotermes* Holmgren and Holmgren (Soldiers)

1. Larger species, head-length to base of mandible 3.10-3.30 mm, head width, 2.25-2.32 mm .... *S. chakratensis* Mathur and Thapa

– Comparatively smaller species, head-length to base of mandible 2.15-2.70, head width 1.40-1.80 mm 2

2. Lateral margins of head feebly outcurved, anterior margin of pronotum with shallow median emargination; antero-lateral margins above maximum width of postmentum distinctly notched; head-length 2.60-2.70 mm .....*S. bengalensis* Mathur and Chhotani

– Lateral margins of head almost parallel; anterior margin of pronotum with broad and deep median emargination; antero-lateral margins above maximum width of postmentum not notched rather incurved only; head length 2.15-2.45 mm .... *S. dunensis* Thakur

12. ***Stylotermes bengalensis*** Mathur and Chhotani

1959. *Stylotermes bengalensis* Mathur and Chhotani, *Zool. Anz.*, **163**(1 & 2) : 42-53. S. and W. *Type-locality* : "Darjiling Division", West Bengal, India.

1989. *Stylotermes bengalensis* Mathur and Chhotani: Roonwal and Chhotani, *Fauna of India Isoptera (Termites)*, **1** : 571, 578-582.

1995. *Stylotermes bengalensis*. Mathur and Chhotani : Verma, *Himalayan Ecosystem Series Fauna of Western Himalaya*, Part 1, U.P. : 48.

2008. *Stylotermes bengalensis* Mathur and Chhotani : Mukherjee, Maiti and Saha. *Memoirs zool. Surv. India*, **21**(2) : 54-57.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist.; Nainital Dist.; Bhowali, Ranikhet, Askot (Kanda Dhar Forest); West Bengal.

Elsewhere : None.

Remarks : The species is endemic to Himalaya infesting number of trees (Sen-Sarma et. al., 1975).

13. ***Stylotermes chakratensis*** Mathur and Thapa

1962. *Stylotermes chakratensis* Mathur and Thapa, *J. Timber Dryers and Preserv. Assoc. India,* **8**(4) : 4-8. S. and W. *Type-locality* : Koawa Block (Ca. 1830 m) Chakrata Forest Division, Dehra Dun Dist.; Uttarakhand, India.

1989. *Stylotermes chakratensis* Mathur and Thapa : Roonwal and Chhotani, *Fauna of India : Isoptera : Termites.*

1995. *Stylotermes chakratensis* Mathur and Thapa : Verma *Himalayan Ecosystem Series; Fauna of Western Himalaya,* Part **1** : 48.

2008. *Stylotermes chakratensis* Mathur and Thapa : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India,* **21**(2) : 55,56,57-58.

Material studied : Identified : 2S., 4W., Kawa Block, Chakrata For. Div., Dehra Dun Dist., Uttarakhand, Coll. Chopra, 2.xii.1949, ex. "Quercus incana (*det.* O.B. Chhotani).

Distribution : INDIA : Uttarakhand : Dehra Dun Dist.; Koawa, Chakrata For. Div.

Elsewhere : None.

14. ***Stylotermes dunensis*** Thakur

1975. *Stylotermes dunensis* Thakur, *J. Indian Acad. Wood Sci.,* **6**(2) : 98-105, 1m., S., W. *Type-locality :* Dehra Dun (Uttarakhand, India).

1989. *Stylotermes dunensis* Thakur : Roonwal and Chhotani, *Fauna of India, Isoptera (Termites)* **1** : 571-572, 584-588.

2008. *Stylotermes dunensis* Thakur : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India,* vol. **21**(2) : 55, 56, 58-59.

Material studied : Identified : 2 S., New Forest, Dehra Dun, Uttarakhand., coll. B.K. Gupta, 27.vii.1971 (*det.* O.B. Chhotani).

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : New Forest.

Elsewhere : None.

Family INDOTERMITIDAE

Genus ***Indotermes*** Roonwal and Sen Serma

15. ***Indotermes capillosus*** Chatterjee and Thakur

1966. *Doonitermes capillosus* Chatterjee and Thakur, *Zool. Anz.,* **176**(5) : 349-357, S. and W. *Type-Locality* : Sal forest, Chandervani block, Assarori Range, Dehra Dun Forest Division, Dehra Dun Dist., Uttarakhand, India.

1995. *Doonitermes capillosus* Chatterjee and Thakur; Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya,* Part I, U.P. : 47-50.

1997. *Indotermes capillosus* (Chatterjee and Thakur) : Chhotani, *Fauna of India : Isoptera (Termites),* **2** : 14.

2008. *Indotermes capillosus* Chatterjee and Thakur : Mukherjee, Maiti and Saha, *Memoirs, zool. Surv. India,* **21**(2) : 61-64.

Material studied : *Identified* : 2 Paratypes S. and sev. Paramorphotypes W., Sal Forest, Chandervani Block, Asarori Range, Dehra Dun Forest Div., Dehra Dun, Uttarakhand, coll. M.L. Thakur, 23.6.1964, ex. 'mound', *det.* P.K. Sen Sarma as *Doonitermes capillosus, redet.* O.B. Chhotani as *Indotermes capillosus.*

Distribution : INDIA : Uttarakhand : Dehra Dun Forest Division : Sal forest, Cahndervani block, Asarori Range, Pauri Dist., Nainital Dist. : Almora Dist. : Chamoli.

Family TERMITIDAE

Key to the subfamilies of Termitidae (Soldiers)

1. Head projected infront into a nasus; mandibles reduced and non-functional .... NASUTITERMITINAE

– Head in various shape (oval, rectangular or squarish), not projected infront into a nasus; mandibles well developed and functional 2

2. Mandibles rod-like, as long as or longer than head; fontanelle generally placed below frontal projection ..... TERMITINAE

– Mandibles sabre-shaped or hooked, generally shorter than head; fonlanelle open and distinct or indistinct 3

3. Mandibles each with a prominent tooth or serrated inner margin (*Microcerotermes*) .... AMITERMITINAE

– Mandibles either toothed or without tooth, left mandible with a small indistinct tooth (*Odontotermes*) or with basal crenulations (*Hypotermes* and *Macrotermes*) .... MACROTERMITINAE

Subfamily AMITERMITINAE

Key to the genus of the subfamily Amitermitinae (Soldier)

1. Mandibles serrated (finely or coarsely) on through out the inner margin ..... ***Microcerotermes*** Silvestri

– Mandibles not serrated on inner margin, with a weak or prominent tooth on each mandibles almost at the middle 2

2. Head with frontal blunt protuberance; mandibles long, thin, slender, slightly incurved at apices ..... ***Eremotermes*** Silvestri

– Head without frontal protuberance; mandibles short, strong and strongly curved at apices 3

3. Mandibles exceptionally broad at base, each with an anteriorly directed tooth; clypeus entir, not bilobed; large species ..... ***Euhamitermes*** Holmgren

– Madibles of normal shape, not very broad at base; each with a less strong tooth directed at right angle,small species ..... ***Synhamitermes*** Holmgren

Genus ***Speculitermes*** Wasmann

Key to the species of genus *Speculitermes* Wasmann based on worker only

1. Mid-dorsal spot of medium size and rounded (diameter 0.12-0.16 mm), raised, very weakly swollen; length of head to base of mandible, 1.06-1.18 mm (0.90-1.20 mm), head-width 1.10-1.35 mm (1.20-1.40 mm) ..... *S. cyclops* Wasmann

– Mid-dorsal spot large and triangular in shape (0.20-0.31), not so raised from the head surface; length of head to base of mandible, 1.05-1.09 mm, head width 1.30-1.35 mm.... ..... *S. triangularis* Roonwal and Sen-Sarma

16. ***Speculitermes cyclops*** Wasmann

1902. *Speculitermes cyclops* Wasmann, *Zool. Jb. Syst.*, **17**(1) : 160-162. 1m and W. *Type-locality* : Khandala near Bombay, Maharastra, India.

1996. *Speculitermes cyclops* Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 44-48.

2006. *Speculitermes cyclops* Wasmann : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 68-69.

Material studied : *Unidentified* : 3 W., Gwain Block, 2 miles North of Koldwara, Garhwal Dist., Uttarakhand, coll. K. Krishna, 4.11.1953, ex. Under stone in soil.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. Pauri Garhwal Dist. (2 miles North of Koldwara), Nainital Dist. : Almora Dist.; Jammu & Kashmir, Karnataka, Maharastra, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh.

Elsewhere : Pakistan.

17. ***Speculitermes triangularis*** Roonwal and Sen-Sarma

1960. *Speculitermes triangularis* Roonwal and Sen-Sarma, Contrib. Syst. Orient. Termites (ICAR Int. Monogr. No. 1) : 15, 26-28. W. *Type-locality* S. Dehra Dun, Uttarakhand, India.

1997. *Speculitermes triangularis* Roonwal and Sen-Sarma : Chhotani, Fauna of India : Isoptera (Termites), **2** : 67-69.

2008. *Speculitermes triangularis* Roonwal and Sen-Sarma Mukherjee, Maiti and Saha, Zool. India, **21**(2) . Kahalquira (1700 m), Bhowali, Nainital Dist . Uttarakhand, coll. P.K. Maiti & psdarty, 11.x.1974, ex 'under cosdung' (F.C. No. 1/11.10.1974).

Distribution : INDIA : Uttarakhand : Dehra dun, Dist. : Lachhiwala forest, Nabapani forest, Nainital Dist. : Kahaliquira, Bhowali; Tehri Garhwal Dist.; Kempty fall. Bageshwar Dist. : Bageswar.

Elsewhere : None.

Remarks : It is a soil inhabiting termite in the Western Himalaya.

Genus ***Euhamitermes***

18. ***Euhamitermes lighti*** Snyder

1933. *Amitermes (Euhamitermes) lighti* Snyder, *Proc. Biol. Soc.*, **46** : 93 S. *Type-locality* : Dehra Dun, Uttarakhand, India.

1993. *Euhamitermes lighti* Snyder : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** 88-91.

2008. *Euhamitermes lighti* Snyuder : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) 70, 72-73

Material studied : Identified : (I) 1S, Ranibagh, Nainital Dist., coll. S.C. Verma, 17.v.1977, *det.* S.C. Verma, (ii) 2S, Sultan forest, Nainital Dist., coll. S.C. Verma, 20.v.1977, *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Lachhiwala forest, Asarori Range; Nainital Dist. : Ranibagh, Sultan Forest; Bageswar Dist. : Bageshwar.

Elsewhere : None.

Remarks : The species restricts itself in the Uttarakhand Himalaya, occurring mostly in the soil.

Genus *Synhamitermes* Holmgren

19. *Synhamitermes quadriceps* (Wasmann)

1902. *Amitermes quadriceps* Wasmann, *Zool. Jb. Syst.*, **17**(1) : 123, W. and Ny. *Type-locality* : Khandala near Bombay, Maharastra, India.

1904. *Termes (Eutermes) quadriceps* (Wasmann) : Desneux, *Gen. Insectorum, Fasc.* **25** : 41.

1912. *Hamitermes (Synhamitermes) quadriceps* (Wasmann) : Holmgren, *K.Sv. Vet. Akad. Handi.*, **48** : 91.

1949. *Synhamitermes quadriceps* (Wasmann) : Snyder, *Smiths. Misc. Colls.*, **112** : 129.

1997. *Synhamitermes quadriceps* (Wasmann) : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 100-104.

2008. *Synhamitermes quadricips* (Wasmann) : Mukherjee Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 75-76.

Material studied : Identified : 2 S., High bank forest area near Sarapduli Road, Pauri Dist., Uttarakhand, coll. S.C. Verma, 25.v.1977, *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Pauri Dist., High bank forest area near Sarapduli Road; Assam, Kerala, Goa, Daman, Madhya Pradesh, Maharastra, Rajasthan, Tripura, West Bengal.

Elsewhere : Bangladesh.

Remarks : The species had undergone many nomenclatural changes since its first description in 1902 by Wasmann(1902) from Khandala (near Bombay). It is a very common soil-dwelling species in India, equally common in the Uttarakhand. Swarming takes place in mid-June and early November (Roonwal and Sen Sarma, 1960).

Genus *Eremotermes* Silvestri'

20. *Eremotermes dehraduni* Roonwal and Sen-Sarma

1960. *Eremotermes dehraduni* Roonwal and Sen-Sarma, *Contrib. Syst. Orient. Termites* (ICAR Ent. Monogr. No. 1) : 49, 50, 51, 53-63 1m. s. and w. *Type-locality* : Malhan Forest Range, 12 miles North-West of Dehra Dun, Uttarakhand, India.

1997. *Eremotermes dehraduni* Roonwal and Sen-Sarma, Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 123-126.

2008. *Eremotermes dehraduni* Roonwal and Sen Sarma : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 76-77.

Material studied : Identified : 5 S and 10 W, Jamnagar, Pauri Garhwal Dist., Uttarakhand, coll. S.C. Verma, 8.vi.1976, *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Malhan Forest Range (near Dehra Dun), Rajpur, Kalsi; Pauri Garhwal Dist. : Jamnagar.

Elsewhere : None.

Remarks : The species is the only representative of the genus having very prominent frontal protuberance appearing knob-like and frons steeply inclining in front. It attacks the root of *Ocimum kilimandscharicum* in nurseries and swarms in June at Dehra Dun (Roonwal, 1973).

Genus *Microcerotermes* Silvestri

Key to the species of *Microcerotermes* Silvestri (Soldiers)

1. Labrum subpentagonal, somewhat pointed at anterior margin at middle and antero-laterall corners sharply angulated; mandibles strongly sickle-shaped; head length to lateral base of 'mandible, 1.60-1.90 and head width 1.00-1.10 ....*M. labioangulatus* Sen Sarma and Thakur

– Labrum pentagonal; mandibles not sickle-shaped, rather straight 2

2. Head widest at base of antennae and weakly converging behind; labrum pentagonal, anterior margin convex; head-length to base of mandible 1.50-1.65, head width, 0.85-0.96 ..... *M. fletcheri* Holmgren and Holmgren

– Head sides subparallel and straighter; labrum sub-squarish, anterior margin rounded; head-length to base of mandible, 1.30-1.50, head-width, 0.78-0.90 .....*M. beesoni* Snyder

21. *Microcerotermes beesoni* Snyder

1933. *Microcerotermes beesoni* Snyder, *Proc. U.S. natn. Mus.*, **82**(16) : 12-14. Im only. *Type-locality* : Chakrata Range, Haldwani, Uttarakhand, India.

1967. *Microcerotermes beesoni* Snyder : Prashad, *et al. Indian For. Bull.*, No. **246** : 6, 14-18, fig. 6-8. Synonymy, description, etc. Lectotype designated and deposited in FRI.

1997. *Microcerotermes beesoni* Snyder : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 155-159.

2008. *Microcerotermes beesoni* Snyder : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 79.

Material studied : Unidentified : A. 1 vial from Nainital Dist & B. 1 vial from Kheri Dist, P.K. Maiti & Party coll. as follows (A)5 S, 16 W, 21.ix.74, ex."Cartoon nest" (B) Sev S & W, 25.ix.74, ex. "Soil"

Identified : (I) 3 S, 4 W, Gairal, Nainital Dist., Uttarakhand, coll. S.C. Verma, 25.iii.1976, (*det.* S.C. Verma); (ii) 2S, Sultan forest, Nainital Dist., coll. S.C. Verma, 18.v.1977, (*det.* S.C. Verma).

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : New Forest, Jhajra; Chakrata Range; Tehri Garwhal Dist.; Pauri Gawhat Dist; Nainital Dist. : Sultan Forest; Chamoli : Pithoragarh Dist.; Assam, Haryana, Punjab, Madhya Pradesh, Orissa and West Bengal.

Elsewhere : Bangladesh, Bhutan, Pakistan.

22. *Microcerotermes fletcheri* Holmgren and Holmgren

1917. *Microcerotermes fletcheri* Holmgren and Holmgren, *Mem. Dep. Agric. India (Ent.)*, **5**(2) : 170-171. S and W. *Type-locality* : Bababudin Hills, Karnataka, India.

1967. *Microcerotermes fletcheri* Holmgren and Holmgren : Prashad, *et. al. Indian For. Bull.*, No. **246** : 6, 40-42, figs. 24-25. Synonymy, description, etc.

1997. *Microcerotermes fletcheri* Holmgren and Holmgren : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 174-176.

2008. *Microcerotermes fletcheri* : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 79,.82-83,.85.

Material studied : Identified : 6S and sev. W., Almora, coll. S.C. Verma, 26.iii. 1976, (*det.* S.C. Verma).

Distribution : INDIA : Uttarakhand : Almora Dist. : Almora; Karnataka, Kerala, Tamil Nadu.

Elsewhere : None.

23. *Microcerotermes labioangulatus* Sen Sarma and Thakur

1975. *Microcerotermes labioangulatus* Sen-Sarma and Thakur, In : Sen-Sarma *et al.*, *Wood Destroying Termites of India* (Final Tech. Rep. PL 480 Proj. No. A7-FS-58) : 13, 54, 65. Included in Soldier key, no description given.

1979. *Microcerotermes labioangulatus* Sen-Sarma and Thakur, *Indian For. Rec. (N.S.) Ent.*, **13**(1) : 5, 16-18. S and W. Holotype : S, in FRI. *Type-locality* : Zoelchara, Ambasa, Tripura, India.

1984. *Microcerotermes labioangulatus* Sen-Sarma and Thakur : Verma, *Indian J. Forestry*, **7**(1) : 82.

1997. *Microcerotermes labioangulatus* Sen-Sarma and Thakur : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 184-186.

2008. *Microcerotermes labioangulatus* Sen-Sarma and Thakur; Mukherjee, Maiti and Saha, *Memoirs zool Surv. India*, **21**(2) : 79, 83-85.

Material studied : No material is available for study.

Distribution : INDIA : Uttarakhand : Nainital Dist. : Nainital; Nagaland and Tripura (Type-locality).

Subfamily TERMITINAE
Genus *Angulitermes* Sjostedt
Key to species of *Angulitermes* Sjostedt (Soldiers)

1. Head with lateral margins irregular and wavy; head-length to base of mandibles, 1.38-1.40 and head-width 1.01-1.05; frontal projection with blunt apex and with dense hair .... *A. akhorisainensis* Chatterjee and Thakur

– Head with lateral margins not way, rather somewhat straight 2

2. Head with frontal projection somewhat acute, projection with a pointed apex directed forward and twisted upwards; head-length to base of mandible, 1.21-1.31 .... *A. acutus* Mathur and Sen Sarma

– Head with frontal projection not acute, rather blunt with weak emargination; head-length to base of mandible, 1.15-1.38 .... *A. dehraensis* (Gardner)

24. ***Angulitermes acutus*** Mathur and Sen Sarma

1961. *Angulitermes acutus* Mathur and Sen-Sarma, *Ann. Mag. Nat. Hist.*, (13) **3**(31) : 401-406. S and W. Holotype : S. in FRI. *Type-locality* : Palayamcottah, Tinnevelly Dist., Tamil Nadu.

1995. *Angulitermes acutus* Mathur and Sen-Sarma : Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part **1** : 47-50.

1997. *Angulitermes acutus* Mathur and Sen-Sarma : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 231-233.

2008. *Angulitermes acutus* Mathur and Sen Sarma : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 86, 89.

Material studied : Identified : 2S., Sev. W. Sultan forest, Nainital, Uttarakhand, coll. S.C. Verma, 20.v.1977 (*det.* S.C. Verma).

Distribution : INDIA : Uttarakhand : Nainital Dist.: Sultan forest; Tamil Nadu.

Elsewhere : None.

25. ***Angulitermes akhorisainensis*** Chatterrjee and Thakur

1964. *Angulitermes akhorisainensis* Chatterjee and Thakur, *J. Bombay nat. Hist. Soc.*, **61**(2) : 348-353, 3 pls. 1m., S. and W. *Holotype* : S, in FRI. *Type-locality* : Akhorisain Block, Tehri Range, Tehri Garhwal Forest Div., Uttarakhand, India.

1997. *Angulitermes akhorisainensis* Chatterjee and Thakur : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 233-236 (detailed synonymy).

2008. *Angulitermes akhorisainensis* Chatterjee and Thakur : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 85, 87.

Material studied : *Identified* : (1) 2 Im, 2S, Khinanauli, 4 Km from Dhikola, Uttarakhand, coll. S.C. Verma, 4.iii.1977 (*det.* S.C. Verma), (ii) 3S., Sev. W., Sultan Forest, Nainital, Uttarakhand, coll. S.C. Verma, 18.v.1977 (*det.* S.C. Verma).

Distribution : INDIA : Uttarakhand : Tehri Garhwal Forest Div. : Tehri Range : Akhorisain Block (type-locality); Nainital Dist. : Bhowali, Sultan Forest; Almora Dist. : Bageshwar; Pauri Dist. : Khinanauli, 4 Km. from Dhikola.

Elsewhere : None.

26. ***Angulitermes dehraensis*** (Gardner)

1945. *Mirotermes dehraensis* Gardner, *Indian J. Ent.*, **6** : 108-110. 1m and S. *Syntypes* : 1m, S and W in FRI, BM, *ZSI*. *Type-locality* : Dehradun, Uttarakhand, India.

1949. *Termes dehraensis* (Gardner) : Snyder, *Smiths. Misc. colls.*, **112** : 179.

1955. *Angulitermes dehraensis* (Gardner) : Ahmad, *Biologia*, Lahore, **1** : 259-260.

1997. *Angulitermes dehraensis* (Gardner) : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 237-241.

2008. *Angulitermes dehraensis* (Gardner) : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 86, 88-89.

Material studied : No material available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Malhan and near the bank of river Tons.

Elsewhere : Afganistan, Nepal and Pakistan.

Remarks : The species generally found under stones, soil and galleries underground and swarms in the month of June (Mathur and Sen Sarma, 1959; Roonwal, 1970). Ahmad (1955) recorded this species, destroying woodworks in Pakistan.

Genus ***Pericapritermes*** Silvestri

27. ***Pericapritermes dunensis*** (Roonwal and Sen Sarma)

1960. *Capritermes dunensis* Roonwal and Sen Sarma, *Centr. Syst. Orient. Termites* (*ICAR Ent. Monogr.*, 1) : 28-33, Pl. 4. Holotype : S, in FRI. *Type-locality* : Dehradun (New Forest), U.P. India.

1968. *Pericapritermes dunensis* (Roonwal and Sen. Sarma) : Krishna, *Bull. Am. Mus. Nat. Hist.*, **138**(Art 5) : 294.

1997. *Pericapritermes dunensis* (Roonwal and Sen-Sarma) : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 324-328.

2008. *Pericapritermes dunensis* (Roonwal and Sen-Sarma) : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv. India*, **21**(2) : 96-98.

Material studied : 1S & 2W from Pauri Garhwal Dist., 4 miles E of Kotdwara, Lalpani block, K. Krishna coll., 3.ii.1953. ex. "under stone in sandy soil".

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Dehra Dun (Type-locality); Pauri Garhwal Dist. : Lalpani Block, four miles east of Kotdwara; Kaunda; Haldwani dist.; Arunachal Pradesh, Meghalaya and West Bengal.

Elsewhere : Bhutan.

Remarks : The species is close to Indian species, *P. durga* (Roonwal and Chhotani), but differs by its nob-like tip of left mandible.

Subfamily MACROTERMITINAE

Genus ***Odontotermes*** Holmgren

Key to the species of the genus *Odontotermes* Holmgren based on Soldiers

1. Larger species, head length to base of mandibles more than 2.00 mm; head-mandibular index, 0.50-0.60 2
   - Smaller species, head-length to lateral base of mandibles, less than or about 2.00 mm 3
2. Left mandible with a minute tooth and situated at basal third of mandibles; head-length, 1.89-2.70; head-width, 1.45-2.15; mandible length, 1.19-1.38 ..... *O. parvidens* (Holmgren and Holmgren)
   - Left mandiblar tooth not minute, rather larger and situated on or near the middle of mandible; head-length, 2.25-3.10; head-width, 1.80-2.50; mandible length, 1.20-1.65 mm .. *O. feae* (Wasmann)
3. Distal segments of antennae distinctly darker than proximal segments 4
   - Distal segments of antennae not darker than the proximal segments, rather uniformly coloured 11
4. Postmentum extraordinarily wide, sides strongly outcurved; left mandibular tooth situated anterior to distal third (mandible-tooth index : 0.21-0.27) 5
   - Postmentum not extraordinarily wide, sides subparallel to weakly outcurved; left mandibular tooth situated at about distal third (mandible-teeth index : 0.30-0.46) 6
5. Head mandibular index more (0.63-0.73); mandibles thinner and weakly hooked, head length, 0.90-1.03; head width, 0.83-0.95; mandible length, 0.60-0.69 mm ..... *O. globicola* (Wasmann)

   Head mandibular index less (0.50-0.59); mandibles thick and more strongly hooked; head length,1.13-1.30; head-width 1.00-1.20; mandible length, 0.63-0.76 ..... *O. giriensis* Roonwal and Chhotani
6. Left mandibular tooth situated in front of distal third (mandible-tooth index: 0.26-0.33) [head and body more hairy: antennae with 15-16 segments; labrum broadly rounded at anterior margin; postmentum not so wide, lateral sides convex] ..... *O. guptai* Roonwal and Bose
   - Left mandibular tooth situated at distal third, mandibular-tooth index 0.33-0.46 7
7. Left mandibular tooth rudimentary; mandibles substright, long and slender, and with weakly incurved apices; postmentum with sides weakly outcurved [head-length, 1.0-1.25, max.head width, 0.90-1.10 mm] ..... *O. microdentatus* Roonwal and Sen Sarma
   - Left mandibular tooth large; mandibles strong, saber-shaped, and with weakly to deeply incurved apices; postmentum with sides almost parallel 8
8. Head-capsule subrectangular; mandibular tooth large and placed near distal one-third portion ..... *O. brunneus* (Hagen)
   - Head capsule rectangularly oval to suboval, left mandibular tooth of medium size and placed near the apical third 9
9. Head capsule subrectangular with lateral sides almost parallel upto the base of antennae; mandibles longer, 0.75-1.00 mm (0.98-1.08) *O. gurdaspurensis* Holmgren and Holmgren
   - Head-capsule oval, distinctly narrowed anteriorly; mandibles of moderate length 10

10. Mandibles long, outer margin strongly incurved near the basal third, labrum longish; mandible-head index : 0.70- (0.69-0.79) .... *O. redemanni* (Wasmann)

– Mandibles short, slender and with weakly incurved outer margin near the basal third; labrum short and broadly rounded interiorly; mandible-head index: 0.60 (0.59-0.67) .... *O. obesus* (Ramour)

11. Tooth on the left mandible placed near apical third or little below (tooth index: 0.32-0.40) 12

– Tooth on the left mandible placed near the middle or below (tooth index : 0.50-0.56)... 13

12. Postmentum swollen, extraordinarily wide, sides distinctly convex; inner margin of left mandible anterior to tooth not wavy .... *O. boveni* Thakur

– Postmentum flat, subrectangular, sides almost parallel; inner margin of left mandible anterior to tooth wavy (outcurved), parrot's beak-like ..... *O. assmuthi* Holmgren

13. Head smaller in size, head-length to base of mandible 1.30-1.63 mm; max. width of head 1.12-1.25 mm; mandibles shorter, length 0.82-0.97 mm (80-1.02 mm); tooth on left mandible very small and rudimentary; antennae longer .... *O. bhagwatii* Chatterjee and Thakur

– Head larger in size, head length 1.75-1.95 mm (1.65-2.00 mm), max. width of head 1.31-1.62 mm (1.28-1.65 mm); mandibles longer, length 1.05-1.20 mm(1.05-1.23 mm); tooth on left mandibles more prominent; antennae shorter ..... *O. horai* Roonwal and Chhotani

28. ***Odontotermes assmuthi*** Holmgren

1913. *Odontotermes (O) assmuthi* Holmgren. *J. Bombay nat. Hist. Soc.*, **22**(1) : 112-113, S and W. *Type-locality* : India : Borivili Jungle (Maharashtra), India.

1949. *Odontotermes (O) assmuthi* : Snyder, Smith. *Misc. Coll.*, **112** : 220. India.

1997. *Odontotermes assmuthi* : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 449-453.

2008. *Odontotermes assmuthi* : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 115-116.

Material studied : (I) 7 vials from Dehra Dun, P.C. Dhar & party coll. as follows : (1) 2 S & Sev W, 10.ix.1960, ex. "Bark of a log tree" (2) 3 S, 13.xi.1960, ex. "In galleries on ground", (3) Sev S, W, 18.xi.1960, ex. "under leaf litter on forest, (4) 2 S & Sev W, 15.xi.1960, ex. "under dry cow-dung", (5) Sev S & W, 13.xi.1960, ex. "under stone", (6) Sev S & W, 12.xi.1960, ex. "under bark of a mango tree", (7) 4 S & 16 W, 19.xi.1960, ex. "under dry cow-dung", (II) 50 S and 10 W, Raiwala Bonbikas Nigam, coll. N. Saha, 18.xi.2003, ex. "Sal log"

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Dehra Dun; Nainital Dist. : Bijrani (Watch Tower); Bihar, Manipur, Karnataka, Maharastra, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh, Nepal, Pakistan.

Remarks : The species is known as sugarcane pest. It also constructs subterranean nest in felled logs, under cow-dung, to different tree trunk poles, bamboo, etc. In Dehra Dun, it swarms in June and July (Mathur and Sen Sarma, 1962; Thakur, 1981; Verma, 1995).

29. ***Odontotermes bellahunisensis*** Holmgren and Holmgren

1911. *Odontotermes (Cyclotermes) bellahunisensis* Holmgren and Holmgren, *Mem. Dept. Agric. India*, **5**(3) : 150-151, 1m, S and W. *Type-locality* : Bellahunisi, Bellary Dist., Karnataka, India.

1961. *Odontotermes bellahunisensis* Holm. & Holm. : Roonwal and Bose, *J. Bombay nat. Hist. Soc.*, **58**(3) : 580-588.

1997. *Odontotermes bellahunisensis* Holm & Holm. : Chhotani, *Fauna of India, Isoptera (Termites)* **2** : 453-457.

2008. *Odontotermes bellahunisensis* Holm. & Holm. : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) :116-117.

Material studied : Identified : Sev. S and W., Nainital, coll. P.K. Maiti, 8.x.1974, ex. Soil (*det.* P.K. Maiti).

Distribution : INDIA : Uttarakhand : Nainital Dist., Almora Dist., Pauri Dist., Uttarkashi Dist.; Assam, Bihar, Kerala, Karnataka, Orissa, Rajasthan and West Bengal.

Elsewhere : None.

Remarks : Thje species is a common soil inhabiting termite and very close to *O. obesus* and *O. redemanni* (Sen Sarma *et al.*, 1975; Thakur, 1981, Verma, 1989, 1995).

30. *Odontotermes bhagwatii* Chatterjee and Thakur

1967. *Odontotermes bhagwatii* Chatterjee and Thakur, *Indian For. Rec. (N.S.) Ent.*, **11**(1) : 6, 33-35, Pls. 3 and 4, S and W. *Holotype* : S. in FRJ. *Type-locality* : Pathankot, Punjab, India.

1981. *Odontotermes bhagwatii* Chatterjee and Thakur : Thakur, *Indian For. Rec. (N.S.) Ent.* **14**(2) : 4, 11, 13, 25-30, Pls. 7, 50, 51 (Details description etc.).

1997. *Odonototermes bhagwatii* Chatterjee and Thakur: Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 457-460.

2008. *Odontotermes bhagwatii* Chatterjee and Thakur : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 117, 118.

Material studied : Identified : (I) 1m., 2S. and 5W., New Forest, Dehra Dun, coll. Forest Entomologist, 25.ix.1954. ex. "under log" (*det.* N. Saha and P. Mukherjee); (ii) 2S, Ramgar, Nainital, coll. R.N. Chopra, 25.viii.1975 (*det.* S.C. Verma).

Distribution : INDIA : Uttarakhand : Nainital Dist. : Ramgarh; Pauri Dist. : C.N. Park, Sarapduli; Dehra Dun Dist. : New Forest, Motichur Forest; Jammu and Kashmir, Madhya Pradesh, Karnataka, Punjab.

Elsewhere : None.

Remarks : It is a minor wood destroying termite (Thakur, 1981; Verma, 1995).

31. *Odontotermes bovini* Thakur

1976. *Odontotermes bovini* Thakur, *Indian Forester*, **102**(8) : 500, 502 (Nom. Nud.)

1981. *Odontotermes bovini* Thakur, *Indian For. Rec. (N.S.) Ent.*, **14**(2) : 4, 12, 30-33, Pls. 8, 9, 50, 51. S and W. *Type-locality* : Gwaldam, Garhwal, Uttarakhand, India.

1997. *Odontotermes bovini* Thakur : Chhotani. *Fauna of India, Isoptera (Termites)*, **2** : 460-462.

2008. *Odontotermes bovini* Thakur : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 114, 118-119, 122.

Material studied : Identified : (i) 2S and 1W, Niglit locality, Bhowali, Naini Tal Dist., coll. P.K. Maiti & party, 8.x.1974, ex. "soil under log"; (ii) 2S and 8W, Niglit locality, Bhowali, Naini Tal Dist., coll. P.K. Maiti & party, 7.x.1974, ex. Stump (*det.* P.K. Maiti).

Distribution : INDIA : Uttarakhand : Garhwal : Gwaldam; Kumaon Hills : Kanda Dhar Forest, Askot; Nainital Dist. : Bhowali; Madhya Pradesh and West Bengal (Darjeeling dist.).

Elsewhere : Nepal.

Remarks : The species is so far known from the Himalaya and Madhya Pradesh, and is characterized by its wide and short postmentum of soldier caste.

32. *N Odontotermes brunneus* (Hagen)

1858. *Termes brunneus* (Hagen), *Linn. Ent.*, **12** : 133-135 1m., S.(?). *Type-locality* : Bengal, India.

1981. *Odontotermes brunneus* (Hagen) : Thakur, *Indian Forest Rec. (N.S.) Ent.*, **14**(2) : 10, 12, 33-37.

1995. *Odontotermes brunneus* (Hagen) : Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part 1, Uttar Pradesh; 47-50.

1997. *Odontotermes brunneus* (Hagen) : Chhotani, *Fauna of India: Isoptera (Termites)*, **2**: 462-465.

2008. *Odontotermes brunneus* (Hagen) : Mukherjee, Maiti and Saha; *Memoirs zool. Surv. India*, **21**(2) : 114, 119, 122-123.

Material studied: 2 vials from Uttarakhand, N. Saha & Party coll. as follows; 1) 5S & 15W from F.R.I. Campus, 11.xi.2003, ex. "Mound", 2) 2S & 10W from Jhajra, 8.xi.2003, ex. "soil".

Distribution : INDIA : Uttarakhand : Nainital Dist. : Bijrani Sal Forest area. Dehra Dun Dist. : F.R.I. Campus and Jhajra Forest; Gujarat, Maharastra, Orissa and Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : It is one of the oldest described species by Hagen (1858) from India and swarms in the Garhwal Himalaya in the month of May (Purkait and Maiti, 1992).

33. *Odontotermes feae* (Wasmann)

1896. *Termes feae* Wasmann, *Ann. Mus. Ston. Nat. Genova*, (2) **16**(36) : 625, 626. S. and W. *Type-locality* : Carin Cheba, Myanmar.

1912. *Odontotermes feae* (Wasmann) : Holmgren, *J. Bombay nat. hist. Soc.*, **21**(3) : 786-787.

1991. *Odontotermes feae* (Wasmann) : Roonwal and Verma, *Occ. Paper, Rec. zool. Surv. India*, No. 129 (detailed synonymy, description, etc.)

1997. *Odontotermes feae* (Wasmann) : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 471-475.

2008. *Odontotermes feae* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 113, 123-124.

Material studied : 7 vials from Uttarakhand coll. N. Saha & Party are as follows; 1) 5S & 20W from Dehra Dun dist., forest ranger office, Dakpathar, 14.ix.2003, 2) 6S & 15W from Pauri Garhwal dist., forest near Laxman Jhula, 17.xi.2003, ex. "Mango tree", 3) 10S & 50W from Jajhra, 8.xi.2003, ex. "rotten sal log", 5) 1S & 50W from Jhajra , 8.xi.2003, ex. "rotten sal log", 6) 3S & 6W from Dehra Dun dist., Dakpathar forest range office, 14.xi. 2003, ex."Fallen branch".

Distribution : INDIA : Uttarakhand : Nainital Dist. : Sultan Forest. Dehra Dun dist. : Dakpathar, F.R.I. Campus, Kalsi Forest. Pauri Garhwal Dist. : Laxman Jhula (Forest area), Dhikola. Arunachal Pradesh, Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, Bhutan, Myanmar, Nepal, Thailand, Sri Lanka and Vietnam.

Remarks : The species can be distinguished from its allied mound building termite *O. horni* by head widest near posterior margin and mandibular tooth below the middle of soldier. Details of biology was delt by Mukherjee et. al (2008).

34. *Odontotermes giriensis* Roonwal and Chhotani

1962. *Odontotermes giriensis* Roonwal and Chhotani, *Proc. Natn. Inst. Sci. India*, (B) **28**(4) : 289, 296, 341-345, Pls 26, 29, S and W, *Type-locality* : Rongrengiri, Garo Hills, Meghalaya, India.

1981. *Odontotermes giriensis* Roonwal and Chhotani : Thakur, *Indian Forest Rec. (N.S.) Ent.*, **14**(2) : 55-57.

1997. *Odontotermes giriensis* : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 478-482 (detailed synonymy).

2008. *Odontotermes giriensis* : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 112,113, 125-126.

Material studied : Identidied : Following three vials from New Forest, Dehra Dun Dist., Uttarakhand, coll. A. Kishore as follows (i) 4S and 2W, 21.ix.1953, ex. "under stone"; (ii) 2S and 7W, 28.vi.1953, ex. "under stone'; (iii) 7S and 4W, 21.v.1953, ex."under dung".

Distribution : INDIA : Uttarakhand : Dehra Dun Dist., : New Forest, Nimi River Valley; Pauri Dist. : Sarapduli. Arunachal Pradesh, Assam, Jammu and Kashmir, Meghalaya, Manipur, Tripura, Orissa and Sikkim.

Elsewhere : Bangladesh.

35. *Odontotermes globicola* (Wasmann)

1902. *Microtermes globicola* Wasmann, *Zool. Jb. Syst.*, **17**(1) : 116-117. S and W. *Holotype* : S in NHM, Maastricht. *Type-locality* : Anuradhpura, Sri Lanka.

1987. *Odontotermes globicola* (Wasmann) : Chhotani and Bose, *Bull. Zool. Surv. India*, **8**(1-3) : 61, 62, 63, 64. (Transfer to *Odontotermes* based on *O. roonwali* as synonym of *O. globicola*)

1997. *Odontotermes globicola* (Wasmann) : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 482-485 (detailed synonymy).

2008. *Odontotermes globicola* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 113, 126-128.

Material studied : Identified : 2S., Naini Tal, Uttarakhand, coll. S.C. Verma, 26.v.1977.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : New Forest; Nainital Dist. : Nainital; Jammu, Kerala, Karnataka, Rajasthan and Tamil Nadu.

36. *Odontotermes guptai* Roonwal and Bose

1961. *Odontotermes bellahuniosensis guptai* Roonwal and Bose, *J. Bombay nat. Hist. Soc.*, **58**(3) : 588-593. S and W. *Holotype* : S in ZSI. *Type-locality* : Near Gudha Village (Nagaur Dist.), Rajasthan, India.

1961. *Odontotermes guptai* Roonwal and Bose : Roonwal, In: *Environment Analysis of Thar Desert* (Eds. Gupta and Prakash) : 409.

1997. *Odontotermes guptai* Roonwal and Bose : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 487-490 (detailed synonymy).

2008. *Odontotermes guptai* Roonwal and Bose : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 113, 128-131.

Material studied : No material avaiable for study.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Doon Valley. Assam, Bihar, Jammu and Kashmir, Himachal Pradesh and Madhya Pradesh.

37. *Odontotermes gurdaspurensis* Holmgren and Holmgren

1917. *Odontotermes (Cyclotermes) obesus f. gurdaspurensis* Holmgren and Holmgren, *Mem. Dept. agric. Sci.*, **5** : 149-150. Lectotype : S, in IARI. *Type-locality* : Gurdaspur, Punjab, India.

1997. *Odontotermes gurdaspurensis* Holmgren and Holmgren : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 490-493.

2008. *Odontotermes gurdaspurensis* Holmgren and Holmgren : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 114, 129-130, 131.

Material studied : Unidentified : 8 vials from Uttarakhand, Dehra Dun as follows; (1) 6 vials coll. P.C. Dhar as (I) Sev S & W, 17.xi.1960, ex "In a twig lying on ground"; (ii) Sev S & W, 16.xi.1960, ex "Base of a tree"; (iii) Queen & 6 S, 17.xi.1960, ex. "Mound"; (iv) 4 S, 3 W, 10.x.1960, ex."Mound"; (v) 6 S, 14 W, 10.x.1960, ex. "On ground under dry leaves in a forest"; (vi) 9 S, 17 W, 10.x.1960, ex. "Mound"; (2) 1 vial from Dolwala, Dehra Dun, coll. G.U. Kurup, Sev S & W, 19.ix.1960; (3) 1 vial from Dehra Dun, coll. T.D. Soota, 3 S; 10 W, 9.ii.1964.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Dehra Dun, Pauri Garhwal Dist. : Jhirna,; Nainital Dist. : Gairal; Himachal Pradesh; Jammu and Kashmir, Madhya Pradesh, Punjab, Maharastra, Uttar Pradesh, Rajasthan and West Bengal.

Remarks : The species is widely distributed in Dehra Dun district wherein it was found from mound, under dry leaves, base of tree, etc. and very close to *O. obesus* in morphological characters.

38. *Odontotermes horai* Roonwal and Chhotani

1962. *Odontotermes horai* Roonwal and Chhotani, *Proc. Natn. Inst. Sci. India*, (B) **28**(4) : 289, 296, 346-349, pls. 30, 31. S, W, *Holotype* : S, in ZSI. *Type-locality* : Bank of Nongpriang Stream, Khasi Hills, Meghalaya, India.

1981. *Odontotermes horai* Roonwal and Chhotani : Thakur, *Indian For. Rec. (N.S.) Ent.*, **14**(2) : 3, 5, 13, 63-66, 156, 180-181.

1997. *Odontotermes horai* Roonwal and Chhotani : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 495-498.

2008. *Odontotermes horai* Roonwal and Chhotani : Mukherjee, Maiti and Saha, *Memoirs zool. Surv India*, **21**(2) : 114, 130-131.

Material studied : 1 vial from Uttarakhand, N. Saha & Party coll 6 S & 23 W from Pauri Garhwal dist, Laxman Jhula, 12.ix.2003.

Distribution : INDIA : Uttarakhand : Pauri Garhwal dist. : Laxman Jhula (present record) Dhikola; Nainital Dist. : Corbet National Park; Kumaon Hills : Bageshwar; Madhya Pradesh, Meghalaya, Nagaland, Sikkim, West Bengal, Uttar Pradesh.

Elsewhere : Nepal and Pakistan.

39. *Odontotermes microdentatus* Roonwal and Sen Sarma

1960. *Odontotermes microdentatus* Roonwal and Sen Sarma, *Contrib. Syst. Orient. Termites (ICAR Ent. Monogr. 1)* : 33-39, 2 pls. 1m, S and W. *Holotype* : S, in FRI. *Type-locality*:Dehra Dun, U.P. India.

1981. *Odontotermes microdentatus* Roonwal and Sen Sarma : Thakur, *Indian For. Rec. (N.S.) Ent.*, **14**(2) : 5, 11, 12, 92-97, 166 (Pls. 34, 35). Synonymy, description etc.

1997. *Odontotermes microdentatus* Roonwal and Sen-Sarma : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 514-517.

2008. *Odontotermes microdentatus* Roonwal and Sen-Sarma: Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 114, 133, 134-136.

Material studied : 12 vials from Uttarakhand, N. Saha & Party coll. as follows : 1) 4 S & 20 W from F.R.I. campus, 11.xi.2003, ex. "Fallen branch

of a tree"; 2) 3 S & 10 W from F.R.I. Campus, 11.xi.2003, ex. "Mound".; 3) 4 S & 18 W from F.R.I. campus, 11.xi.2003, ex. "Fallen branch of a tree"; 4) 10 S & 15 W from Motichur forest, 18.xi.2003; 5)4 S & 6 W from Raiwala,.Bonbikas nigam, 18.xi.2003, ex. "Sal log"; 6) 4 S & 15 W from Raiwal Timber dep, dev. Cor., 18.xi.2003; 7) 3 S & 16 W from Chilla forest, 18.xi.2003, ex."Mound"; 8) 15 S & 14 W from Jhajra, 8.xi.2003, ex. "Rotten Sal Log"; 9) 2 S & 15 W from Motichur forest, 18.xi. 2003, ex."Fallen branch"; 10) 4 S & 11 W from Motichur forest, 18.xi.2003; 11) 5 S & 10 W from F.R.I. Campus, Dehra Dun, 11.xi.2003, ex. "Fallen branch"; 12) 6 S & 16 W from Chilla forest, 18.xi.2003, ex. "Sal log"

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Dehra Dun, Kalsi, Matichur Forest, Raipur Village, Kumaon Hills : Askot, Bageshwar; Nainital Dist. : Sultan Forest; Pauri Garhwal Dist. : Dhikola; Himachal Pradesh, Jammu and Kashmir, Bihar, Madhya Pradesh and Uttar Pradesh.

Elsewhere : Nepal.

Remarks : The minute tooth present on the base of anterior third of left mandible of soldiers keeps the species separate from all other Indian *Odontotermes*. A very common species in the plains as well as in the Himalaya, build low earthen mounds and also a wood destroying termite in the Kumaon Hills (Sen-Sarma *et al.*, 1975).

40. ***Odontotermes obesus*** (Rambur)

1842. *Odontotermes obesus* Rambur, *Histoire nat. Insectes. Nevropteres* : 304 1m.

1965. *Odontotermes obesus* Rambur : Krishna, *Am. Mus. Novit.*, No. **2210** : 24-25.

1997. *Odontotermes obesus* Rambur : Chhotani, *Fauna of India : Isoptera (Termites)*, **2** : 519-524.

2008. *Odontotermes obesus* Rambur : Mukherjee, Maiti and Saha, *Memoirs. zool. Surv.India* **21**(2) : 114, 136, 138.

Material studied : 11 vials from Uttarakhand, coll. N. Saha & Party are as follows : 1) 10S & 20W, Chilla forest, 19.xi.2003, ex. 'Mound' 2) 5S & 20W from Timli forest, 8.xi.2003, ex. 'Mound' 3) 3S & 20W from Timli, 8.xi.2003. ex 'Mound' 4) 4S & 18W from Asarori forest, 8.ix.2003, ex. 'Fallen branch of Sal' 5) 4S & 22W from Jhajra Forest, 8.xi.2003, ex "Mound". 6) 11S & 20W from Jhajra Forest, 28.xi.2003, ex. 'Sal log'. 7) 2S & 25W from Chilla forest, 19.xi. 2003, ex. "small mound" 8) 8S & 17W from Motichur forest, 18.xi.2003, ex. "rotten branch". 9)2S & 10W from Jhajra, 8.xi.2003, ex. "Mound" 10) 16S & 40W from Harbartpur, 8.xi.2003. 11) 23S & 13W from Jhajra, 8.11.2003, ex. "Gallary on Sal tree".

Distribution : INDIA : Uttarakhand : Kumaon Hills : Askot (Dholakot), Bageshwar; Almora Dist. : Barechina Range; Pauri Dist. : Dhikola, Sarapduli Forest. Dehra Dun Dist. : Timli, Asarori forest, Jhajra Forest, Motichur Forest, Harpartpur; Naini Tal Dist. : Corbette National Park. All over India including Assam, Jammu and Kashmir, Himachal Pradesh, Meghalaya, Arunachal Pradesh, Nagaland, Manipur and Tripura.

Elsewhere : Bhutan, Bangladesh, Myanmar and Pakistan.

Remarks : Common mound building species in India (Mukherjee, Maiti and Saha, 2008).

41. ***Odontotermes parvidens*** Holmgren and Holmgren

1917. *Odontotermes parvidens* Holmgren and Holmgren, *Mem. Dept. Agric. Sci.*, **5**(3) : 154. S and W. Syntypes : S and W, in IARI, ZSI, and Riksmus., Stockholm. *Type-localities* : Mysore to Mercara Road,Karnataka, India; Dhar, Gurdaspur Dist.,Punjab, India; Gauhati, Assam, India; Khamakhya Hill, Gauhati, Assam and 'Chaumahani, Noakhali Dist., Bangladesh.

1997. *Odontotermes parvidens* Holmgren and Holmgren : Chhotani, *Fauna of India,Isoptera (Termites)*, **2** : 526-530.

2008. *Odontotermes parvidens* Holmgren and Holmgren : Mukherjee, Maiti and Saha, *Memoirs zool. Surv, India*, **21**(2) : 113, 138-140.

Material studied : (1) 13 vial from Dehra Dun are as follows: (A) (i) 2S, T.D. Soota coll., 20.iii.1962. (ii) 4S & 10W, T.D. Soota coll, 9.iii.1963. (B) 10S & 20W, G.U. Kurup coll, 28.x.1960. (C) P.C. Dhar (i) 2S & 5W, 14.xi.1960, ex. "Inside the rotten base of a cut tree" (ii) 3S & 6W, 19.xi.1960, ex. "under dry cow dung".(iii) 4S & 8W, 16.xi.1960, ex. "under leaves fallen on ground". (iv) 15S, 16.xi.1960, ex. "Base of a tree".

(v) 6S & 9W, 12.xi.1960, ex. "under a bark of a tree". (vi) 5S & 6W, 15.xi.1960, ex. "under a small stone". (vii) 3S & 4W, 15.xi.1960, ex. "under dry cowdung". (vii) 4S & 8W, 15.xi.1960, ex. "wood of a living tree". (ix) 3S & 9W, 16.xi.1960. ex."under dry leaves fallen on ground (x) 2S & 6W, 10.x.1960, ex. "Dead part of a fallen tree in soil" (2) 5 vials from Nainital dist. as follows: (A) P.K. Maiti & Party coll. (i) 10S & 20W, 29.ix.1974, ex. "soil". (ii) 2S & 8W, 1.x.1974, ex. "soil". (iii) 2S & 4W, 24.ix.1974, ex. "nest on scar mark of tree trunk". (iv) 5S & 10 W, 29.ix.1974, ex. "soil".(B) A. Singh coll. (v) 2S & 3W, 23.xii.1970. (C) R.S. Pillai coll. (vi) 5S & 7W, 11.iii.1962. (3) 3 vials from Uttarakhand, N. Saha & Party coll. as follows (i) 10S & 100W from Motichur forest 18.xi.2003, ex. "Mound". (ii) 10S & 40W from Jhajra, 8.xi. 2003, ex. "Sal log" (iii) 3S & 16W from Chilla forest, 19.xi.2003, ex. "root of thorn tree".

Distribution : INDIA : Uttarakhand : Dehra Dun Dist., Dehra Dun; Jhajna, New Forest; Matichur Forest, Chilla Forest; Nainital Dist.; Pauri Dist. : Sangli, Gairal; Uttarkashi Dist. : Uttarkashi; Tehri Garhwal Dist. : Narendranagar; Arunachal Pradesh, Assam, Jammu and Kashmir, Manipur and Nagaland.

Elsewhere : Bangladesh.

42. *Odontotermes redemanni* (Wasmann)

1893. *Termes redemanni* Wasmann, *Wein. Ent. Zeig.*, **12**(7) : 239. Im, S and W. Lectotype : S. in NHM, Maastricht. *Type-locality* : Sri Lanka.

1967. *Odontotermes redemanni* (Wasmann): Roonwal and Chhotani, *Zool. Ang.*, **178**(3/4) : 251-252.

1983. *Odontotermes redemanni* (Wasmann) : Maiti, *Occ. Pap. Rec. zool. Surv. India*, No. **42** : 19, 25, 110-114.

1985. *Odontotermes redemanni* (Wasmann).: Verma, *Indian J. Forestry*, **8**(3) : 182.

2008. *Odontotermes redemanni* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 114, 143-144.

Material studied : Identified : (i) 1m., 2S., 4W., Corbett National Park, Bijrani, Nainital Dist., Uttarakhand, coll. S.C. Verma, 6.vi.1976. *det.* S.C. Verma; (ii)7S and 8W., New Forest, Dehra Dun Dist., coll. Forest Entomologist (A. Kishore), 4.viii.1953. ex. Manure. *det.* Maiti and Saha.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : New Forest, Motichur Forest; Pauri Garhwal Dist. : Dhikola, Sarapduli Road, Corbett National Park, Sangli, Gairal; Nainital Dist. : Bijrani, Sultan Forest; Uttarakashi Dist. : Uttarkashi; Tehri Garhwal dist. : Narendranagar; Almora Dist.; Pithoragarh Dist. Common in the plains of India including Bangladesh, Nepal and Sri Lanka.

Remarks : *O. redemanni* is one of the most common mound building termite in India and adjacent countries. It is a variable species in morphological character and causes damage to trees, agricultural plants and timber in human use (Sen-Sarma *et al.*., 1975; Chhotani, 1980; Maiti, 1983).

Genus *Microtermes* Wasmann

Key to species of *Microtermes* Wasmann (Soldier)

1. Antennae with 2nd segment equal to 3rd and 4th combined together; head and body less so hairy; length of head to lateral base of mandible, 0.80-1.00 mm, head width 0.74-0.90 mm ..... *M. obesi* Holmgren

– Antennae with 2nd segment shorter than 3rd and 4th combined together; head and body comparatively densely hairy; length of head to lateral base of mandible, 0.82-0.96 mm, head width, 0.75-0.86 mm. .... *M. unicolor* Snyder

43. *Microtermes obesi* Holmgren

1911. *Microtermes obesi* Holmgren, *J. Bombay nat. Hist. Soc.*, **21**(1) : 787-788. 1m. *Type-locality* : Khandala, Maharashtra, India.

1964. *Microtermes obesi* Holmgren : Chatterjee and Thakur, *Indian For. Rec. (N.S.) Ent.*, **10**(11) : 222, 223, 234-239, 265, 266 (Synonymy, description, etc.).

1985. *Microtermes obesi* Holmgren : Verma, *Indian J. Forestry*, **7**(4) : 309, 310, 313.

2008. *Microtermes obesi* Holmgren : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 148, 151-153.

Material studied : (A) 13 vials from Dehra Dun, P.C. Dhar coll, as follows: (i) 6S & 10W, 16.xi.1960, ex. "In a twig lying on ground" (ii)

5S & 15W, 16.xi.1960, ex. "under leaves fallen on ground" (iii) 3S & 11W, 19.xi.1960, ex. "in a decayed tree lying on ground" (iv) 4S & 8W, 18.xi. 1960, ex. "under leaf litter fallen on ground" (v) 2S & 6W, 14.xi.1960, ex. "rotten twig of wood lying on ground". (vi) 6S & 6W, 16.xi.1960, ex. "Base of a cut tree trunk". (vii) 4S & 6W, 16.xi.1960, ex. "Base of a cut tree trunk" (viii) 1S & 12W, 16.xi.1960, ex. "under leaves fallen on ground" (ix) 1S & 30W, 16.xi.1960, ex. "In a small twig lying on ground" (x) 1S & 28W, 20.xi.1960, ex. "A small twig lying on ground" (xi) 2S & 27W, 18.xi.1960, ex. "A small twig lying on ground" (xii) 3S & 25W, 16.xi. 1960, ex. "In a twig lying on ground" (xiii) 1S & 4W, 19.xi.1960, ex. "under leaf litter lying on ground".(B) 3 vials from Nainital Dist., P.K. Maiti & Party coll, as follows: (i) 1S & 8W, 29.ix.1974. ex. "Soil". (ii) 6S & 10W, 3.ix.1974, ex. "Soil" (iii) 1S, 29.ix.1974, ex. "Nest on scar mark on tree trunk"; (C) 2S and 22W, Matichur Forest, coll. N. Saha and party, 18.xi.2003, ex. "rotten Jamun tree"

Distribution : INDIA : Uttarakhand : Dehra Dun dist. : Matichur Forest, Arcadia Tea Estate, Mathibehri Tea Estate, Dehra Dun; Nainital Dist. : Bijrani; Pauri Garhwal dist. : Dhikhola. Common in Indian region including Bhutan, Nepal, Bangladesh, Pakistan, Kampuchia, Thailand, Sri Lanka, Vietnam.

44. *Microtermes unicolor* Snyder

1933. *Microtermes unicolor* Snyder, *Proc. Boil. Soc. Washington*, **46** : 92-93. 1m only. Syntypes in BM and USNM.

1997. *Microtermes unicolor* Snyder : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 589-592 (detailed synonymy).

2008. *Microtermes unicolor* Snyder : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 150, 153-155.

Material studied : 2 S and 10 W from Nainital Dist. P.K. Maiti and Party coll., 1.x. 1974, ex. Log.

Distribution : INDIA : Uttarakhand : Dehra Dun dist. : Lachiwala Forest; Pauri Garhwal dist. : Dhikola. Punjab, Jammu and Kashmir, Himachal Pradesh.

Elsewhere : Bangladesh and Pakistan.

Remarks : The species is restricted to northern India including Western Himalaya.

Genus *Nasutitermes* Dudley

Key to species of *Nasutitermes* Dudley (Soldier)

1. Larger species, head length with rostrum 1.70-1.80 mm, head length without rostrum 1.00 mm (1.10 -1.12), head width, 0.95 mm (1.00-1.07) .... *N. thanensis* Prasad and Sen- Sarma

– Smaller species, head length with rostrum 1.45-1.60 mm, head length without rostrum 0.95-1.03 mm; head width 0.90-0.98 mm.... ..... *N. dunensis* Chatterjee and Thakur

45. *Nasutitermes dunensis* Chatterjee and Thakur

1969. *Nasutitermes dunensis* Chatterjee and Thakur, *Bull. Syst. Zool.*, **1**(2) : 57-65. Im, S and W, *Holotype*: S in FRI. *Type-locality* : Mohamedpur Block, Asarori Range, Dehra Dun Forest Div., Dehra Dun, Uttarakhand India.

1997. *Nasutitermes dunensis* Chatterjee and Thakur : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 630-633.

2008. *Nasutitermes dunensis* Chatterjee and Thakur : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, **21**(2) : 156, 160-161.

Material studied : 2 vials from Uttarakhand, N. Saha & party coll. as follows : 1) 5S & 25W from Sahasradhara, 6.xi.2003, ex. "Saphada log" 2) 4S & 15W from Sahasradhara, 6.xi.2003, ex. "Saphada log"

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Mohamedpur Block, Asarori Range; Sahasradhara; Pauri Dist. : Dhikola. Corbett National Park; Kumaon Hills.

46. *Nasutitermes thanensis* Prashad and Sen-Sarma

1959. *Nasutitermes thanensis* Prashad and Sen-Sarma, *Rev. Termite Genus Nasutitermes India Region (ICAR Ent. Monogr.* 10.23) : 4, 61-63. S and W. Holotype : S, in FRI. *Type-locality* : Thano (Dehra Dun, India).

1997. *Nasutitermes thanensis* Prashad and Sen-Sarma : Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 673-674.

2008. *Nasutitermes thanensis* Prashad and Sen-Sarma : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, 21(2) : 157, 173-174.

Distribution : INDIA : Uttarakhand : Dehra Dun Dist. : Thano; West Bengal.

Remarks : The species is known so far only from its type-locality and Kalimpong, West Bengal in the eastern Himalaya.

Genus ***Trinervitermes*** Holmgren

47. ***Trinervitermes biformis*** (Wasmann)

1902. *Eutermes biformis* Wasmann, *Zool. Jb. Syst.*, 17(1) : 133-135 pl. 4, figs 10, 10a (Lectotype : S. major). *Type-locality* : Bandarawella, Sri Lanka.

1963. *Trinervitermes biformis* (Wasmann) : Mathur and Thapa, *Indian Forester*, 3(3 and 4) : 110.

1975. *Trinervitermes biformis* (Wasmann) : Sen Sarma et. al. *Wood Destroying Termites of India (Final Tech. Rep. PL 480 Project No.* A7-FS-58) : 17, 61.

1995. *Trinervitermes biformis* (Wasmann) : Verma, *Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part 1, Uttar Pradesh : 47-50, Uttarakhand.

1997. *Trinervitermes biformis* (Wasmann) : Chhotani, Fauna of India : Isoptera (Termites), 2 : 726-732 (detailed synonymy).

2008. *Trinervitermes biformis* (Wasmann) : Mukherjee, Maiti and Saha, *Memoirs zool. Surv. India*, 21(2) : 177-179.

Material studied : Identified : (i) 5S and 4W, Dhikola, Pauri Dist., Uttarakhand, coll. S.C. Verma, 15.ii.1978, *det.* S.C. Verma; (ii) 2S (maj.) and 3S (min.), Bijrani, Nainital, Uttarakhand, coll. S.C. Verma, 28.ii.1973, *det.* S.C. Verma.

Distribution : INDIA : Uttarakhand : Nainital Dist. : Bijrani; Pauri Dist. : Dhikola; Andhra Pradesh; Karnataka; Kerala, Maharastra; Madhya Pradesh; Rajasthan; Tamil Nadu and West Bengal.

Elsewhere : Pakistan and Sri Lanka.

FAUNAL COMPOSITION AND VERTICAL DISTRIBUTION

The termite fauna of Uttarakhand studied in the present context come to a total of 47 species under 19 genera and 6 families. The state could be considered moderately rich in termite species since the area supports roughly 20% of the total Indian fauna of 260 species and almost 50% of the Himalayan species (107). This hilly area enjoys predominantly temperate climate which seems to be inhospitable to termites being primarily humid loving creatures. But the foot-hills and adjoining plains of the state enjoying hot, humid and rainy weather conditions seem to be ideal for termite survival and distribution from where most of the collections were made including some material from higher altitudes upto Chaubatia (2250m).

Among the primitive termite *Archotermopsis wroughtoni*, the only representative of the family Termophsidae is known from the Western Himalaya to humid temperate North Western Himalayas, including Pakistan and Afghanistan of Palaearctic Realms.

Thirteen species of wood-inhabiting termites belong to family Kalotermitidae, Rhinotermitidae and Stylotermitidae under the genera *Neotermes* (3 spp.), *Glyptotermes* (1 species), *Bifiditermes* (1 species), *Cryptotermes* (1 species), *Stylotermes* (3 species), *Coptotermes* (1 species) and *Heterotermes* (3 species) are reported here. However, the nests of species of last two genera have some times soil connection also.

Other soil inhabiting termites, the species *Indotermes capillosus* from the Kumaon Hills belongs to Oriental monogeneric family Indotermitidae and rest 22 species under 3 subfamilies belong to family Termitidae. The subfamily Amitermitinae is represented by *Speculitermes* (2 species), *Euhamitermes* (1 species), *Synhamitermes* (1 species), *Eremotermes* (1 species), *Microcerotermes* (3 species) occur in certain semi-moist and moist tropical parts of the region.

The subfamily Termitinae is represented by two genus namely, *Angulitermes* (3 species) and

Pericapritermes (1 species) of which *Angulitermes akhorisainensis* Chatterjee and Thakur is endemic in Uttarakhand. Of the subfamily Macrotermitinae, the Afro-Asian genus *Odontotermes* by far the largest genus, represented by 15 species. The mound building species are, *O. redemanni*, *O. obesus* and *O. microdentatus*, *O. parvidens* (referred to as *O. distans* Holmgren and Holmgren in some literature) occurs in the highest altitude of 2250m at Chaubatia, Ranikhet. Another genus *Microtermes* under the subfamily is represented by two species.

The study of the fauna of Uttarakhand indicates significant distribution pattern that termite species richness gradually decreases with the increasing altitude (Table-1). The altitudinal gradient of termite distribution is distinctively exhibited in the state with increasing altitudes. For clarity, Dehra Dun situated at the foot hills with lowest 682m altitude supports highest number of species to a total of 23 species which decreases with gradual increase of altitude to a hight of 2250m at Chaubatia (Ranikhet) supporting only two species. This observation further proves that species richness falls with increasing altitude (Table-1), which is observed in many other animals including insects.

Table - 1
Altitudinal Gradients of Uttarakhand

	Altitude (m)	Species/Genus
Chaubatia (Ranikhet)	2250	2/1
Ranikhet Town	1860	3/3
Bhowali	1650	4/4
Almora	1350	5/5
Askot	1250	11/9
Bageshwar	820	15/9
Dehra Dun	682	23/9

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REFERENCES

BOSE, G. 1999. Termite Fauna of the North Eastern India, *Rec. Zool. Surv. India, Occ. Paper*, No. **171** : 1-148.

CHATTERJEE, P.N. and THAKUR, M.L. 1966a. Biology and ecology of Oriental termites (Isoptera). Observations on the habits and biology of some termites of the Doon Valley. *Indian Forester*, Dehra Dun, **92**(2) : 139-142.

CHATTERJEE, P.N. and THAKUR, M.L. 1966b. Description of the hitherto unknown imago caste of *Euhamitermes lighti* Snyder with description of other castes. *Indian Forest Bull (N.S.) Ent.*, Delhi, No. **256** : 1-11.

CHATTERJEE, P.N. and THAKUR, M.L. 1966c. *Doonitermes capillosus* gen. et sp. nov. from Doon Valley (Uttar Pradesh, India), Isoptera : Termitidae : Amitermitinae. *Zool. Anz. Leipzing*, **176**(5) : 349-357.

CHATTERJEE, P.N. and THAKUR, M.L. 1969. A new species of *Nasutitermes* (Isoptera : Termitidae : Nasutitermitinae) from Doon Valley, India. *Bull. Syst. Zool.*, Calcutta, **1**(2) : 57-65.

CHHOTANI, O.B. 1997. *Fauna of India, Isoptera* (Termites), **2** : XX+800 pp. (*Publ. Zool. Surv. India*).

GARDNER, J.C.M. 1945 (June 30). New Termitidae from India and Burma (Isoptera). *Indian J. Ent.*, **6**(1-2) (1944) : 103-110.

MAITI, P.K., LAHIRI, A.R., SAHA, N. and ROY, P.H. 1995. Insecta : Isoptera, *Zool. Surv. India, State Fauna Series* 4 : *Fauna of Meghalaya*, Part 3 : 431-455.

MAITI, P.K. 1983. Termite Fauna (Isoptera) of West Bengal, India. Their recognition, biology and ecology. *Occ. Paper. Rec. Zool. Surv. India* No. **42** : 152.

MAITI, P.K. and SAHA, N. 1997. Insecta: Isoptera, *Zool. Surv. India, State Fauna Series* 6 : *Fauna of Delhi*, 207-213 pp.

MAITI, P.K., SAHA, N. and ROY, P.H. 1999. Insecta : Isoptera, *Zool. Surv. India, State Fauna Series* 7 : *Fauna of Tripura*, Part 2 : 295-308.

MAITI, P.K., SAHA, N., ROY, P.H. and SAR, A. 2003. Insecta : Isoptera, *Zool. Surv. India, State Fauna Series* 9, *Fauna of Sikkim*, Part 2 : 251-262.

MAITI, P.K., SAHA, N., ROY, P.H. 2004. Insecta : Isoptera, *Zool. Surv. India, State Fauna Series* 10 : *Fauna of Manipur* : 154-164.

MAITI, P.K., SAHA, N., ROY, P.H. 2007. Insecta : Isoptera, *Zool. Surv. India, State Fauna Series* 14 : *Fauna of Mizoram* : 241-248.

MAITI, P.K., SAHA, N. 1996. Studies on Biodiversity of termites of the Himalaya, *Proc. Symp. On Perspective of Biodiversity, Zool. Soc. Calcutta*, p. 14 (abstract).

MATHUR, R.N. and SEN-SARMA, P.K. 1959. Notes on the habits and biology of Dehra Dun termites (Part 1) *J. Timbers Dryers and Preserv. Assoc. India*, Dehra Dun, **5**(3) : 3-9, 2 pls.

MATHUR, R.N. and SEN-SARMA, P.K. 1960. Notes on the habits and biology of Dehra Dun termites (Part 2). *J. Timbers Dryers & Preserv. Assoc. India,* Dehra Dun **6**(2) : 23-27.

MATHUR, R.N. and SEN-SARMA, P.K. 1962a. Notes on the habits and biology of Dehra Dun termites (Part 3). *J. Timbers Dryers & Preserv. Assoc. India*, Dehra Dun **8**(1) : 1-18, 2 pls.

MATHUR, R.N. and THAPA, R.S. 1962b. A new species of *Stylotermes* (Isoptera : Rhinotermitidae : Stylotermitinae) from India. *J. Timbers Dryers & Preserv. Assoc. India*, Dehra Dun, **8**(4) : 4-8.

MUKHERJEE, P., MAITI, P.K. and SAHA, N. 2008. Termites (Isoptera) Fauna of the Himalaya including its Zoogeographical Analysis. *Memoirs zool. Surv. India*, **21**(2) : 1-207, Fig. 107.

PRASAD, B. and SEN-SARMA, P.K. 1959 *Revision of the Termite Genus Nasutitermes* Banks (Isoptera : Termitidae : Nasutitermitinae) *from the Indian Region (ICAR Ent. Monogr.* No. 10.23) : 1-66.

PURKAIT, K. and MAITI, P.K. 1992. Swarming Ecology of some species of Odontotermes in India. *Proc. Zool. Soc.*, Calcutta, **45** (Supple. A) : 509-512.

ROONWAL, M.L. 1953. Systematics of Oriental termites. No. 1. A new species of termite, *Heterotermes gerteudae*, sp. nov., from North India (Isoptera : Family Rhinotermitidae). *Indian J. Ent.*, **15**(2) : 115-118.

ROONWAL, M.L. 1970. Termites of the Oriental Region in *Biology of Termites* (Ed. By K. Krishna and F. M. Weesner), Vol. **2** : 315-391, New York and London (Academic Press).

ROONWAL, M.L. and CHHOTANI, O.B. 1989. *Fauna of India, Isoptera (Termites)*, **1** : viii+ 672 pp (*Publ. Zool. Surv. India*).

ROONWAL, M.L. and SEN-SARMA, P.K. 1960. Contributions to the systematics of Oriental Termites, *I.C.A.E. Ent. Monograph* No. **1** : 1-407. New Delhi (Manager of Publication, Govt. of India).

SEN-SARMA, P.K. and THAKUR, M.L., 1980. On the Collection of termites of Kumaon hills, Uttar Pradesh, India (Insecta : Isoptera), *Indian Forest Rec.* (*N.S.*) *Ent.*, Dehra Dun, **14**(1) : 1-30.

SEN-SARMA, P.K. and THAKUR, M.L., MISRA, S.C. and GUPTA, B.K. 1975. *Studies on Wood destroying Termites in relation to Natural termite resistance of Timber* (Final Technical Report) : 1-187. Dehra Dun (Forest Research Institute).

SNYDER, T.E. 1933a. New termites from India. *Proc. U.S. nat. Mus.*, Washington, **82**(16) : 1-15.

SNYDER, T.E. 1933b. Two new termites from India. *Proc. Biol. Soc. Wash.*, Washington, **46** : 91-94.

SNYDER, T.E. 1934. New termites from India. *Indian Forest Records (Ent.)*, Delhi, **20**(11) : 1-28.

SNYDER, T.E. 1949. Catalogue of the Termites (Isoptera) of the world. *Smiths. misc. colls.*, **112** : 2 + 490 pp.

THAKUR, M.L. 1974. Hitherto unknown imago caste of *Stylotermes bengalensis* Mathur et Chhotani (Isoptera : Stylotermitidae), *Indian Forestr*, Dehra Dun, **100**(11) : 629-695.

THAKUR, M.L. 1975. Two new species of termite genus *Stylotermes* Holmgren et Holmgren (Isoptera : Stylotermitidae) from the Indian Region. *J. Indian Acad. Wood Sci.*, Bangalore, **6**(2) : 94-105.

THAKUR, M.L. 1978b. Imago caste of *Neotermes megaoculatus megatoculatus*. Roonwal et Sen-Sarma (Isoptera : Kalotermitidae) from Kumaon Hills, Uttar Pradesh. *J. Bombay nat. Hist. soc.*, Bombay, **75** : 143-147.

THAKUR, M.L. and CHATTERJEE, P.N. 1970. The imago caste of *Doonitermes capillosus* Chatterjee & Thakur (Isoptera : Termitidae : Amitermitinae), *Oriental Insects*, Delhi, **4**(2) : 159-163.

VERMA, S.C. 1980. Fauna of Corbett National Park. Termites. (Insecta : Isoptera), *Cheetal*, Dehra Dun, **21**(2&3) : 45-46.

VERMA S.C. 1984. Association of eight species of termites (Isoptera) in a small log in India. *Ann. Entomol.* Dehra Dun, **2**(2) : 45-48.

VERMA S.C. 1986. The mound of the termite *Odontotermes parvidens*, with associated nest of *Euhamitermes lighti* and *Microtermes unicolor* (Isoptera : Termitidae) in the Doon Valley, Uttar Pradesh, India. *Indian J. Forestry*, Dehra Dun. **9**(3) : 241-244.

VERMA S.C. 1987. Swarming behaviour of the termite *Odontotermes feae* (Termitidae : Macrotermitinae) in Dehra Dun (N. W. India). *Indian J. Forestry*, Dehra Dun, **10**(1) : 13-15.

VERMA S.C. 1989. Hitherto unknown queen, soldier and worker caste of *Odontotermes dehraduni* (Snyder) from Uttar Pradesh, India (Termitidae). *Indian J. Forestry*, Dehra Dun, **11**(4), : 310-315.

VERMA S.C. 1994 Termites (Insecta : Isoptera) - Check list, Association in Species and Pest of Eucalyptus, *Zool. Surv. India, Fauna of Conservation Areas : Rajaji National Park* : 217-235.

VERMA, S.C. 1995. Isoptera : *Zool. Surv. India, Himalayan Ecosystem Series, Fauna of Western Himalaya.* Part I, Uttar Pradesh : 47-50.

VERMA, S.C. and PUROHIT, G.L. 1993. Termites (Insecta:Isoptera) Rajaji National Park, Uttar Pradesh, India, *Zoology* (Journal of Pure and Applied Zoology), New Delhi, **3**(3) : 195-210.

VERMA, S.C. and THAKUR, R.K. 1975. New records of distribution of termite species *Odotoermes horai* Roonwal and Chhotani and *Odontotermes redemanni* (Wasmann) from Doon Valley, Uttar Pradesh, India. *Labdev J. Sci. & Tech.* (Life Sciences), Kanpur, **13**(3) : 225-226.

VERMA, S.C. and THAKUR, R.K. 1978. A new species of *Nasutitermes* Dubley (Isoptera : Nasutitermitinae) from Corbett National Park, Uttar Pradesh, *J. Indian Acad. Wood Sci., Bangalore*, **9**(1) : 50-55.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 105-131

HEMIPTERA : WATER-BUGS

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INTRODUCTION

The State of Uttarakhand was parted out from the undivided state of Uttar Pradesh in 2000 and notified as 27th state of the country. The faunal diversity of the new state had earlier been recorded in the then state of Uttar Pradesh by various workers but under the State Fauna Series of Zoological Survey of India the fresh enumeration and assessment of the faunal wealth have been attempted in favour of Uttarakhand. In this perspective the present study on water-bugs (Order – Hemiptera) has been taken up to bring out a faunistic-cum-taxonomic account of the State. Distant (1902-1920), Hutchinson (1933, 1940), Pradhan (1950), Brooks (1951), Lunsbury (1968), Prasad (1975, 1970, and Andersen (1990-1993) had recorded a number of species of water bugs from different localities of the then Uttar Pradesh which now fall under Uttarakhand. These earlier recorded water-bugs have been incorporated in the present study along with the freshly surveyed unnamed collections received from different survey parties of the Department.

SYSTEMATIC ACCOUNT

Following is the systematic account of all the species of water-bugs dealt in the present paper in relation to the faunal wealth of the State of Uttarakhand.

Series HYDROCORISAE
Family CORIXIDAE
Subfamily CORIXINAE
Genus ***Corixa*** Geoffroy

1. *Corixa (Vermicorixa) lateralis* Leach
2. *Corixa (Tropocorixa) promontoria* Distant
3. *Corixa (Tropocorixa) pruthiana* Hutchinson

Family NAUCORIDAE
Subfamily LACCOCORINAE
Genus ***Heliocoris*** Stål

4. *Heliocoris obliquatus* (Spinola)
5. *Heliocoris vicinus* Montandon

Family NEPIDAE
Subfamily NEPINAE
Genus ***Laccotrephes*** Stål

6. *Laccotrephes rubber* (Linnaeus)
7. *Laccotrephes griseus* (Guerin–Mensville)

Subfamily RANATRINAE
Genus ***Ranatra*** Fabricius

8. *Ranatra elongata* Fabricius
9. *Ranatra filiformis* Fabricius
10. *Ranatra varipes* Stål

Family BELOSTOMATIDAE
Subfamily LETHOCERINAE
Genus ***Lethocerus*** Mayr

11. *Lethocerus indicus* (Lepeletier & Serville)

Subfamily BELOSTOMATINAE
Genus ***Diplonychus*** Laporte

12. *Diplonychus annulatus* (Fabricius)
13. *Diplonychus rusticus* (Fabricius)

Family NOTONECTIDAE
Subfamily ANISOPINAE
Genus ***Anisops*** Spinola

14. *Anisops paranigrolineata* Spinola
15. *Anisops nigrolineata* Lundblad
16. *Anisops niveus* (Fabricius)
17. *Anisops sardea* Herrich-Schiffer
18. *Anisops bouvieri* Kirkaldy

Subfamily NOTONECTINAE
Genus ***Enithares*** Spinola

19. *Enithares ciliata* (Fabricius)

20. *Enithares lineatipes* Horvath
21. *Enithares hungerfordi* Brooks

Family HELOTREPHIDAE
Subfamily HELOTREPHINAE
Genus ***Tiphotrephes*** Esaki & China

22. *Tiphotrephes indicus* (Distant)

Genus ***Limnotrephes*** Esaki & China

23. *Limnotrephes kumaonis* Polhemus

Family PLEIDAE
Genus ***Paraplea*** Esaki & China

24. *Paraplea indistinguenda* (Matsumara)
25. *Paraplea frontalis* (Fieber)

Series AMPHIBICORISAE
Family GERRIDAE
Subfamily HALOBATINAE
Genus ***Metrocoris*** Mayr

26. *Metrocoris anderseni* Chen & Niesser
27. *Metrocoris falcatas* Chen & Niesser
28. *Metrocoris communis* Distant
29. *Metrocoris compar* (Buchanan White)
30. *Metrocoris tenuicornis* Esaki & China
31. *Metrocoris nepalensis* Distant

Subfamily PTILOMERINAE
Genus ***Ptilomera*** Amoyt & Servile

32. *Ptilomera (Ptilomera) laticaudata* (Hardwicke)

Genus ***Heterobates*** Bianchi

33. *Heterobates rihandi* (Pradhan)

Subfamily CYLINDROSTETHINAE
Genus ***Cylindrostethus*** Mayr

34. *Cylindrostethus productus* (Spinola)

Subfamily EOTRECHINAE
Genus ***Eotrechus*** Kirkaldy

35. *Eotrechus longipes* Andersen

Genus ***Chimarrhometra*** Bianchi

36. *Chimarrhometra orientalis* (Distant)

Genus ***Amemboa*** Esaki

37. *Amomboa (Amemboa) dentata* Polhemus & Andersen

Subfamily GERRINAE
Genus ***Limnometra*** Mayr

38. *Limnometra anadyomene* (Kirkaldy)

Genus ***Aquarius*** Schellenberg

39. *Aquarius adelaides* (Dohrn)

Genus ***Neogerris*** Matsumara

40. *Neogerris parvula* (Stål)

Genus ***Gerris*** Fabricius

41. *Gerris sahlbergi* Distant

Genus ***Limnogonus*** Stål

42. *Limnogonus (Limnogonus) nitidus* (Mayr)

Family VELIIDAE
Subfamily MICROVELIINAE
Genus ***Microvelia*** Westwood

43. *Microvelia douglasi* Scott

Family HYDROMETRIDAE
Subfamily HTDROMETRINAE
Genus ***Hydrometra*** Latreille

44. *Hydrometra greeni* Kirkaldy

Family MESOVELIIDAE
Subfamily MESOVELIINAE
Genus ***Mesovelia*** Mulsant & Rey

45. *Mesovelia vittigera* Horvath.

Key to families of water-bugs of Uttarakhand

1. Antennae short and not visible from above, concealed in cavity below the head – Hydrocorisae 2
– Antennae longer than head and visible clearly not, concealed–Amphibicorisae 8
2. Rostrum short, triangular and unsegmented; front tarsi single segmented scoop-like, fringed with hairs ..... CORIXIDAE
– Rostrum cylindrical; front tarsi one to three segmented and not scoop like without fringe of hairs 3
3. Mernbrane of hemelytra without veins ..... NAUCORIDAE
– Membrane of hemelytra with veins 4
4. Tip of abdomen provided with respiratory siphon 5
– Tip of abdomen not provided with respiratory siphon 6

5. A pair of filamentous non-retractile abdominal appendages at the tip of abdomen (united to form siphon as and when required); front tarsi one segmented ..... NEPIDAE

– A pair of flat retractile abdominal appendages serve as respiratory siphon; front tarsi two or three segmented ..... BELOSTOMATIDAE

6. Body elongated with oar like hind legs with long swimming hairs; rostrum four segmented; abdomen with a mid-ventral keel ..... NOTONECTIDAE

– Body oval shaped all legs alike, hind leg without long swimming hairs; rostrum three segmented; abdomen without a mid-ventral keel 7

7. Head and pronotum fused; scutellum large nearly half the width of the body; hemelytra without clavus ..... HELOTREPHIDAE

– Head and pronotum distinctly separated and not fused; scutellum small; hemelytra with distinct clavus ..... PLEIDAE

8. Claws of front tarsi pre-apical; apex of last tarsal segment clefted or bifid 9

– Claws apical; apex of last tarsal segment entire 10

9. Hind femora long surpassing end of abdomen; middle legs inserted closer to the hind legs than to fore legs; head without central groove ..... GERRIDAE

– Hind femora short and scarecely surpassing end of abdomen; middle legs inserted about midway between hind legs than to fore legs; head with a central groove ..... VELIIDAE

10. Head long; as long as entire thorax; body long and thin; antennae and legs filiform .. .. HYDROMETRIDAE

– Head short; body short and elongately oval; antennae with basal two segments stout and strong and leg not filiform but normal ..... MESOVELIIDAE

SERIES HYDROCORISAE
Family CORIXIDAE
Subfamily CORIXINAE
Genus *Corixa* Geoffroy

1762. *Corixa* Geoffroy, *Hist. abreg. Ins.*, **1** : 477

Key to the subgenera of the genus *Corixa*

1. Right paramere evenly curved, narrow, uncrested; its greatest width in the distal half, greatest width at the proximal angle is less than half, strigil small or absent ..... ***Vermicorixa***

– Right paramere very wide or crested apically; its maximum thickness in the distal half and almost as great or greater than in the proximal angle stirgil moderate in size ..... ***Tropocorixa***

1. *Corixa (Vermicorixa) lateralis* Leach

1818. *Corixa lateralis* Leach, *Trans. Linn. Soc. London.*, **12** : 1.

1906. *Corixa heiroglyphica* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 49.

1920. *Corixa affinis* : Distant, *Rec. Indian Mus.*, **18** : 205.

1940. *Corixa (Vermicorixa) lateralis lateralis* : Hutchinson, *Trans. Conn. Acad. Arts Sci.*, **33** : 427.

Diagnostic characters : Adults may obtain length between 4.9-5.3 mm; frontal impression in males very deep forming a well defined arch in between the eyes; clavus rastrate but corium not rastrate but punctured; male pala undialated with evenly curved peg row throughout the entire length; male with small strigil; paramere evenly curved, narrow and uncrested.

Distribution : India : Uttarakhand (Dist. – Dehra Dun); Assam; Jammu and Kashmir; Maharastra; Meghalaya; West Bengal.

Remarks : This species was recorded as *Corixa heiroglyphica* by Prasad (1975) from Ranipokhri, Dehra Dun, presently Uttarakhand.

Key to the species of the subgenus *Tropocorixa*

1. Pronotal disc large, about twice as large as wide as long; xyphus subelongate; male with strigil moderately large oblong and of seven combs; inner pennis sheath anchor shaped

with a small apical subcentral projection; left paramere not triangular but elongated with a basal part subparallal in the lateral view ..... *promontoria*

– Pronotal disc small, less than twice as wide as long; xyphus subequilateral; male with strigil rather small, elongate and of six combs; inner pennis sheath regularly anchor shaped at the apex; left paramere very broadly triangular ..... *pruthiana*

2. ***Corixa (Tropocorixa) promontoria*** Distant

1910. *Corixa promontoria* Distant, *Fauna Brit. India, Rhynchota*, **5** : 341.

1922. *Corixa ribeiroi* : Paiva & Dover, *Rec. Indian Mus.*, **24** : 333.

1933. *Sigara promontoria* : Hutchinson, *Rec. Indian Mus.*, **35** : 404.

1940. *Corixa (Tropocorixa) promontoria* : Hutchinson, *Trans. Conn. Acad. Arts Sci.*, **33** : 437.

2004. *Sigara (Tropocorixa) promontoria* : Thirumalai, *Rec. zool. Surv. India*, **102** : 68.

Diagnostic characters : Adults may be 6.13-6.44 in body length; frontal impression in males moderately deep forming a deep furrow between two elongate patches of hair; pronotum black with six transverse lines with 2nd, 3rd, & 4th tending to split and anastomosed. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Bihar; Delhi; Karnataka; Orissa; Punjab; Rajasthan; West Bengal.

Remarks : Hutchinson (1940) recorded this species from Ammangarh and Malwa Tal, Naini Tal, presently Uttarakhand.

3. ***Corixa (Tropocorixa) pruthiana*** Hutchinson

1940. *Corixa (Tropocorixa) pruthiana* Hutchinson, *Trans. Conn. Acad. Arts Sci.*, **33** : 447.

1989. *Corixa (Tropocorixa) pruthiana* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* **118** : 13.

Material examined : 4 exs. (3 MM, 1F) Dinapur, Dist. Almorah, 3.X.2001, P. Mukhopadhyay and party coll.

Diagnostic characters : Body length of adult insects may be 5.18-5.5 mm; frontal impression well marked and narrowly arched between the eyes; pronotum light brown with six transverse yellow lines with second, third and fourth lines dividing and anastamosed. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Almorah); Karnataka; Tamil Nadu.

Elsewhere : Pakistan.

Family NAUCORIDAE
Subfamily LACCOCORINAE
Genus ***Heleocoris*** Stal

1876. *Heleocoris* Stal, *K. svenska Vit.-Akad. Handl.*, **16** : 142.

Key to the species of the genus *Heliocoris*

1. Anterior margin of pronotum having a clear concavity; posterior angles of pronotum terminating obliquely ..... *obliquatus*

– Anterior margin of pronotum with no concavity but somewhat straight; posterior angles of pronotum not oblique but straight ..... *vicinus*

4. ***Heleocoris obliquatus*** (Spinola)

1873. *Naucoris obliquatus* Spinola, *Ess* : 54.

1876. *Heleocoris obliquatus* : Stal, *K. svenska Vit.-Akad. Handl.*, **16** : 146.

1910. *Heleocoris obliquatus* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 322.

1975. *Heleocoris obliquatus* : Prasad, *Ind. J. Zool.*, **3**(2) : 36.

1999. *Heleocoris obliquatus* : Bal & Basu, *State Fauna Series 4, Fauna of Meghalaya, Part* **4** : 446.

Diagnostic characters : Adults may be 10.5 mm in body length; head and pronotum spotted with grey and black markings; scutellum black, apex pale. Other characters as in the key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Pauri Garhwal); Bihar; Maharastra; Meghalaya.

Elsewhere : Myanmar.

Remarks : This species was not available in the present collection. It was recorded from by Prasad (1977) from Corbett National Park, presently Uttarakhand.

5. ***Heleocoris vicinus*** Montandon

1910. *Heleocoris vicinus* Montandon, *Bull. Soc. Sci. Bucarest.*, **19** : 655.

1910. *Heleocoris vicinus* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 322.

Materials examined : 3 exs. (2MM, 1F), Naukuchia Tal, Kumaon, W. Himalayas, Dist. Naini Tal, 5.V.1911, S. Kemp coll; 1ex., Sat Tal, Kumaon, W. Himalayas, Dist. Naini Tal, 9-10.V.1911, S. Kemp coll.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Dehra Dun); Tamil Nadu; West Bengal.

Elsewhere : Myanmar.

Family NEPIDAE

Key to the subfamilies and genera of the family Nepidae

1. Body elongately sub-oval and flattened; pronotum about as large as or little shorter than broad. Hind coxae widely separated from each other; anterior femora incrassate and longitudinally grooved below; a round tubercle at the base of each anterior femora; anterior coxae very short ..... subfamily NEPINAE and genus ***Laccotrephes***

– Body very long, narrow and thin; pronotum slender and much longer than broad. Hind coxae very close; anterior femora incrassate but without any grooved below; one or two pairs of sharp teeth on the anterior femora; anterior coxae very long ..... subfamily RANATRINAE and genus ***Ranatra***

Subfamily NEPINAE
Genus *Laccotrephes* Stål

1865. *Laccotrephes* Stål, *Hem, Africa,* **3** : 186.

Key to species of the genus *Laccotrephes*

1. Abdomen above yellowish red in colour; anterior area of pronotum provided with a small indistinct tubercle; abdominal appendages a little longer than the body; size 30-35 mm ..... *ruber*

– Abdomen above light bluish in colour; anterior area of pronotum provided with a strong acute spine like process; abdominal appendages less than body in length; size 15-20 mm ..... *griseus*

6. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr* : 165.

1868. *Laccotrephes ruber* : Stål, *Hem. Fabr.,* **1** : 135.

1906. *Laccotrephes ruber* : Distant, *Fauna Brit. India, Rhynchota,* **3** : 18.

2004. *Laccotrephes ruber* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part* **2** : 298.

Materials examined : 1 ex (1M), Naini Tal, Dist. Naini Tal, 15.V.1908. R.H. coll.

Diagnostic characters : Adult insects attain a length of about 30-35 mm. Other diagnostic as in the key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Pauri Garhwal); Bihar; Delhi; Gujrat; Jammu & Kashmir; Kerala; Maharastra; Meghalaya; Manipur; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : China, Taiwan, Japan, Nepal, Pakistan.

7. *Laccotrephes griseus* (Guerin-Mensville)

1829. *Nepa griseus* Guerin-Mensville *Iconogr. Regn. Anim.* Ins., : 352.

1910. *Laccotrephes griseus* : Montandon, *Annali Mus. zool. Napoli.,* **3**(10) : 3.

2002. *Laccotrephes griseus* : Thirumalai & Ramakrishna, *Rec. zool. Surv. India,* **100**(3-4) : 105.

Material examined : 1 ex. (1M), Bhim Tal, Kumaon, W. Himalayas, Dist. Naini Tal, 2-10.V.1911., S. Kemp coll.

Diagnostic characters : Adult insects attain a length of about 15-20 mm. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Andhra Predesh; Bihar; Kerala; Maharastra; Meghalaya; Orissa; Pondicherry; Punjab; Tamil Nadu; West Bengal.

Elsewhere: Myanmar, Malacca, Seychelles, Thailand, Sri Lanka.

Subfamily RANATRINAE
Genus *Ranatra* Fabricius

1790. *Ranatra* Fabricius, *Skr. Nat. Selsk.* **1**(1) : 227.

Key to species of the genus *Ranatra*

1. Abdominal appendages much longer than the body; anterior femur armed with one spine like tooth; metasternal process subtriangular and midlongitudnally foveatly sulcate; body length 40-45 mm .... *elongata*

– Abdominal appendages less than the body; anterior femur armed with more than one spine like tooth; metasternal process otherwise; body length less than 40-45 mm 2

2. Adults with abdominal appendages 3-4 mm shorter than the body length; metasternal process posteriorly triangular with a distinct midlongitudnal ridge; body about 27-28 mm .....*filiformis*

– Adults with abdominal appendages 7-8 mm shorter than the body length; metasternal process posteriorly blunt with an indistinct midlongitudnal ridge; body about 19-20 mm ..... *varipes*

8. *Ranatra elongata* Fabricius

1790. *Ranatra elongata* Fabricius, *Skr. Nat. Selsk.*, 1(1) : 228.

1906. *Ranatra elongata* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 20.

1997. *Ranatra elongata* : Bal & Basu, *State Fauna Series 6, Fauna of Delhi*, 266.

2002. *Ranatra elongata* : Thirumalai & Ramakrishna, *Rec. zool. Surv. India*, 100(3-4) : 105.

Material examined : 1ex. (1F), Maldhun, Naini Tal, Dist. Naini Tal, 14-19.11.1907. Mus. coll.

Diagnostic characters : As in key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Bihar; Jammu & Kashmir; Kerala; Maharastra; Orissa; Pondicherry; Tamil Nadu; West Bengal.

Elsewhere : Australia, Nepal, Sri Lanka.

9. *Ranatra filiformis* Fabricius.

1790. *Ranatra filiformis* Fabricius, *Skr. Nat. Selsk.*, 1(1) : 228.

1906. *Ranatra filiformis* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 21.

1997. *Ranatra filiformis* : Bal & Basu, *State Fauna Series 6, Fauna of Delhi*, 266.

2002. *Ranatra filiformis* : Thirumalai & Ramakrishna, *Rec. zool. Surv. India*, 100(3-4) : 105.

Diagnostic characters : As in key.

Distribution : India : Uttarakhand (Dist. – Pauri Garhwal); Assam; Kerala; Maharastra; Orissa; Pondicherry; Punjab; Tamil Nadu; West Bengal.

Elsewhere : Nepal, Pakistan, Philippine Island, Sri Lanka.

Remarks : Specimens of this species were not available in the present collection. It was recorded from Uttarakhand by Prasad (1977).

11. *Ranatra varipes* Stål

1861. *Ranatra varipes* Stål, *Ofvens. K. Vet-Akad Forh.*, 18 : 203.

1910. *Ranatra varipes* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 316.

2004. *Ranatra varipes* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part 2* : 299.

Diagnostic characters : As in key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Pauri Garhwal); Bihar; Meghalaya; Manipur; Orissa; Tripura; Tamil Nadu; West Bengal.

Elsewhere : Myanmar, Malaya Penninsula, Nepal, Sri Lanka.

Remarks : It was recorded from Uttarakhand by Prasad (1977).

Family BELOSTOMATIDAE

Key to subfamilies and genera of the family Belostomatidae

1. Abdominal sternites V and VI subdivided laterally by suture like folds; spiracles located on or adjacent to mesal margins of ventral laterotergites; front tarsus three segmented and armed with only one well developed claw; body length from 40-110 mm ..... subfamily LETHOCERINAE and genus ***Lethocerus***

– Abdominal sternites not subdivided laterally by suture; spiracles located near center of ventral laterotergites; front tarsus one or two segmented and armed with two equal claws;

body length not more than 30 mm .... subfamily BELOSTOMATINAE and genus ***Diplonychus***

Genus ***Lethocerus*** Mayr

1853. *Lethocerus* Mayr, *Verh.zool-bot.Ver.Wien*, 2(1852); 17.

12. ***Lethocerus indicus*** (Lepeletier & Serville)

1825. *Belostoma indica* Lepeletier and Serville, *Encycl. Meth.*, : 272.

1909. *Lethocerus indicus* : Montandon, *Bull. Soc., Sci. Buc.*, **17** : 138.

2004. *Lethocerus indicus* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part* **2** : 301.

Diagnostic characters : Adults of this Giant Indian water-bug may be 62-85 mm in body length; head with parallel sides in between the eyes; pronotum with a transverse faciae at the basal end and a fine median carination; hemelytra with distinct membrane provided with prominent longitudinal veins; posterior tibiae and tarsi ampliately compressed; middle and posterior legs provided with thick sets of swimming hairs on the ventral side; male genital operculum triangular with pointed tip while female genital operculum with truncated tip.

Distribution : India : Uttarakhand (Dist. –Dehra Dun); Assam; Bihar; Kerala; Maharastra; Manipur; Meghalaya; Mizoram; Orissa; West Bengal.

Elsewhere : China, Japan, Malaya Penninsula, Myanmar, Pakistan, Phillipines, Sri Lanka, Sumatra.

Remarks : This species was recorded from Uttarakhand by Prasad (1977).

Genus ***Diplonychus*** Laporte

1833. *Diplonychus* Laporte, *Guerin's Mag. zool.*, **2** : 18.

Key to species of the genus *Diplonychus*

1. Body very broad and almost oval shaped; head as long as the intraocular space; anterior tarsus with two segments; hemelytra without any shinning spot beyond the middle of the inner margin; anterior tarsal claws well developed ..... *annulatus*

– Body not very broad and sub-oval shaped; head shorter than the intraocular space; anterior tarsus with single segment; hemelytra provided with shinning rounded spot beyond the middle of the inner margin; anterior tarsal claws very small .... *rusticus*

13. ***Diplonychus annulatus*** Fabricius

1803. *Nepa annulatum* Fabricius, *Syst. Rhynchota* : 106.

1906. *Sphaerodema annulatum* : Distant, *Fauna of Brit. India, Rhynchota*, **3** : 35.

1961. *Diplonychus annulatus* : Lauck & Menke, *Ann. Entomol., Soc., Amer.*, **54** : 649.

1997. *Diplonychus annulatus* : Bal & Basu, *State Fauna Series 6, Fauna of Delhi* : 270.

Diagnostic characters : Adults may obtain upto 21-22 mm in body length and breadth upto such, having a more or less oval shaped body. Other characters as in the key.

Distribution : India : Uttarakhand (Dists. – Dehra Dun, Pauri Garhwal); Assam; Bihar; Meghalaya; Orissa.

Elsewhere : Bangladesh, Formosa, Pakistan.

Remarks : This species was recorded from Uttarakhand by Prasad (1976).

14. ***Diplonychus rusticus*** Fabricius

1803. *Nepa rustica* Fabricius, *Ent. Sept.*, **4** : 62.

1906. *Sphaerodema rusticum*: Distant, *Fauna of Brit. India, Rhynchota*, **3** : 36.

1961. *Diplonychus rusticus* : Lauck & Menke, *Ann. Entomol., Soc., Amer.*, **54** : 649.

2004. *Diplonychus rusticus* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part* **2** : 302.

Diagnostic characters : Body length of adults may be 15-17 mm; lateral and basal of pronotum and embolium always pale in colour. Other characters as in the key.

Distribution : India : Uttarakhand (Dists. – Dehra Dun, Pauri Garhwal); Bihar; Delhi; Jammu and Kashmir; Kerala; Maharastra; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Australia, China, Formosa, Indonesia, Japan, Malaya, Maynmar, New Guinea, New Zealand, Sri Lanka, Thailand.

Remarks : This species was recorded from Uttarakhand by Prasad (1976).

Family NOTONECTIDAE.

Key to subfamilies and genera of the family Notonectidae

1. Hemelytral commisure with a definite hairlined pit at the anterior end just behind the scutellum. Pronotum more longer than wide without any foveat excavation; middle femur without any anteapical protuberance; anterior leg of male with single tarsal segment while female with two tarsal segments ..... subfamily ANISOPINAE and genus ***Anisops***

– Hemelytral commisure without any definite hairlined pit at the anterior end behind the scutellum. Pronotum more wider than long with its anterior angles foveately excavate; middle femur with an anteapical pointed protuberance; anterior legs of both sexes with three tarsal segments .... subfamily NOTONECTINAE and genus ***Enithares***

Subfamily ANISOPINAE

Genus ***Anisops*** Spinola

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.*, : 58.

Key to species of the genus *Anisops* (of males)

1. Pronotal lateral margins diverging 2

– Pronotal lateral margins otherwise 3

2. Viewed laterally, the intraocular space not swollen beyond the margins of the eyes; rostral prong with rounded apex .... *paranigrolineata*

– Viewed laterally, the intraocular space is swollen beyond the margins of the eyes; rostral prong with truncated apex .... *nigrolineata*

3. Intraocular space not produced anteriorly into a cephalic horn; body length of male upto 5.1 mm; rostral prong longer than the 3rd rostral segment; labrum provided with two tufts of long erectile hairs not forming any loop ..... *niveus*

– Intraocular space produced anteriorly into a cephalic horn; body length of male much longer; rostral prong otherwise; labrum provided with tufts of hairs otherwise 4

4. Much prominent cephalic horn with frons excavate of its entire length and bordered laterally by two carinae; body length of males 7.5 to 8.4 mm; rostral prong slightly shorter than the 3rd rostral segment; stridulatory comb provided with about 18 teeth ..... *sardea*

– Short cephalic horn with frons excavate triangularly and bordered laterally by two carinae; body length of males 6.0 to 6.3 mm; rostral prong as long as the 3rd rostral segment; stridulatory comb provided with about 12 teeth ..... *bouvieri*

Genus ***Anisops*** Spinola

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.*, : 58.

14. *Anisops paranigrolineata* Brooks

1951. *Anisops paranigrolineata* Brooks, *Kans. Univ. Sci. Bull.*, **34** : 409.

1994. *Anisops paranigrolineata* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* **165** : 18.

Diagnostic characters : Adults may be 6.0-6.3 mm in body length; head rounded with wide synthlipsis; pronotal posterior margin convex; rostral prong of male slightly shorter than the third rostral segment; stridulatory comb on the front tibiae of male provided with 18 teeth. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Maharastra; Tamil Nadu.

Remarks : It was recorded from Kumaon, W. Himalayas, Naukuchia Tal by Brooks (1951).

15. *Anisops nigrolineata* Lundblad

1934. *Anisops nigrolineata* Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 160.

1951. *Anisops nigrolineata* : Brooks, *Univ. Sci. kans. Bull.* **34** : 409.

1989. *Anisops nigrolineata* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* **118** : 25.

Material examined : 10 exs (8FF, 2MM), Goaldham, Dist. Bageshwar, 2.X.2004, Mrs M. Ghosh and party coll.

Diagnostic characters : Body length may be 5.4 – 6.6 mm for adult insects; head rounded with wide synthlipsis; pronotal posterior margin convex; rostral prong of male slightly shorter than the third rostral segment; stridulatory comb on the front tibiae of male provided with about 22 teeth. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Bageshwar); Himachal Pradesh; Karnataka; Madhya Pradesh; Maharastra; Tamil Nadu.

Elsewhere : Afghanistan, Bangladesh, Myanmar, Indonesia.

16. *Anisops niveus* (Fabricius)

1775. *Notonecta nivea* Fabricius, *Sys. Ent.*, 690.

1906. *Anisops niveus* : Distant, *Fauna of Brit. India, Rhynchota*, **3** : 46.

1951. *Anisops niveus* : Brooks, *Univ. kans. Sci. Bull.*, **34** : 373.

1989. *Anisops niveus* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* **118** : 25.

Diagnostic characters : Body length may be 4.8-5.4 mm for adult insects; head rounded and synthlipsis wide; pronotal posterior margin convex and medianly emerginate; rostral prong of male longer than the third rostral segment and apex acuminate; stridulatory comb on the front tibiae of male with about 15 even sized teeth. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Dehra Dun); Bihar; Kerala; Orissa, Tamil Nadu, West Bengal.

Elsewhere : Indonesia, Java, Malaya, Myanmar, Phillipines, Seychelles, Sri Lanka, Sumatra.

Remarks : It was recorded by Prasad from Dehra Dun in 1975.

17. *Anisops sardea* Herrich-Shaffer

1850. *Anisops sardeus* Herrich- Shaffer, *Die Wanz. Ins.*, **9** : 41.

1906. *Anisops sardeus* : Distant, *Fauna of Brit. India, Rhynchota*, **3** : 45.

1951. *Anisops sardeus* : Brooks, *Univ. kans. Sci. Bull.*, **34** : 423.

2004. *Anisops sardeus* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part* **2** : 300.

Material examined : 4 exs. (2MM, 2FF), Naukuchia Tal, 4200ft, W. Himalayas, 5.V.1911., S. Kemp coll.

Diagnostic characters : Body length may be 7.2-8.4 mm; head rounded with a much prominent cephalic horn in males only; synthlipsis narrow; pronotal posterior margin convex and medianly emerginate; rostral prong in males with acuminate apex; stridulatory comb in the front tibiae of male composed of about 18 teeth which decrease slightly in length from base to apex. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Dehra Dun); Bihar; Himachal Pradesh; Karnataka; Maharastra; Manipur; Orissa; Punjab; Tamil Nadu; West Bengal.

Elsewhere : Afghanistan, Africa, Albania, Canary Islands; Myanmar; Syria, Turkey.

18. *Anisops bouvieri* Kirkaldy

1904. *Anisops bouvieri* Kirkaldy, Wiener *Ent. Zeit.*, **23** : 116.

1951. *Anisops bouvieri* : Brooks, *Univ. kans. Sci. Bull.*, **34** : 423.

1994. *Anisops bouvieri* : Bal & Basu, *State Fauna Series 3, Fauna of West Bengal, Part* **5** : 584.

Disgnostic characters : Body length may be 5.7-6.3 mm; lateral margin of head rounded; vertex forms a short cephalic horn in males; synthlipsis narrow; pronotal posterioir margin posteriorly convex and medianly emerginate; rostral prong in males as long as third rostral segment and apex acuminate; stridulatory comb of front tibiae of male composed of 12 teeth which decrease in length from base to apex. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist. – Dehra Dun); Andhra Pradesh; Andaman and Nicobar Islands; Assam; Madhya Pradesh; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Bangladesh, China, Malaysia, Myanmar, New Guinea, Thailand.

Remarks : It was recorded from Doon Valley by Prasad (1975).

Subfamily NOTONECTINAE
Genus ***Enithares*** Spinola

1873. *Enithares* Spinola, *Ess. Ins. Hemipt.*, : 60.

Key to species of the genus *Enithares*

1. Body length of both sexes 9.0 – 9.6 mm; scutellum basally reddish brown with a centrally darker wedge shaped area; metaxyphus with basal lateral margins almost parallal and apically convergent with blunt apex; pronotal posterior margin almost straight; hind femur of male provided with small nodule at the distal end on ventral side ..... *ciliata*

– Body length of both sexes more than 10 mm; scutellum otherwise; metaxyphus otherwise; pronotal posterior margin may be straight or otherwise; hind femur of male otherwise 2

2. Body length of both sexes 10.5 – 12.0 mm; scutellum creamy white; metaxyphus moderately long with apex acuminate; pronotal margin centrally emerginate; hind femur of male with no distinct nodule ..... *lineatipes*

– Body length of male 14.5 – 15.5 mm and female 13.5 – 14.0 mm; scutellum dark brown with greenish yellow lateral margins; metaxyphus very long with apex acuminate; pronotal posterior margin almost straight; male hind femur with a small black nodule on the middle of latero-ventral side..... *hungerfordi*

19. ***Enithares ciliata*** (Fabricius)

1798. *Notonecta ciliata* Fabricius, *Suppl. Ent. Syst.*, 524.

1906. *Enithares indica* : Distant, *Fauna of Brit. India, Rhynchota*, 3 : 42.

1919. *Enithares lactea* : Paiva, *Rec Indian Mus.*, 19 : 55.

1938. *Enithares abbreviata* : Hafiz and Mathai, Rec., *Indian Mus.*, 40 : 210.

1968. *Enithares ciliata* : Lunsbury, *Pacific Ins.*, 10(2) : 413.

2004. *Enithares ciliata* : Bal & Basu, *State Fauna Series 10, Fauna of Manipur Part* 2 : 301.

Diagnostic characters : As in the key.

Distribution : India : Uttarakhand (Dist. – Dehra Dun); Andhra Pradesh; Andaman Islands; Bihar; Goa; Kerala; Maharastra; Manipur; Rajasthan; Tamil Nadu.

Elsewhere : Bhutan.

Remarks : It was recorded from Ranipokhri, Dehra Dun by Prasad (1975).

20. ***Enithares lineatipes*** Horvath

1889. *Enithares lineatipes* Horvath, *Termesz. Fuz.* 12 : 39.

1906. *Enithares lineatipes* : Distant, *Fauna of Brit. India, Rhynchota*, 3 : 42.

1968. *Enithares lineatipes* : Lansbury, *Pacific Ins.*, 10(2) : 418.

Material examined : 5 exs., Bhimtal, 4500ft, Kumaon, 19-22.IX.1906., N.A.

Diagnostic characters : As in the key.

Distribution : India : Uttarakhand (Dist. - Naini Tal).

21. ***Enithares hungerfordi*** Brooks

1948. *Enithares hungerfordi* Brooks, *J. kans. Ent. Soc.*, 21 : 41.

1968. *Enithares hungerfordi* : Lansbury, *Pacific Ins.*, 10(2) : 372.

1989. *Enithares hungerfordi* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* 118 : 22.

Material examined : 9 exs. (8MM, 1F), Goaldham, Dist. Bageshwar, 2.X.2004, Mrs. M. Ghosh & party coll.; 2 exs (2MM), Baijula, Dist. Bageshwar, 1.X.2004, Mrs. M. Ghosh & party coll.

Diagnostic characters : As in the key.

Distribution : India : Uttarakhand (Dist.- Bageshwar); Kerala; Tamil Nadu.

Family HELOTREPHIDAE
Subfamily HELOTREPHINAE

Key to the genera of the subfamily Helotrephinae

1. Lateral carina of cephalotum not extending to the eye surface; abdominal carina extending upto the sternite IV ..... ***Tiphotrephes***

– Lateral carina of cephalotum extending to the eye surface; abdominal carina extending upto the sternite V .....***Limnotrephes***

Genus ***Tiphotrephes*** Esaki & China

1928. *Tiphotrephes* Esaki & China, *EOS*, **4** : 152.

22. *Tiphotrephes indicus* (Distant)

1910. *Tiphotrephes indicus* Distant, *Fauna of Brit. India, Rhynchota*, **5** : 338.

1928. *Tiphotrephes indicus* : Esaki & China, *EOS, Revta. Esp. Entomol.*, **4** : 151.

1999. *Tiphotrephes indicus* : Thirumalai, *IAAB, Publication No.* **7** : 33.

Diagnostic characters : Body length 1.5 mm; cephalonotum convex, broader than long and distinctly punctate; pronotal portion anteriorly raised than posteriorly; scutellum brownish olivaceous and basal margin distinctly pale; abdomen black underside with yellowish lateral margins.

Material examined : 2 exs, Sat Tal, 4500ft, Kumaon, W. Himalayas, 9-10.IV. 1911, S. Kemp coll.

Distribution : India : Uttarancal (Dist. –Naini Tal); Maharastra; West Bengal.

Elsewhere : Indonesia, Myanmar, Malayasia, Singapore, Thailand.

Genus ***Limnotrephes*** Esaki & China

1928. *Limnotrephes* Esaki & China, EOS, **4** : 160.

23. *Limnotrephes kumaonis* Polhemus

1990. *Limnotrephes kumaonis* Polhemus, *Acta Entomol. Bohemoslov.*, **87** : 61.

Diagnostic characters : Body length 1.73 mm; cephalonotum convex, broader than long and punctate prominently; pronotal portion posteriorly more raised than anteriorly; scutellum often transluscent and base of scutellum with a transverse light brown stripe; female subgenital plate truncated anteriorly.

Distribution : India : Uttarakhand (Dist. – Almorah).

Remarks : This species was described by Polhemus (1990) from Kumaon, W. Almorah.

Family PLEIDAE

Genus ***Paraplea*** Esaki & China

1928. *Paraplea* Esaki & China, *EOS*, **4** : 166.

Key to species of the genus *Paraplea*

1. Front of head with no markings; pronotum with reticulum like punctures; no spine like process on abdominal sternites .... *indistinguenda*

– Front of head with mid longitudinal streak and two pairs of small irregular brown patches just above the streak on the vertex; pronotum with coarse punctures and a puncture free zone at the anterior half of the vertex; prominent spine like backwardly directed processes on the 3rd and 6th abdominal sternite .....*frontalis*

24. *Paraplea indistinguenda* (Matsumara)

1905. *Plea indistinguenda* Matsumara, *J. Sapporo agric. Coll.*, **2** : 59.

1906. *Plea pallescens* : Distant, *Fauna of Brit. India, Rhynchota*, **3** : 48.

1934. *Plea indistinguenda* : Lundblad, *Arch. Hydrobiol. Suppl.* **12** : 127.

1999. *Plea (Paraplea) indistinguenda* : Thirumalai, *IAAB*, **7** : 34.

Material examined : 1ex. Sat Tal, 4500 ft., Kumaoon, W. Himalayas, 9-10.V.1911, S. Kemp. Coll.

Diagnostic characters : Body length 1.5 mm; pale yellowish above; elytra less punctate. Other characters as in the key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Bihar; Kerala; West Bengal.

Elsewhere : Bangladesh, Japan.

25. *Paraplea frontalis* (Matsumara)

1844. *Plea frontalis* Fieber, *Ent. Monogr. Leipzig*, (5)**3** : 296.

1910. *Plea pelopea* : Distant, *Fauna of Brit. India, Rhynchota* **5** : 138.

1934. *Plea (Paraplea) frontalis* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 138.

1947. *Plea (Paraplea) frontalis* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 349.

1996. *Plea frontalis* : Bal & Basu, *State Fauna Series 3, Fauna of West Bengal Part* **5** : 552.

Material examined : 3 exs, Malwa Tal, Kumaoon, W. Himalayas., 7.V.1911. S. Kemp coll.; 2 exs, Bhim Tal, Kumaoon, W. Himalayas., 2-10.IV.1911, S. Kemp coll.; 1 ex, Sat Tal, Kumaoon, W. Himalayas., 9-10.IV.1911, S. Kemp coll.

Diagnostic characters : Body length 2.5 mm; pronotum unspotted anf provided with shallow punctures; elytra coarsely reticulately punctate. Other characters as in the key.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Nicobar Islands; Orissa; Pondicherry; Tamil Nadu.

Elsewhere : Formosa, Java, Myanmar, Sumatra.

Series AMPHIBICORISAE
Family GERRIDAE

Key to the subfamilies of the family Gerridae

1. Metasternum extremely reduced, usually only represented by a very short subtriangular plate enclosing the scent gland orifice; claws of hind tarsi modified, straight or s-shaped ..... subfamily HALOBATINAE
– Metasternum well developed, clearly reaching the metacetebular region laterally; claws of hind tarsi falcate 2
2. Metacetebular groove dorsally reaching the anterior end of the first abdominal tergum; fore tarsi very long, atleast one and half the length of tibia ..... subfamily PTILOMERINAE
– Metacetebular groove not reaching the anterior end of first abdominal tergum; fore tarsi short 3
3. Metacetebular groove dorsally connected with hind margin of mesonotum; fourth antennal segment short and curved; rostrum short, not surpassing the prosternal margin; first segment of fore tarsi less than one and half length of second segment ..... CYLINDROSTETHINAE
– Metacetebular groove indistinct dorsally; fourth antennal segment straight; rostrum long, clearly surpassing the prosternal margin; first segment of fore tarsi more than one and half length of second segment 4
4. Pronotal lobe always reduced in apterous forms; pretarsal arolia present; lateral suture between meso and meta thorax distinct ... subfamily EOTRECHINAE
– Pronotal lobe generally not reduced in apterous forms; pretarsal arolia absent; lateral suture between meso and meta thorax indistinct ..... subfamily GERRINAE

Subfamily HALOBATINAE
Genus ***Metrocoris*** Mayr

1865. *Metrocoris* Mayr, *Verh.zool-bot. Ges Wien*, **15** : 445.

Key to the species of the genus *Metrocoris*

1. Apterous males more than 6.0 mm in length 2
– Apterous males less than 6.0 mm in length 3
2. Fore femur of male more strongly incrassate with a ventral bicuspid apical tooth; inner face of both fore femur and tibia with distinct long and dense hair fringe; paramere large and hooked shaped with blunt apex. ..... *anderseni*
– Fore femur of male less strongly incrassate with a ventral bicuspid subapical tooth; inner face of fore femur with distinct long hair fringe; paramere relatively short and falciform with blunt apex ..... *falcatus*
3. Fore femur of male incrassate with a small apical tooth; paramere falciform and slightly extending beyond the genital segment ..... *communis*
– Fore femur of male normal not incrassate, may or may not have tooth; paramere otherwise 4
4. Fore femur of male slightly curved dorsally with a median constriction on the ventral face; no ventral apical tooth; paramere prominent distal half curved and extending beyond the genital segments to form a right angle hook ..... *compar*
– Fore femur of male slender without any curvature dorsally and no median constriction on the ventral face; ventral apical tooth may or may not be present; paramere otherwise 5

5. Fore femur of male with a very small subapical tooth on the ventral face; paramere relatively short but distinctly falciform, inner face without any small projection ..... *tenuicornis*

– Fore femur of male without any tooth on the ventral face; paramere relatively short and slightly curved, inner face with a small projection pointing upwards .... *nepalensis*

26. *Metrocoris anderseni* Chen & Niesser

1993. *Metrocoris anderseni* Chen & Niesser, *Steenstrupia* **19**(1) : 23.

Diagnostic characters : Apterous male may be 7.6 mm in length while apterous female 5.2 mm long. Other diagnostic characters as in key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Dehra Dun).

Remarks. This species was described by Chen & Niesser from Uttarakhand in 1993.

27. *Metrocoris falcatus* Chen & Niesser

1993. *Metrocoris falcatus* Chen & Niesser, *Steenstrupia*, **19**(1) : 25.

Diagnostic characters : Apterous male 6.4 mm in length while apterous female 5.0 mm long. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Dehra Dun).

Remarks. This species was described by Chen & Niesser from Uttarakhand in 1993.

28. *Metrocoris communis* Distant

1910. *Eudos comminis* Distant, *Ann Mag. Nat. Hist.*, **5**(8) : 151.

1929. *Metrocoris communis* : Esaki , *Ann. Mag. Nat. Hist. Soc.*, **4**(10) : 49.

1965. *Metrocoris communis* : Den Boer, *Zool. Verh. Leiden.*, **74** : 13.

1993. *Metrocoris communis* : Chen & Niesser, *Steenstrupia*, **19(2)** : 49.

Diagnostic characters : Apterous male 5.5 mm and apterous female 4.5 mm in length. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dists. – Naini Tal, Dehra Dun); Karnataka, Maharastra, Tamil Nadu.

Elsewhere : Afghanisthan, Iran.

29. *Metrocoris compar* (Buchannan White)

1883. *Metrocoris compar* Buchnnan White, *Voy. Challenger Rept. Zool.*, **7**(19) : 68.

1893. *Metrocoris compar* : Dahl, *Ergeben. Plankt. Exp.*, **2** : 8.

1902. *Metrocoris compar* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 189.

2003. *Metrocoris compar* : Bal & Basu, *State Fauna Series 9, Fauna of Sikkim, Part* **2** : 549.

Material Examined : 2 exs. (apterous 1M, macropterous 1F), Muni-ki-reti, Dist. Tehri Garhwal, 9.XI.2002., P. Mukhopadhyay and party coll.

Diagnostic characters : Apterous male 5.0 mm and apterous female 4.8 mm in length. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist – Tehri Garhwal); Arunachal Pradesh; Himachal Pradesh; Sikkim; West Bengal.

Elsewhere : Bhutan, Myanmar.

30. *Metrocoris tenuicornis* Esaki

1926. *Metrocoris tenuicornis* : Esaki, *Ann. Mag. Nat. Hung.*, **23** : 125.

1993. *Metrocoris tenuicornis* : Chen & Niesser, *Steenstrupia*, **19**(2) : 70.

2003. *Metrocoris tenuicornis* : Bal & Basu, *State Fauna Series 9, Fauna of Sikkim, Part* **2** : 549.

Diagnostic characters : Apterous male may be 4.8-5.4 mm and apterous female 3.8-5.0 mm in length. Other diagnostic characters as in the key.

Distribution : India : Uttarakhand (Dist – Naini Tal); Arunachal Pradesh; Assam.

Elsewhere : China, Indonesia, Malaysia, Vietnam.

31. *Metrocoris nepalensis* Distant

1910. *Metrocoris nepalensis* Distant, *Ann. Mag. Nat. Hist.*, **5**(8) : 148.

1993. *Metrocoris nepalensis* : Chen & Niesser, *Steenstrupia*, **19**(2) : 66.

Diagnostic characters : Apterous male 5.1 mm and apterous female 5.3 mm in length. Other diagnostic characters as in the key.

Material Examined : 8 exs. (apterous 4MM, 4FF), Makoro, near Gagas River (Kasauni), Dist. Almorah, 29.IX.2001., A. Bal & party coll.

Distribution : India : Uttarananchal (Dists. – Almorah, Tehri Garhwal); Arunachal Pradesh.

Elsewhere : Nepal.

Subfamily PTILOMERINAE

Key to the genera of the subfamily Ptilomerinae

1. Hind femora much longer than middle femora; middle femora of male with hair fringe on ventral side; second antennal segment shorter than third segment ..... ***Ptilomera***

– Hind femora subequal to or shorter than middle femora; middle femora of male without hair fringe; second antennal segment longer than third segment..... ***Heterobates***

Genus ***Ptilomera*** Amyot & Serville

1848. *Ptilomera* Amyot & Serville, *Hemipteres*, : 413.

32. ***Ptilomera (Ptilomera) laticaudata*** (Hardwicke)

1825. *Gerris laticaudata* Hardwicke, *Trans. Linn. Soc.*, **14** : 134.

1902. *Ptilomera laticaudata* : Distant, *Fauna of Brit. India., Rhynchota*, **2** : 185.

1965. *Ptilomera (Ptilomera) laticaudata* : Hungerford & Matsuda, *Kans. Univ. Sci. Bull.*, **45(5)** : 416.

2003. *Ptilomera (Ptilomera) laticaudata* : Bal & Basu, *State Fauna Series 9, Fauna of Sikkim.* Part **2** : 548.

Material examined : 147 exs (apterous 51FF, 91MM; macropterous 2MM, 2FF), Makoro, Dist. Almorah, 29.IX.2001., A. Bal & party coll.; 15 exs (apterous 7FF, 8MM), Ranibagh, Dist. Naini Tal, 8.X.2001, A. Bal & party coll.; 3 exs (apterous 2FF, 1M), Kotbharmar, Dist. Bageshwar, 29.IX.2004., M. Ghosh & party coll.; 2 exs (apterous FF), Garur, Dist. Bageshwar, 26.III.2001, S. K. Chakraborty & party coll.; 1 ex (apterous M) Bageshwar, Dist. Bageshwar, 30.IX,2004., M. Ghosh & party coll.

Diagnostic characters : Both apterous and macropterous adults may be 13.0-15.0 mm in length, males a little smaller than females in body length; rear margin of metacoxa armed with thorn like projection in both the sexes; almost all over the middle femur provided with fringed hairs in male; parameres very prominent, bent and laterally directed; 7th abdominal segment modified and provided with prominent connexival spines in females.

Distribution : India : Uttarakhand (Dists. - Almorah, Bageshwar, Dehra Dun, Naini Tal); Arunachal Pradesh; Himachal Pradesh; Meghalaya; Orissa; Sikkim; West Bengal.

Elsewhere : Myanmar, Malay Penninsula, Sri Lanka, Thailand.

Genus ***Heterobates*** Bianchi

1896. *Heterobates* Bianchi, *Annu. Mus. St. Petersb.*, : 75.

33. ***Heterobates rihandi*** (Pradhan)

1950. *Teratobates rihandi* Pradhan, *Res. Indian Mus.*, **48** : 103.

2002. *Heterobates rihandi* : Thirumalai, *Rec.zool Surv.India* **100(1-2)** : 68.

Material examined : 2 exs (apterous 2FF), Makoro, Dist. Almorah, 29.IX.2001, A Bal & party coll.

Diagnostic characters : Adult insect may be 7.2 mm in length; head longer than broad; antennae shorter than the body length and first segment longer than the rest three segments together while third and fourth segments subequal and second segment longer than each of them; rostrum not passing beyond anterior coxae; pronotum shinning black with an inverted T shaped pale yellowish brown mark at the middle touching the posterior margin; mesonotum provided with a median longitudinal yellowish brown fascia in the posterior three fourth of its length; middle tibia with a fine fringe of long conspicuous hair and tarsi tapering to the apex without claws; posterior tarsi very short and without claws.

Distribution : India : Uttarakhand (Dist. – Almorah); Arunachal Pradesh.

Subfamily CYLINDROSTETHINAE

Genus ***Cylindrostethus*** Mayr

1865. *Cylindrostethus* Mayr, *Verh. zool.- bot. Ges. Wien*, **15** : 444.

34. *Cylindrostethus productus* (Spinola)

1840. *Gerris productus* Spinola, *Essai Sur less insects hemipteres rhynchotes on heteropteres* , 64.

1902. *Cylindrostethus productus* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 184.

1910. *Janias elegentulus* : Distant, *Ann. Mag. Nat. Hist.*, **5**(8) : 145.

1994. *Cylindrostethus productus* : Polhemus, *Bishop Mus. Occ. Pap.*, **38** : 10.

2002. *Cylindrostethus productus* : Thirumalai, *Rec. zool Surv.India* **100**(1-2) : 58.

Diagnostic characters : Adults may be upto 25 mm in length; body cylindrical in shape; a mid-longitudinal line from top of the head to the anterior area of pronotum; eyes are long and placed obliquely on the sides of head; rostrum very short scarcely reaching the anterior coxae; middle and posterior tarsi without claws; antennae with first segment longer than the second and third segments together while the third segment shortest and second and fourth segments subequal; connexival spines very prominent in both sexes.

Distribution : India : Uttarakhand (Dist. – Dehra Dun); Karnataka; Kerala; Madhya Pradesh; maharastra; Orissa; Punjab; Tamil Nadu; Uttar Pradesh; West Bengal.

Remarks : It was recorded from Uttarakhand by Prasad (1975).

Sub family EOTRECHINAE

Key to the genera of subfamily Eotrechinae

1. Hind leg subequal to middle leg in length; hind tibia and tarsus together longer than hind femur; claws on the apex of tarsus; male genital segments with lateral or caudal processes ..... ***Eotrechus***

– Hind leg distinctly shorter than middle leg in length; hind tibia and tarsus together shorter than hind femur; claws not on the apex of tarsus; male genital segments otherwise 2

2. Body length 8.5-10 mm; male genital segment provided with a pair of antler shaped projections on the caudal margin; in male fore femur without tubercle and patches of spine like hairs on the ventral side ..... ***Chimarrhometra***

– Body length less than 5.4 mm; male genital segment not modified as above; in male fore femur provided with distinct tubercle and patches of spine like hairs on the ventral side at the distal end on ventral side .... ***Amemboa***

Genus *Eotrechus* Kirkaldy

1902. *Eotrechus* Kirkaldy, *Entomologist*, **35** : 137.

35. *Eotrechus longipes* Anderson

1982. *Eotrechus longipes* Andersen, *Steenstrupia*, **9**(1) : 11.

2000. *Eotrechus longipes* : Thirumalai, *J. Aqua. Biol.* **15**(1&2) : 36.

Diagnostic characters : Apterous male may be 7.6–8.2 mm in length while macropterous male a little longer upto 8.9–9.8 mm in length body length. Apterous female may be 8.3 mm and macropterous females grow upto 8.9–10.2 mm; a transverse basal band on head and lateral stripes in front of eyes; a median streak and lateral stripes on pronotum; first second and fourth antennal segments subequal in length while third segment smallest to them; first femora moderately incrassate at the base in males all these tarsi armed with prominent terminal claws; process of male pygophore provided with a notch on lower margin and a broad distal part.

Distribution : India : Uttarakhand (Dist. – Almorah); Arunachal Pradseh; West Bengal.

Elsewhere : Nepal.

Remarks : It was recorded from Uttarakhand (Upper Gumti Valley, Almorah and Gori Valley, Kumaon) by Andersen (1982).

Genus *Chimerrhometra* Bianchi

1896. *Chimerrhometra* Bianchi, *Ann. Mus. St. Petersb.*, **1** . 71

36. *Chimerrhometra orientalis* (Distant)

1879. *Halobates orientalis* Distant, *Trans. R. ent. Soc. Lond.*, **1879** : 126.

1896. *Chimerrhometra orientalis* : Bianchi, *Ann. Mus St. Petersb.*, **1** : 71.

1910. *Geris monticola* : Distant *Ann. Mag. nat. Hist.*, **5**(8) : 141.

1999. *Chimerrhometra orientalis* : Bal & Basu, *State Fauna Series 4, Fauna of Meghalaya* Part **4** : 450

Material examined : 7 exs (macropterous 1F; apterous 2MM, 4FF) Makoro, Dist. Almorah, 29.IX.2001, A. Bal & party coll; 2 exs (apterous 2FF) Baijnath, Dist. Bageshwar, 24.III.2001, A .Bal & party coll.

Diagnostic characters : Apterous male may be 7.0–8.6 mm in length while macropterous forms found to be 8.8 mm in body length; apterous female grow upto 7.9-9.4 mm and macropterous forms may be 8.6–9.4 mm in length; head with a broad median band and lateral stripes; median and lateral stripes on pro - and mesonotum in apterous forms; antennae with first segment longest and robust, a little curved while other segments almost subequal in length; male fore femur distinctly incrassate; in male pygophore subovate, forked into a pair of very prominent, vertically raised antler-shaped process; male claspers very large falciform with apices crossing beneath pygophore.

Distribution : India : Uttarakhand (Dists. – Almorah, Bageshwar); Arunachal Pradesh; Assam; Himachal Pradesh; Jammu & Kashmir; Meghalaya; West Bengal.

Elsewhere : Pakistan.

Genus *Amemboa* Esaki

1925. *Amemboa* Esaki, *Philipp. J. Sci.*, **26** : 62.

37. *Amemboa (Amemboa) dentata* Polhemus & Andersen

1984. *Amemboa (Amemboa) dentata* Polhemus & Andersen, *Steenstrupia*, **10**(3) : 92.

2002. *Amemboa (Amemboa) dentate* : Thirumalai, *Rec. zool Surv. India*, **100**(1-2) : 58.

Diagnostic characters : Apterous males 3.4-3.6 mm and macropterous forms 4.4mm in length while apterous female 4.0 mm in length; antennae almost equal to the length of the body; fourth segment longest while first and third subequal and second segment shortest; in males fore femur strongly incrassate basally and distinctly arched dorsally; ventral side of male fore femur provided with a sub-oval crest-like patch of dark hairs in basal third, a tuft of hairs on the middle and a large tubercle before apex furnished with dark pubescence and a short hair tuft, the median hair tuft much closer to the basal than the distal hair tufts; fore tibiae of male curved with large tumescence about middle, clothed with dark short hairs; in male pygophore modified distally into a narrow process, claspers small and club shaped.

Distribution : India : Uttarakhand (Dist. – Dehra Dun).

Subfamily GERRINAE

Key to genera of the subfamily Gerrinae

1. Antennae very long, more than the body length; male with fore femur almost straight terminated with two distinct spines ..... ***Limnometra***
– Antennae mederately long or shorter than the body length; in male fore femur otherwise 2
2. Antennae half of the body length; dark pronotum with median pale stripe anteriorly; connexival spines well developed ..... ***Aquarius***
– Antennae more than half but less than half of body length; pronotum otherwise; connexival spines not well developed..... 3
3. Pronotum with one large pale roundish spot anteriorly; middle legs without claws ..... ***Neogerris***
– Pronotum with elongated pale yllow stripe; middle legs with a pair of claws 4
4. First tarsal segment little shorter than the second on the front legs; 7th segment of male with a concave ventral apical margin and a small median emergination; 8th segment of female always well exposed .. ***Gerris***
– First tarsal segment much shorter than the second on the front legs; 7th segment of male with a concave ventral apical margin without any median emergination; 8th segment of female always basally telescoped within tubular 7th segment..... ***Limnogonus***

Genus *Limnometra* Mayr

1865. *Limnometra* Mayr, *Verh. zool. Bot. Ver. Wien*, **15** : 443.

38. *Limnometra anadyomene* (Kirkaldy)

1901. *Gerris* (Limnometra) *anandyomene* Kirkaldy, *Entomologist*, **34** : 117.

1904. *Gerris anadyomene* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 177.

1938. *Limnometra anadyomene* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 371.

1958. *Limnometra anadyomene* : Hungerford & Matsuda, *Kans. Univ. Sci. Bull.*, **39** : 402.

1999. *Limnometra anadyomene* : Thirumalai, *I.A.A.B.*, **7** : 40.

Material examined : 1ex, Sat Tal, 4600ft, Kumoon, W. Himalayas, 9-10.V.1911, S. Kemp. coll.

Distribution : India : Uttarakhand (Dist. –Naini Tal); Karnataka, Kerala, Tamil Nadu.

Diagnostic characters : Adults may be 9-14 mm in body length; first and fourth antennal segments almost subequal in length and longest while second segment smallest and third segment longer than second but smaller than first; anterior femur not thicker than middle femur; in male middle femur longer than body but equal in female; connexival spines in male clearly surpass the first genital segment but seldom surpass the abdominal tip and never do so in female.

Genus *Aquarius* Schellenberg

1800. *Aquarius* Schellenberg, *Das Geschlecht der Land und Wass., Zurich*, : **25**.

39. *Aquarius adelaidis* (Dohrn)

1860. *Gerris adelaidis* Dohrn, *Stettin. Ent.Ztg.*, **21** : 408.

1896. *Gerris spinolae :* Lethierry & Serville, *Cat gen. Hem.*, **3** : 63.

1902. *Gerris spinolae* : Distant, *Fauna of Brit. India, Rhynchota*, **2** : 180.

1969. *Gerris adelaidis* : Cheng & Fernando, *Oriental insects*, **3(2)** : 4.

1990. *Aquarius adelaidis* : Anderson, *Steenstrupia*, **16**(4) : 60.

2002. *Aquarius adelaidis* : Thirumalai, *Rec. zool. Surv India*, **100**(1-2) : 60.

Material examined : 1 ex, Bhim Tal, 4450 ft, Dist. Naini Tal, Kumaoon, W. Himalayas, 2-10.V.1911, S. Kemp. Coll; 2 exs, Sat Tal 4500 ft, Dist. Naini Tal, Kumaoon, W. Himalayas, 9-10.V.1911, S. Kemp coll; 2 exs, Malwa Tal, 3600ft., Dist. Naini Tal, Kumaoon, W. Himalayas, 7.V.1911, S. Kemp coll.

Diagnostic characters : Brachypterous males may be 10.4-10.9 mm and macropterous males upto 11.2-12.2 mm in body length, females of both forms may be a bit larger in size like 14.8-15.2 mm; first antennal segment longest while second and fourth segments smaller than first and third smallest; male fore femur almost straight and slightly constricted before apex, terminated by two distinct spines; middle femur of male with numerous spines ventrally; male with stout and long connexival spines almost reaching abdominal end (proctiger); females also provided with stout and long connexival spines usually surpassing abdominal end; parameres conical and setose, while proctiger elongate oval with pointed apex.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Arunachal Pradesh; Bihar; Karnataka; Kerala; Maharastra; Manipur; Meghalaya; Rajasthan; Sikkim; Tamil Nadu; West Bengal.

Elsewhere : Borneo, China, Malaya, Myanmar, Sri Lanka, Thailand.

Genus *Neogerris* Matsumara

1913. *Neogerris* Matsumara, *Thousand Insects of Japan, Additaments*, **1** : 100.

40. *Neogerris parvula* (Stål)

1859. *Gerris parvula* Stål, *K. Svenska Eug. Zool.*, **4** : 265.

1868. *Limnogonus parvuls* : Stål, *K. Sevenska Vet.-aad. Handl.*, **7** : 133.

1899. *Gerris tristan* : Kirkaldy, *Rev. d' ent.*, **18** : 88.

1902. *Gerris tristan* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 170.

1960. *Limnogonus (Neogerris) parvulus* : Matsuda, *Kans. Univ. Sci. Bull.*, **41** : 114.

1975. *Neogerris parvula* ; Andersen, *Ent. Scand. Suppl.*, 7 : 86.

1989. *Neogerris parvula* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, **118** : 42.

1996. *Limnogonus parvulus* : Bal & Basu, *State Fauna Series 3 : Fauna of West Bengal*, **5** : 526.

1999. *Neogerris parvula :* Thirumalai, *I.A.A.B.*, **7** : 39.

Material examined : 1ex, Malwa Tal, 3600 ft., Kumaoon, Dist. Naini Tal, W. Himalayas, 7.V.1911.

Diagnostic characters : Body length of adult insects may be 6.0-6.5 mm; antennal first segment

longest and as long as or little longer than second and third segments together; a large rounded yellow spot on pronotum differs this species from all other known species; in male the hind margin of pygophore straight while in females the hind margin of 7th abdominal segment bisinuate.

Distribution : India : Uttarakhand (Dist.- Naini Tal); Arunachal Pradesh; Assam; Kerala; Orissa; Pondicherry; Sikkim; Tamil Nadu; West Bengal.

Elsewhwre : Bangladesh, China, Iran, Java, Sri Lanka, Vietnam.

Genus *Gerris* Fabricius

1794. *Gerris* Fabricius, *Ent. Syst.*, **4** : 187.

41. *Gerris sahlbergi* Distant

1902. *Gerris sahlbergi* Distant, *Fauna of Brit. India, Rhynchota*, **2** : 179.

1975. *Gerris sahlbgi* : Prasad, *J. Bombay nat. Hist. Soc.*, **73**(2) : 413.

1993. *Gerris (Gerris) sahlbergi* : Anderson, *Can. J. Zool.*, **71**(12) : 2490.

1999. *Gerris (Gerris) sahlbergi* : Thirumalai, *I.A.A.B.*, **7** : 39.

Material examined : 1ex. Naini Tal, Kumaoon, Dist. Naini Tal.

Diagnostic characters : Adult insects may be 8.0-12.0mm in body length; head with a small black spot on the vertex; antennae with first segment longest and almost as long as second and third segments together which are subequal in length, while fourth segment a little longer than the third segment; submarginal pale stripes of pronotum usually uninterrupted between the lobe and anterior pronotum; in females apices of connexival spines covered with large stiff dark hairs.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Jammu and Kashmir.

Genus *Limnogonus* Stål

1868. *Limnogonus* Stål, *K. sevenska Vet.-Akad. Handl.*, **7** : 132.

42. *Limnogonus (Limnogonus) nitidus* (Mayr)

1865. *Hydrometra nitida* Mayr, *Verh.zool.-bot. Ges. Wien.*, **15** : 434.

1902. *Gerris nitida* : Distant, *Fauna of Brit India, Rhynchota*, **2** : 178.

1934. *Limnogonus nitidus* : Lundblad, *Arch.Hydrobiol. Suppl.*, **12** : 387.

1969. *Limnogonus nitidus* : Cheng & Fernando, Oriental ins., **3**(2) : 101.

1989. *Limnogonus (Limnogonus) nitidus* : Thirumalai, Rec. zool. Surv., Occ. Paper **118** : 41.

1999. *Limnogonus (Limnogonus) nitidus* : Thirumalai, I.A.A.B., **7** : 39.

2003. *Limnogonus (Limnogonus) nitidus* : Bal & Basu, *State Fauna Series* 9, *Fauna of Sikkim*, **2** : 551.

Material examined : 1 ex (macropterous M), Goaldham, Dist. Bageshwar, 2.X.2004., Mrs. M. Ghosh & party coll.

Diagnostic characters : Body length of adult insects may be 6.0-8.0 mm; head with two longitudinal yellowish lines above within eyes; first and fourth antennal segment longest and subequal in length while second and third segments shortest and also subequal in length; anterior part of pronotum with a pair of linear small yellowish patches; posterior margin of dorsal vesicle plate remarkably angular; 7th abdominal segment provided with fairly prominent connexival spines in both the sexes.

Distribution : India : Uttarakhand (Dist. Bageshwar); Arunachal Pradesh, Andaman and Nicobar Islands; Assam; Bihar; Delhi; Kerala; Karnataka; Manipur; Orissa; Rajasthan; Sikkim; Tamil Nadu; Tripura; West Bengal.

Elsewhere : Borneo, China, Java, Maldives, Myanmar, Nepal, Sri Lanka, Sumatra, Thailnad, Vietnam.

Genus *Microvelia* Westwood

1834. *Microvelia* Westwood, *Ann. Soc. Ent. France*, **33** : 647.

43. *Microvelia douglasi* Scott

1874. *Microvelia douglasi* Scott, *Ann. Mag.nat. Hist.*, **14** : 448.

1902. *Microvelia repentina* : Distant, *Fauna of Brit. India, Rhynchota*, **2** : 174.

1902. *Microvelia singalensis* : Distant, *Fauna of Brit. India, Rhynchota*, **2** : 174.

1909. *Microvelia kumaonensis* : Distant, *Ann. Mag. Nat. Hist.*, **3**(8) : 500.

1934. *Microvelia douglasi* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 347.

1947. *Microvelia douglasi* : Hafiz and Pradhan, *Rec. Indian Mus.*, **45** : 373.

1994. *Microvelia douglasi* :Tthirumalai, *Rec. zool. Surv. India, Occ. Paper* **165** : 40.

2004. *Microvelia douglasi* : Bal & Basu, *State Fauna Series 10 : Fauna of Manipur*, **2** : 306.

Material examined : 11 exs., Sat Tal, Ind. Mus, 9-10.V.1911, S. Kemp coll; 1 ex. Naukuchia Tal, Kumaoon, S. Kemp coll; 1 ex. Bhim Tal, 19-22.IX.2006. N.A.

Diagnostic characters : Adults are minute in size and may be 2 mm in body length; head pronotum and body beneath dull black; anterior margin of pronotum pale yellowish and interrupted at the middle, thus not reaching the anterior angles; fourth antennal segment longest while second segment slightly shorter than first and distinctly shorter than the third; tibial comb present only on anterior tibia in males; intermediate tibia distinctly smaller than femora.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Arunachal Pradesh; Kerala; Karnataka; Manipur; Orissa; Tamil Nanu; Tripura; West Bengal.

Elsewhere : Indonesia, Japan, Sri Lanka.

Genus ***Hydrometra*** Latreille

1796. *Hydrometra* Latreille, *Prec. Car. Ins.*, : **86.**

41. ***Hydrometra greeni*** Kirkaldy

1898. *Hydrometra greeni* Kirkaldy, *Entomologist*, **31** : 2.

1902. *Hydrometra vittata* : Distant, *Fauna of Brit. India, Rhynchota*, **2** : 170.

1919. *Hydrometra vittata* : Paiva, *Rec. Indian Mus.*, **16** : 170.

1923. *Hydrometra greeni* : Dover, *J. Bombay. Nat. Hist. Soc.*, **32** : 614.

1934. *Hydrometra greeni* : Hungerford & Evans, *Ann. Mus. Nat. Hung.*, **38** : 79.

1994. *Hydrometra greeni* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper* **165** : 29.

2004. *Hydrometra greeni* : Bal & Basu *State Fauna Series 10, Fauna of Manipur*, **2** : 304.

Material examined : 2 exs, Almorah, Dist. Almorah, 22.IX.1958, B.S. Lamba coll.

Diagnostic characters : Adult insects may be 11.0 – 12.0 mm in length; head very long and much longer than pronotum and dialated distally; eyes placed considerably far from both the ends on the much elongated head; first antennal segment shortest, second and fourth segments subequal in length while third segment longest; hemelytra extends upto 5th abdominal segments in both the sexes; in males a tranverse depression on 6th ventral abdominal segment which is also fringed with short erect hairs on the dorsal margin.

Distribution : India : Uttarakhand (Dist. – Almorah); Andaman & Nicobar Islands; Arunachal Pradesh; Assam; Bihar; Gujrat; Karnataka; Maharastra; Manipur; Orissa; Pondicherry; Rajasthan; Tamil Nadu; West Bengal.

Elsewhere : Japan, Malaysia, Sri Lanka.

Genus ***Mesovelia*** Mulsant & Rey

1852. *Mesovelia* Mulsant & Rey, *Ann. Soc. Linn. Lyon* : **138.**

45. ***Mesovelia vittigera*** Horvath

1895. *Mesovelia vittigera* : Horvath, *Rev.d'Ent.*, **14** : 160.

1901. *Mesovelia orientalis* : Kirkaldy, *Ann. Mus. Civ. Genova*, **20** : 808.

1902. *Mesovelia mulsanti* : Distant, *Fauna of Brit. India, Rhynchota*, **2** : 169.

1934. *Mesovelia vittigera* : Lundblad, *Arch. Hydrobiol Suppl.*, **12** : 186.

2004. *Mesovelia vittigera* : Bal & Basu *State Fauna Series 10, Fauna of Manipur*, **2** : 303.

Material examined : 4 exs (2MM, 2FF), Dist. Naini Tal, Kuamoon, N.A.

Diagnostic characters : Adults attain a length upto 2.5-3.0 mm; body elongate with prominent head; eyes large and almost touching the anterior margin of pronotum; two ocelli equally distant from the eyes as far as from each other; fourth segment of antennae longer than third segment; pronotum with lateral angles tuberculously sub-prominent; hemelytra may be absent (apterous forms), when present may be fully developed (macropterous forms) or half developed (brachypterous forms); in females middle femur spiny below; in males the last abdominal segment with a single median spine and two sets of bush like hairs laterally.

Distribution : India : Uttarakhand (Dist. – Naini Tal); Andaman & Nicobar Islands; Bihar; Karnataka; Orissa; Tamil Nadu; West Bengal.

Elsewhere : Africa, Malaysia, Sri Lanka.

SUMMARY

The paper has dealt with water-bugs belonging to 11 families of the Order – Hemiptera *viz.* Corixidae, Naucoridae, Nepidae, Belostomatidae, Notonectidae, Helotrephidae, Pleidae, Gerridae, Veliidae, Hydrometridae, and Mesoveliidae from Uttarakhand. A total number of 45 species under 26 genera belonging to above mentioned 11 families have been included in the present study. Taxonomic keys for the different taxa like families, subfamilies, genera, and species of water-bugs have been proposed. Diagnostic characters for each species and their distribution have also been cited in the present paper.

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REFERENCES

AMYOT, G.J.B AND SERVILLE, J.G. 1843 *Historie naturelle des insects hemipteres.* **I.** *Paris,* : 413.

ANDERSEN, N.M. 1982. The semiaquatic bugs : (hemiptera, gerromorpha) Phylogeny, Adaptation, Biogeography and Classification. *Entomonograph,* **3** : 1-455.

ANDERSEN, N.M. 1990. Phylogeny and taxonomy of water striders, genus, *Aquarius* Schellenberg (Insecta, Hemiptera, Gerridae) with a new species from Australia. *Steenstruptia,* **16**(4) : 37-81.

ANDERSEN, N.M. 1975. The *Limnogonus* and *Neogerris* of the Old world with character analysis and a reclassification of the Gerrinae (Hemiptera : Gerridae). *Ent. Scand. Suppl.,* **7** : 1-96.

ANDERSEN, N.M. 1993. Classification, phylogeny, and zoogeography of the pond skaters genus *Gerris* Fabricius (Hemiptera: Geriidae) *Can.J. Zool.* **71**(12) : 2473-2508.

BAL, ANIMESH AND BASU R.C. 1996. Insecta : Hemiptera : Mesovellidae, Hydrometridae, Vellidae and Gerridae. *Fauna of West Bengal, State fauna Series,* **3** (Part-5) : 511-534.

BAL, ANIMESH AND BASU, R.C. 1996. Insecta : Hemiptera : Belostomatidae, nepidae, Notonectidae and Pleidae. *Fauna of West Bengal, State fauna Series* **3** (Part 5) : 535-558.

BAL, ANIMESH AND BASU, R.C. 1997. Hemiptera : Water bugs. *Fauna of Delhi, State Fauna Series,* **6** : 261-276.

BAL, ANIMESH AND BASU R.C. 1999. Insecta : Hemiptera : Water-bugs. *Fauna of Meghalaya, State Fauna Series,* **4** (Part 4) : 431-461.

BAL, ANIMESH AND BASU, R.C. 2003. Insecta : Hemiptera : Water-bugs. *Fauna of Sikkim, State Fauna Series,* **9** (Part 2) : 541-557.

BAL, ANIMESH AND BASU, R.C. 2003. Insecta : Hemiptera : Water-bugs. *Fauna of Sikkim, State Fauna Series,* **9** (Part 2) : 541-557.

BAL, ANIMESH AND BASU, R.C. 2004. Insecta : Hemiptera : Water-bugs. *Fauna of Manipur, State Fauna Series,* **10** : 293-310.

BROOKS, G.T. 1951. A revision of genus *Anisops* (Notonectidae, Hemiptera). *Kans. Univ. Sci. Bull.,* **34**(8) : 301.

BIANCHI, G. 1896. On two new forms of the heteropterous family Gerridae. *Annu. Mus. zool. St. Petersb.* 1 : 67-76.

BUCHANAN. W.F. 1883. Report on the pelagic Hemiptera procured during the voyage of H.M.S Challenger, in the years 1873-1876. *Rep. Sci. Res. Challenger, zool.* **7** : 1-80.

CHEN, L.C AND NEISER, N. 1993. A taxonomic revision of the Oriental water strider genus, *Metrocoris* Mayr (Hemiptera, Gerridae). Part I & II. *Steenstruptia*, **19**(1) : 1-43 & (2) : 45-82.

CHENG, L. AND FERNANDO, C.H. 1969. A taxonomic study of the Malayan gerridae (Hemiptera:Heteroptera) with notes on their biology and distribution. *Oriental Ins.*, **3**(2) : 97-160.

DISTANT, W.L.1902. *The Fauna of British India, including Ceylon and Burma. Rhynchota,* **2** : 1-503.

DISTANT, W.L.1906. *The Fauna of British India, including Ceylon and Burma. Rhynchota,* **3** : 1-503.

DISTANT, W.L.1909. *The Fauna of British India, including Ceylon and Burma. Rhynchota,* **3** : 1-507.

DISTANT, W.L.1910. *The Fauna of British India, including Ceylon and Burma.* Appendix **5** : 137-166 & 310-353.

DISTANT, W.L.1910. Some undescribed Gerrinae. *Ann. Mag. Nat. hist.*, **5**(8) : 140-153.

DISTANT, W.L.1920. The Rhynchota Heteroptera (Notonectidae and Corixidae) of Seistan. *Rec. Ind. Mus. Calcutta.* **18** : 205-207.

DAN BOER, M.H.1865. Revisionary notes on the genus, *Metrocoris* Mayr (Heteroptera, Gerridae), with descriptions of four new species. *Zool. Verh.* **74** : 1-38.

DAHL 1893. Die *Halobates*-Ausbeute der Plankton-Expedition. *Erg. Plank. Exp* 2 (G)(a)(alpha) : 1-9.

DOHRN, A. 1860. Zur Heteropteran Fauna Ceylon's. *Stettin. Ent. Ztg.* **21** : 409.

DOVER, C. 1923. Aquatic Rhynchota in the collection of the Agricultural College, Coimbatore, Southern India. *J. Bombay nat. Hist. Soc.* **32**(3) : 614-615.

ESAKI, T. AND CHINA, W.E. 1928. A new family of aquatic heteroptera. *Trans. R. ent. Soc. Lond.* **75** : 279-295.

ESAKI, T. 1925. New or little known water striders from the Oriental regeion. *Philipp. J. Sci.* **26** : 57-66.

ESAKI, T. 1926. Water striders of the subfamily Halobatinae in the Hungarian National Museum. *Annals. Hist. nat.Mus. natn. Hung.* **23** : 117-164.

ESAKI , T. 1929. New or little known Gerridae. II. Indian species. *Ann. Mag. Nat. Hist.* **10**(4) : 412-419.

FABRICIUS, J.C. 1775. Systema Entomologiae. *Elensburgi et. Lipsiae*. 1-832.

FABRICIUS, J.C. 1790. Nova Insectorum genera. *Skr. nat. Selsk.* **1**(1) : 227-228.

FABRICIUS, J.C. 1794. *Entomologia Systemetica.* Hafinae. 1-477.

FABRICIUS, J.C. 1798. *Supplementum Entomologia Systemetica.* Hafinae. 1-527.

FABRICIUS, J.C. 1803. *Systema Rhyngotorum,* 1-314.

FIEBER, F.X. 1844. Monographic der gattung Ploa. *Ent. Monogr. Leipzig.* (5)**3** : 296.

GEOFFROY, E.L. 1762. Histoire abregee des insects qui se trouvent aux environs de Paris. **1** : 477.

HUTHCINSON, G.E. 1933. A revision of the Distantian and Paivian types of Notonectidae and Corixidae in the Indian Museum. *Rec. Indian Mus.* **35**(4) : 393-408.

HUTHCINSON, G.E. 1940. A revision of the Corixidae of India and adjacent regions. *Trans. Connecticut Acad. Arts. Sci.* **33** : 339-476.

HERRICH-SHAFFER, G.A.W. 1850. *Die Wanzenartigen Insecten.* **9** : 40-41.

HAFIZ, H.A AND MATHAI, G. 1938. On a collection of aquatic rhynchota from the Rajmalai Hills, Santhal Pargana, Bihar. *Rec. Indian. Mus.* **40**(2) : 207-210.

HAFIZ, H.A. AND PRADHAN, K.S. 1947. Notes on a collection of aquatic rhynchota from the Patna State, Orissa, with description of two new species. *Rec. Indian. Mus.* **45**(4) : 347-376.

HORVATH, G. 1895. hemipteres nouveaus d'Europe et des Pay, Limitrophes. *Rev. Entomologie.* **14** : 152-165.

HORVATH, G. 1889. Analecta ad cognitionem Heteroptorum Himalayensium. *Termesz. Kans.* 29-40.

HARDWICKE, T. 1825. Description of *Cermatia longicornis* and of three new insects from Naupaul. *Trans. Linn. Soc.* **14** : 134.

HUNGERFORD, H.B. AND MATSUDA, R. 1965. The gunus *Ptilomera* Amyot and Seville (Gerridae:Hemiptera). *Kans. Univ. Sci. Bull.* **45**(5) : 397-515.

HUNGERFORD, H.B. AND MATSUDA, R. 1958. The *Tenagogonus-imnometra* Complex of the Gerrinae. *Kans. Univ. Sci. Bull.* **39**(9) : 371-457.

HUNGERFORD, H.B. AND EVANS, N. E. 1934. The Hydrometridae of the Hungarian National Museum and other studies in the family (hemiptera). *Ann. Mag. Nat. Hung.* **38** : 31-112.

KIRKALDY, G.W. 1898. Notes on aquatic Rhynchota 1. *Entomologist.* **31** : 2-4.

KIRKALDY, G.W. 1899. Sur quelque hemipteres aquatiques nouveaux on peu conus. *Rev. dent.* **18** : 88.

KIRKALDY, G.W. 1901. Miscellanea Rhynchotalia. *Entomologist.* **34** : 116-117.

KIRKALDY, G.W. 1902. Miscellanea Rhynchotalia. No. 3. *Entomologist.* **35** : 136-137.

KIRKALDY, G.W. 1904. Uber Notonectiden (Hemiptera). *Wien. Ent. Ztg.* **23** : 111-135.

LINNAEUS, C. 1764. Systema natureae. *Museum S : ae R : ae M tis Ludivicae Ulricae etc. Holmiae.*

LEPELETIER, A.L.M. AND SERVILLE, J.G.A. 1825. *Enclycopedie methodigue.* **10** : 272.

LAPORTE, F.L. 1833. Essai'd d'une classification tematique de lórdre des hemipteres (Hemipteres : Heteropteres Latr.). *Guerin's Mag. Zool.* **2**(52-55) : 1-88.

LAUCKE, D.R. AND MENKE, A.S. 1961. The higher classification of the Belostomatidae (Hemiptera). *Ann. Ent. Soc. Amer.* **54**(5) : 644-657.

LUNDBLAD, V. O 1934. Zur kenntnis der aquatilen und semiaquatilen hemipteren von Sumatra, Java und Bali. Arch. Hydrobiol. Suppl. **12** : 1-195, 263-489.

LUNSBURY, I. 1968. The *Enithares* (Hemiptera-Heteroptera : Notonectidae). *Pacific Insects.* **10(2)** : 353-442.

LETHIERRY, A.L. M. AND SERVILLE, M. 1896. *Catalogue general des Hemipteres, Berlin.* **3** : 1-275.

LEACH, W.E. 1818. On the classification of natural tribe of insects Notonectides with descriptions of the British species. *Trans. Linn. Soc. London.* **12** : 10-18.

MONTANDON, A.L. 1909. Belostomatidae et Nepidae. Notes diverses et description d,especes nouvelles. *Bull. Soc. Sci. Buc.* **17** : 138.

MONTANDON, A.L. 1910. Quelques types d Hemepteres de Gurein Meneville des collections due Musee Zool. De Univ. de naples. *Annali. Mus. zool. Napoli.* **3**(10) : 1-4.

MAYR, G. 1853. Zwei neue wazan as Kordofan. *Verh. zool.-bot. Ver. Wien.* **2**(1852) : 17.

MAYR, G. 1865. Diagnosis neuer Hemeipteren. II. *Verh. zool.-bot. Ges. Wien.* **15** : 429-446.

MATSUMARA, S. 1905. Die wasser hemipteren japan. *J. Sapporo. Agric. Coll.* **2** : 53-65.

MATSUDA, R. 1960. Morphology, evolution and a classification of Gerridae (Hemiptera-Heteroptera). *Kans. Univ. sci. Bull.* **41**(2) : 25-632.

MULSANT, P. E. AND REY, C. 1852. description de quelques Hemipteres Heteropteres Noveaux on peu connus. *Opusc. Ent.* 1-157.

PAIVA, C. AND DOVER, C. 1922. Five new species of Rhynchotan genus *Corixa. Rec. Indian. Mus.* **24** : 331-333.

PRASAD, P. 1975. Studies on the water-bugs of Doon Valley. (Hemiptera : Heteroptera). *Ind. J. Zool.* **3**(2) : 35-38.

PRASAD, P. 1977. Studies on the water bugs (Hemiptera : Heteroptera) of Corbett National Park. *J. Bombay nat. Hist. soc.* **73**(2) : 413-415.

POLHEMUS, J.T. 1990. A new tribe, anew genus and three new species of Helotrephidae (Heteroptera) from South east Asia, and world checklist. *Acta. Ent. Bohemeslovaca.* **87** : 45-63.

POLHEMUS, D.A. 1994. Taxonomy, Phylogeny, and Zoogeography of the Genus *Cylindrostethus* Fieber in the Paleotropic regeion (Heteropera:Gerridae). *Bishop Mus. Occ. Pap.* **38** : 1-34.

PRADHAN, K.S. 1950. On a collection of aquatic Rhynchota from the Rihand Dam site, Mirzapur District (U.P) with the description of a new water strider (Insecta:hemiptera:Gerridae). *Rec. Indian Mus.* **48**(3&4) : 101-105.

POLHEMUS, J.T. AND ANDERSON, N.M. 1984. A revision of *Amemboa* Esaki with notes on the phylogeny and ecological evolution of Eotrechinae water striders (Insecta, Hemiptera, Gerridae). *Steenstruptia.* **10**(3) : 65-111.

STAL, C. 1859. Hemiptera. *K. svenska. Eug. Zool.* **4** : 249.

STAL, C. 1861. Nova meyhods familias quasdam hemipterorum dispnendi. *Ofvers K. et.-Akad. Forh.* **18** : 203.

STAL, C. 1865. *Hemiptera Africana.* **3** : 1-191.

STAL, C. 1868. Hemiptera Fabriciana. *K. sevenska Vet.-Akad. Handl.* **7** : 1-148.

STAL, C. 1876. Enumeratio Hemipterorum. 5. *K. Svenska Vet.-akad. Forh.* **27** : 705.

SPINOLA, M.M. 1873. *essai sur less insects hemipteres Rhyngotes ou Heteropteres.* : 1-68.

SCHELLENBERG, J.R. 1800. *Das Geschlecht der and und Wasserwanzen. Nach Familien geordnet mit Abbildungen.* Orell, Fussli & Co. Zurich. 32 pp.

SCOTT, J. 1874. On a collection of Hemiptera Heteroptera from Japan. Discriptions of various new genera and species. *Ann. Mag. Nat. Hist.* **14**(4) : 442-462.

THIRUMALAI, G. 1989. Aquatic and semi aquatic Hemiptera (Insecta) of Javadi Hills, Tamil Nadu. *Rec. zool. Surv. India Occ. Paper* **118** : 1-63.

THIRUMALAI, G. 1994. Aquatic and semi aquatic Hemiptera of Tamil nadu. I dharmaouri and Puddukottai Districts. *Rec.zool.Surv. India. Occ. Paper* **165** : 1-45.

THIRUMALAI, G. 2000. Diversity of the semi aquatic bugs (gerromorpha:hemiptera) in Arunachal Pradesh, North East India. *J. aqua. Biol.* **15**(1&2) : 35-39.

THIRUMALAI, G. 1999. Aquatic and semi aquatic Heteroptera of India. *Indian association of aquatic Biologists (IAAB). Publication No.* **7** : 1-74 pp.

THIRUMALAI, G. 2002. A checklist of Gerromorpha (Hemiptera) from India. *Rec. zool. Surv. India.* **100**(1-2) : 55-97.

THIRUMALAI, G. 2004. A checklist of Aquatic and semi aquatic Hemiptera (Inscta) of Karnataka. *Rec. zool. Surv. India.* **102** (1-2) : 57-72.

The chart showing the occurance of water-bugs in different districts of Uttarakhand.

Name of species	DISTRICTS												
	Almorah	Bageshwar	Chamoli	Champawat	Detra-Dun	Hharidwar	Nani-Tal	Pauri Garhwal	Pittoragarh	Rudraprayag	Tehri Garhwal	Udham Singh Nagar	Uttarkashi
1. *Corixa (V) lateralis*	-	-	-	-	+	-		-	-	-	-	-	-
2. *Corixa (T) promontoria*	-	-	-	-		-	+	-	-	-	-		
3. *Corixa (T) pruthiana*	+		-	-	-	-	-	-		-	-	-	-
4. *Heliocoris obliquatus*		-	-	-	-	-	+	+	-	-	-	-	-
5. *Heliocoris vicinus*	-	-	-	-	-		+	-			-	-	
6. *Laccotrephes ruber*	-	-	-	-	-	-	+	+	-	-	-		
7. *Laccotrephes griseus*			-	-			+	-	-	-	-		-
8. *Ranatra elongata*			-				+	-			-	-	-
9. *Ranatra filiformes*								+		-		-	
10. *Ranatra varipes*		-					+	+	-			-	
11. *Lethocerus indicus*					+					-		-	
12. *Diplonychus annulatus.*		-		-	+			+		-	-		
13. *Diplonychus rusticus*					+			+					
14. *Anisops paranigrolineata*							+				-		-
15. *Anisops nigrolineata*		+	-										
16. *Anisops niveus*				-	+	-							
17. *Anisops sardea*							+						
18. *Anisops bouvieri*					+		-						
19. *Enithares ciliata*					+		+						
20. *Enithares lineatipes*							+						

Name of species	DISTRICTS												
	Almorah	Bageshwar	Chamoli	Cchampawat	Detra-Dun	Hharidwar	Nani-Tal	Pauri Garhwal	Pittoragarh	Rudraprayag	Tehri Garhwal	Udham Singh Nagar	Uttarkashi
21. *Enithares hungerfordi.*	-	+	-	-	-	-		-	-	-	-	-	-
22. *Tiphotrephes indicus*	-	-	-	-	-		+	-	-	-	-	-	-
23. *Limnotrephes kumaonis*	+	-	-	-	-	-	-	-	-	-	-	-	-
24. *Paraplea indistinguenda*	-	-	-	-	-	-	+	-	-	-	-	-	-
25. *Paraplea frontalis*	-	-	-		-	-	+	-		-	-	-	-
26. *Metrocoris anderseni*	-	-	-	-	+	-	+	-	-	-	-	-	-
27. *Metrocoris falcatus*	-	-	-		+	-	+	-	-	-	-	-	-
28. *metrocoris communis*	-	-	-	-	+	-	+	-	-	-	-	-	-
29. *Metrocoris compar*	-	-	-	-	-	-	-	-	-	-	+	-	-
30. *metrocoris tenuicornis*	-	-	-		-	-	+	-	-	-	-	-	-
31. *metrocoris nepalensis*	+	-	-	-	-	-	-	-	-	-	+	-	-
32. *Ptilomera (P) laticaudata.*	+	+	-	-	+	-	+	-	-	-	-	-	-
33. *Heterobates rihandi.*	+	-	-	-	-	-	-	-	-	-	-	-	-
34. *Cylindrostethus productus.*	-	-	-	-	+	-	-	-	-	-	-	-	-
35. *Eotrechus longipes*	+	-	-	-	-	-	-	-	-	-	-	-	-
36. *Chimarrhometra orientalis*	+	+	-	-	-	-	-	-	-	-	-	-	-
37. *amemboa dentate*	-	-	-	-	+	-	-	-	-	-	-	-	-
38. *Limnometra anadyomene*	-	-	-	-	-	-	+	-	-	-	-	-	-
39. *Aquarius adelaides.*	-	-	-	-	-	-	+	-	-	-	-	-	-
40. *Neogerris parvula*	-	-	-	-	-	-	+	-	-	-	-	-	-

Name of species	DISTRICTS											
	Almorah	Bageshwar	Chamoli	Champawat	Detra-Dun	Hharidwar	Nani-Tal	Pauri Garhwal	Pittoragarh	Rudrapryag	Tehri Garhwal	Udham Singh Nagar	Uttarkashi
41. *Gerris sahlbergi*	-	-	-		-	-	+	-	-	-	-	-	
42. *Limnogous (L) nitidus*		+	-		-	-	-	-	-	-	-		-
43. *Microvelia douglasi*		-	-		-	-	+	-	-	-		-	-
44. *Hydrometra greeni*	+		-		-	-	-	-	-		-		
45. *Mesovelia vittigera*	-	-	-			-	+	-	-	-		-	-

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INSECTA : HEMIPTERA : APHIDIDAE

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INTRODUCTION

Aphids are small homopteran insects infesting varieties of plants, sometimes causing economic losses. It prefers a temperate climate to thrive on. Hilly areas of Uttarakhand are good abode of aphids as it gives suitable climatic condition with a wide range of host plants. Quite a few workers have worked on this group from this area. They are Chakraborti *et al.* (1972, 1978, 1980, 1982), Banerjee *et al.* (1969), Chakraborti & Verma (1975), David *et al.* (1968, 1969, 1970, 1974), Ghosh, L.K. (1969, 1970) etc.

A review of literature reveals the existence of 163 species of aphids belonging to 90 genera and 7 subfamilies from Uttarakhand. Among these 4 species are new record from this state. Description of new morphs of one species has also been given for the first time.

All the specimens were collected by the first author himself unless otherwise mentioned and are deposited in the National Zoological Collection of Zoological Survey of India, Kolkata. A short description was provided for the species which were before the author and the rest were reviewed from literature.

CLASSIFIED LIST OF APHIDIDAE OF UTTARAKHAND

Subfamily ANOEIINAE
Tribe AICEONINI
Genus ***Aiceona*** Takahashi

1. *Aiceona retipennis* David, Narayan & Raja Singh

Tribe ANOECIINI
Genus ***Anoecia*** Koch

2. *Anoecia furcata* (Theobald)
3. *Anoecia himalayansis* Chakraborti & Maity
4. *Anoecia nemoralis* Borner
5. *Anoecia vagans* (Koch)

Subfamily APHIDINAE
Tribe APHIDINI
Genus ***Aphis*** Linnaeus

6. *Aphis achyranthi* Theobald
7. *Aphis citricola* V.d.G.
8. *Aphis craccivora* Koch
9. *Aphis euphorbiae* Kaltenbach
10. *Aphis fabae* Theobald
11. *Aphis gossypii* Glover
12. *Aphis kurosawai* Takahashi
13. *Aphis longisetosa* Basu
14. *Aphis nerii* (B.d.F.)
15. *Aphis nasturtii* Kaltenbach
16. *Aphis rubifolii* (Thomas)
17. *Aphis verbasci* Schrank

Genus ***Hysteroneura*** Davis

18. *Hysteroneura setariae* (Thomas)

Genus ***Melanaphis*** V.d.G.

19. *Melanaphis pahansis* (Takahasi)

Genus ***Rhopalosiphum*** Koch

20. *Rhopalosiphum maidis* (Fitch)
21. *Rhopalosiphum rufiabdominalis* (Sasaki)

Genus ***Schizaphis*** Borner

22. *Schizaphis graminum* (Rondoni)
23. *Schizaphis rotundiventris* (Signoret)

Genus ***Toxoptera*** Koch

24. *Toxoptera aurantii* (B.d.F.)
25. *Toxoptera citricidus* Kirkaldy

Tribe MACROSIPHINAE
Genus ***Acutosiphon*** Basu, Ghosh & Raychaudhuri

26. *Acutosiphon obliquoris* Basu, Ghosh & Raychaudhuri

Genus ***Aulacorthum*** Mordvilko

27. *Aulacorthum solani* (Kaltenback)

Genus ***Brachycaudus*** V.d.G.

28. *Brachycaudus helicrysi* (Kaltenback)

Genus ***Capitophorus*** V.d.G.

29. *Capitophorus hippophaes javanicus* H.R.L.
30. *Capitophorus hippophaes mitegoni* Eastop
31. *Capitophorus tricholepidis* Chakraborti
32. *Capitophorus arkengelskii* Nevsky
33. *Capitophorus formosartemisiae* (Takashi)

Genus ***Chaetosiphon*** Mordvilko

34. *Chaetosiphon fragaefolii* (Cockerell)
35. *Chaetosiphon (Pentatrichopus) heterotrichus* Chakraborti, Ghosh & Raychaudhuri
36. *Chaetosiphon gracillicornis* David, Rajasingh & Narayan
37. *Chaetosiphon (Pentatrichopus) tetrahodus* (Walker)

Genus ***Cavariella*** del Guercio

38. *Cavariella aegopodii* (Scopoli)

Genus ***Dysaphis*** Borner

39. *Dysaphis foeniculus* (Theobald)

Genus ***Eumyzus*** Shinji

40. *Eumyzus darjeelingensis* Basu & Raychaudhuri

Genus ***Hyadaphis*** Kirkaldy

41. *Hyadaphis coriandri* (Das)

Genus ***Hayhurstia*** del Guercio

42. *Hayhurstia atriplices* (Linn.)

Genus ***Hyperomyzus*** Borner

43. *Hyperomyzus carduellinus* (Theobald)

Genus ***Jacksonia*** Theobald

44. *Jacksonia companulata* Chakraborti & Raychaudhuri

Genus ***Indiapis*** Basu

45. *Indiaphis crassicornis* Basu

Genus ***Impatientinum*** Mordvilko

46. *Impatientinum impatiens* (Shinji)
47. *Impatientinum impatiense dalhousiensis* Verma

Genus ***Indoidiopterus*** Chakraborti, Ghosh & Raychaudhuri

48. *Indoidiopterus geranii* (Chawdhury, Basu, Chakraborti, & Raychaudhuri)

Genus ***Liosomaphis*** Walker

49. *Liosomaphis atra* H.R.L
50. *Liosomaphis himalayansis* Basu

Genus ***Lipaphis*** Mordvilko

51. *Lipaphis erysimi* (Kaltenbach)

Genus ***Longicaudus*** V.d.G

52. *Longicaudus dunlopi* H.R.L

Genus ***Macrosiphoniella*** del Guercio

53. *Macrosiphoniella sanborni* (Gill.)
54. *Macrosiphoniella yomogifoliae* Shinji
55. *Macrosiphoniella pseudoartemesiae* Shinji

Genus ***Macromyzus*** Takahasi

56. *Macromyzus woodwardie* (Takahasi)

Genus ***Macrosiphum*** Passerini

57. *Macrosiphum (Sitobion) miscanthi* (Takahasi)
58. *Macrosiphum (Macrosiphum) pachysiphon* H.R.L
59. *Macrosiphum (Macrosiphum) rosae* (Linn.)
60. *Macrosiphum (Sitobion) rosaiformis* Das

Genus ***Matsumuraja*** Schumacher

61. *Matsumuraja capitophoroides* H.R.L.

Genus ***Metopolopium*** Mordvilko

62. *Metopolopium dirhodum* (Walker)
63. *Metopolopium rubi* (Narzikulov)

Genus ***Myzus*** Passerini

64. *Myzus ascalonicus* Dincaster
65. *Myzus brevisiphon* Basu
66. *Myzus cerasi* (Fab.)
67. *Myzus obtusirostris* David, Narayan & Rajasingh
68. *Myzus ornatus* Laing
69. *Myzus persicae* (Sulzer)
70. *Myzus umifoliae* (Shinji)

Genus ***Myzaphis*** V.d.G

71. *Myzaphis rosarum* (Kaltenbach)

72. *Myzaphis turanica* Navasky

Genus ***Nasonovia*** Mordvilko

73. *Nasonovia* (*Nasonovia*) *rostrata* David & Hameed

Genus ***Neohyalomyzus*** Basu, Ghosh & Raychaudhuri

74. *Neohyalomyzus raoi* H.R.L.

Genus ***Neomegouropsis*** Ghosh, Basu & Raychaudhuri

75. *Neomegouropsis dooarsis* (Ghosh & Raychandhuri)

Genus ***Neomasonaphis*** Remaudiere & Remaudiere

76. *Nemasonaphis anaphilidis* Basu

77. *Neomasonaphis rhododendris* (Chakraborti, Mondal & Raha)

78. *Neomasonaphis rumicis* Chakraborti & Raychaudhuri

79. *Neomasonaphis tuberculata* (Chakraborti, Mondal & Raha)

Genus ***Neomyzus*** Van der Goot

80. *Neomyzus* (*Neomyzus*) *circumflexus* (Buckton)

Genus ***Oedisiphum*** V.d.G.

81. *Oedisiphum soureni* Basu

Genus ***Ovatus*** V.d.G.

82. *Ovatus crataegarius* (Walker)

Genus ***Paczoskia*** Mordvilko

83: *Paczoskia budhium* Banerjee, Ghosh & Raychaudhuri

Genus ***Pentalonia*** Coquerel

84. *Pentalonis nigronervosa* Coquerel

Genus ***Pleotrichophorus*** Borner

85. *Pleotrichophorus glandulosus* (Kaltenbach)

Genus ***Pseudoacyrthosiphon*** Ghosh & Raychaudhuri

86. *Pseudoacyrthosiphon* (*Anacyrthosiphon*) *takahashii* (Ghosh)

Genus ***Rhodobium*** H.R.L.

87. *Rhodobium porosum* (Sanderson)

Genus ***Shinjia*** Takahashi

88. *Shinjia pteridifolia* (Shinji)

Genus ***Tricaudatus*** Narzikulov

89. *Tricaudatus polygoni* (Narzikulov)

Genus ***Trichosiphonaphis*** Takahashi

90. *Trichosiphonaphis polygoni* (V.d.G.)

Genus ***Uroleucon*** Mordvilko

91. *Uroleucon fuscaudatus* Chakroborti & Raychaudhuri

92. *Uroleucon longisetosus* (Takahashi)

93. *Uroleucon kashmiricus* (Verma)

94. *Uroleucon sonchi* (Linn.)

Genus ***Vesiculaphis*** del Guercio

95. *Vesiculaphis verbasci* (Chowdhuri, Basu, Chakraborti & Raychaudhuri)

96. *Vesiculaphis pieridis* Basu

Genus ***Xenomyzus*** Aizenberg

97. *Xenomyzus scabripes* Basu, Ghosh & Raychaudhuri

Subfamily DREPANOSIPHINAE

Genus ***Betulaphis*** Glendenning

98. *Betulaphis hissarica* Narzikulov

99. *Betulaphis longicornis* Quednau & Chakraborti

Genus ***Clethrobius*** Mordvilko

100. *Clethrobius dryobius* Chakraborti & Raychaudhuri

Genus ***Chaitophorus*** Koch

101. *Chaitophorus himalayensis* (Das)

Genus ***Chromaphis*** Walker

102. *Chromaphis hirsutustibis* Kumar & Lavigne

103. *Chromaphis juglandicola* (Kaltenbach)

Genus ***Drepanosiphum*** Koch

104. *Drepanosiphum oregonensis* Grenosky

105. *Drepanosiphum platonoides* (Schrank)

Genus ***Hoplocallis*** Pintera

106. *Hoplocallis microsetosus* (Quednau & Chakraborti)

Genus ***Panaphis*** Kirkaldy

107. *Panaphis juglandis* (Geoze)

Genus ***Periphyllus*** Van der Hoeven

108. *Periphyllus aesculi* H.R.L.

109. *Periphyllus pusillus* Quednau & Chakraborti
110. *Periphyllus villosi* Chakraborti

Genus ***Pterocallis*** Passerini

111. *Pterocallis affinis* Chakraborti

Genus ***Serratocallis*** Quednau & Chakraborti

112. *Serratocallis takahashi* Quednau & Chakroborti

Genus ***Takecallis*** Matsumura

113. *Takecallis himalayensis* Chakraborti

Genus ***Taoia*** Quednau

114. *Taoia indica* (Ghosh & Raychaudhuri)

Genus ***Tinocallis*** Matsumura

115. *Tinocallis nevskyi* Remandiere & Quednau

Genus ***Tinocalloides*** Basu

116. *Tinocalloides montans* Basu

Genus ***Yamatocallis*** Matsumura

117. *Yamatocallis brevicauda* Chakraborti

Subfamily GREENIDEINAE

Genus ***Eutrichosiphum*** Essig & Kuwana

118. *Eutrichosiphum assamense* Ghosh, Basu & Raychaudhuri
119. *Eutrichosiphum alnicola* Basu
120. *Eutrichosiphum khasyanum* Ghosh & Raychaudhuri
121. *Eutrichosiphum pseudopassaniae* Szelegiewiez
122. *Eutrichosiphum pyri* Chakraborti, Ghosh & Raychaudhuri
123. *Eutrichosiphum quercifoliae* Raychaudhuri, Ghosh, Banerjee & Ghosh
124. *Eutrichosiphum querciphaga* Chakraborti & Maity
125. *Eutrichosiphum tapatii* Mondal, Chatterjee & Raychaudhuri
126. *Eutrichosiphum tattakanum* (Takahashi)

Genus ***Greenidea*** Schouteden

127. *Greenidea* (*Trichosiphum*) *anonae* Pergande
128. *Greenidea* (*Trichosiphum*) *bucktonis* Ghosh, Basu & Raychaudhuri
129. *Greenidea* (*Greenidea*) *ficicola* Takahashi
130. *Greenidea* (*Trichosiphum*) *formosana formosana* Maki
131. *Greenidea* (*Trichosiphum*) *haldari* Maity & Chakraborti
132. *Greenidea* (*Trichosiphum*) *kumaoni* Chakraborti & Raychaudhuri
133. *Greenidea* (*Paragreenidea*) *parthenocissi* Saha & Chakraborti

Genus ***Mollitrichosiphum*** Snenaga

134. *Mollitrichosiphum* (*Metatrichosiphon*) *buddleiae* Ghosh
135. *Mollitrichosiphum* (*Metatrichosiphon*) *montanum* (V.d.G.)

Subfamilt HORMAPHIDINAE

Genus ***Aleurodaphis*** Van der Goot

136. *Aleurodaphis antennata* Chakraborti & Maity

Genus ***Astegopteryx*** Karsch

137. *Astegopteryx bambusae* (Buckton)

Genus ***Ceratovacuna*** Zehutner

138. *Ceratovacuna lanigera* Zehutner

Genus ***Hammamelistes*** Shimer

139. *Hammamelistes miyabei* (Matsumura)

Genus ***Neothoracapis*** Matsumura

140. *Neothoracapis garhwalensis* Chakraborti & Raha

Genus ***Pseudoregma*** Doncaster

141. *Pseudoregma bucktoni* Ghosh, Pal & Raychaudhuri

Genus ***Pseudothoracapis*** Raychaudhuri, Ghosh & Das

142. *Pseudothoracapis himachali* (Raychaudhuri, Ghosh & Das)

Subfamily LACHNINAE

Genus ***Cinara*** Curtis

143. *Cinara comata* Donaster
144. *Cinara indica* Verma

Genus ***Lachnus*** Burmeister

145. *Lachnus tropicalis* (V.d.G.)

Genus ***Nippolachnus*** Matsumura

146. *Nippolachnus piri* Matsumura

Genus ***Pyrolachnus*** Basu & H.R.L.

147. *Pyrolachnus pyri* (Buckton)

Subfamily PEMPHIGINAE

Genus ***Baizongia*** Rondoni

148. *Baizongia pistaciae* (Linn.)

Genus ***Eriosoma*** Leach

149. *Eriosoma lanigerum* (Hansmann)

150. *Eriosoma (Schizoneura) longipilosum* Charaborti & Raychaudhuri

151. *Eriosoma (Schizoneura) longipilosum* Ghosh, Verma & Raychaudhuri

152. *Eriosoma (Schizoneura) phoenax* Mordvilko

Genus ***Epipemphigus*** H.R.L.

153. *Epipemphigus imaicus* (Cholodkovsky)

Genus ***Forda*** Heyden

154. *Forda riccobonii* (Stefani)

Genus ***Kaburagia*** Takagi

155. *Kaburagia ailanthi* Chowdhuri, Basu, Chakraborti & Raychaudhuri

Genus ***Kaltenbachiella*** Schoutedon

156. *Kaltenbachiella carpinicola* Ghosh, Chakraborti & Bhattacharjee

Genus ***Pemphigus*** Hartig

157. *Pemphigus mordvilkoi* Cholodkovsky

158. *Pemphigus nainitalensis* Cholodkovsky

Genus ***Prociphilus*** Koch

159. *Prociphilus (Stagona) xylostei* (De Geer)

Genus ***Thecabius*** Koch

160. *Thecabius affinis* (Kaltenbach)

Genus ***Tetraneura*** Hartig

161. *Tetraneura (Indotetraneura) lambersi* Chakraborti & Maity

162. *Tetraneura (Indotetraneura) utpali* Chakraborti, Maity & Bhattacharya

163. *Tetraneura nigriabdominalis* (Sasaki)

SYSTEMATIC ACCOUNT

Key to the subfamilies

1. First trasal segment with more than 7 ventral hairs; head usually with a median longitudinal suture ..... LACHNINAE

- First tarsal segment with at most 7 ventral hairs; head may or may not have a median suture 2

2. Siphunculi usually elongated and densely hairy, if short and truncate than without any hair but with a pair of dorsal processi arising from abdominal tergite 7 ..... GREENIDEINAE

- Siphunculi of various shape, if elongate than without hairs 3

3. Empodial hair always fine; subanal plate never indented or bilobed 4

- Empodial hair flattened or fine, subanal plate usually indented or bilobed 5

4. Siphunculi usually elongate; cauda longer than broad; p.h. usually longer than base of last antennal segment ..... APHIDINAE

- Siphunculi never elongate, cone shaped with apical rim not chitinised; cauda broader than long; p.h. always shorter than base of last antennal segment ..... ANOECINAE

5. Eyes in all morphs large or sometimes 3 faceted, siphunculi truncate, elongate or clavate or ring like, never absent, variably imbricated or reticulated; wax gland plate may be present ..... DREPANOSIPHINAE

- Eyes in apterae always 3 faceted; siphunculi truncate, cone shaped, ring like or absent; wax gland plate usually present 6

6. Head in apterae free from pronotum; frontal processi absent; antennae 5-6 segmented, first tarsal segment with 2-7 hairs dorsoapical hairs; dorsoapical hairs of second tarsal segments fine; Cauda ruonded ..... PEMPHIGINAE

Head in apterae fused with pronotum; usually with a pair of frontal horus; antennae 2-5 segmented; first tarsal segment with less than 5 hairs; dorsoapical hair of second tarsal segment capitate cauda knobbed or rounded ..... HORMAPHIDINAE

Subfamily ANOECIINAE

Key to the genera

Apterae with eyes 3 faceted. Lateral abdominal tubercles absent. Mesothoracic furea with separate arms. Alatae with media of fore wing twice brached ..... ***Aiceona*** Takahashi

- Apterae with eyes many faceted. Lateral abdominal tubercles prsent. Mesothoracic furca with united arms. Alatae with media of fore wing once branched ..... ***Anoecia*** Koch

Tribe AICEONINI
Genus ***Aiceona*** Takahashi

1921. *Aiceona* Takahashi, R; *Aphididae of Formosa*, **1** : 85.

1. *Aiceona retipennis* David, Narayan and Raja Singh

1970. *Aiceona retipenis* David, S.K., Narayan, K. & Raja Singh, S; *Oriental Ins.*, **4**(4) : 413.

1980. *Aiceona retipennis*; Raychaudhuri, D.N. (ed), Aphids of North India & Bhutan, Zoological Society, Kol., 1-521.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Assam, Himachal Pradesh, West Bengal.

Tribe ANOEOCIINI
Genus ***Anoecia*** Koch

1857. *Anoecia* Koch, C.L., Die. Pfl. Aphiden, **3** : 275.

Key to the species of *Anoecia* Koch

1. Dorsal hair on abdomen fine, a few with spatulate or incrassate apices 2
- Dorsal hairs on abdomen with flagellate apices, never with spatulate or incrassate apices, F.T.C 7,7,7 .... ***himalayensis*** Chakraborti & Maity
2. Marginal tubercles present on 1st-7th, abdominal tergites. Antennal segment VI with 1-2 secondary rhinaria, F.T.C. 6, 6, 7 .... ***Vagans*** Koch
- Marginal tubercles absent on 5th & 6h tergites. Antennal segment VI without any secondary rhinaria F.T.C. 6, 6, 6 .... ***nemoralis*** Borner

2. *Anoecia furcata* (Theobald)

1915. *Forda furcata* Theobald, F.V., Entomologists Res., **27** : 53.

1982. *Anoecia furcata* (Theobald), Chakraborti, S, Maity, S.P. and Bhattacharya, D.K. Oriental Ins., **16** (1) : 100.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Euro.

Remarks : Only alate viviparous females were reported from this area.

3. *Anoecia himalayensis* Chakraborti & Maity

1978. *Anoecia himalayensis* Chakraborti, S. & Maity, S.P. Entomon, **3**(1) : 265.

1982. *Anoecia furcata* (Theobald), Chakraborti, S, Maity, S.P. and Bhattacharya, D.K. Oriental Ins., **16** (1) : 100.

Distribution : India : Uttarakhand (Garhwal) H.P.

4. *Anoecia nemoralis* Borner

1950. *Anoecia nemoralis* Borner, C., *Neue suropaische Blattlausarten*, 17.

1980. *Anoecia nemoralis* : Ghosh, A.K. *Fauna of India, P.T. 4, Homoptera : Aphidoidea*, Zool. Surv. India, 96-102.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Europe.

5. *Anoecia vagans* (Koch)

1856. *Schizoneura vagans* Koch, Die Pfl. Aphiden, **8** : 268.

1980. *Anoecia vagans* (Koch), Raychaudhuri, D.N. (ed) Aphids of North East India and Bhutan, Zoological Society, Kol., 1-521.

Distribution : India : Uttarakhand (Garhwal), Sikkim.

Elsewhere : Africa, Europe, Russia.

Subfamily APHIDINAE
Key to the tribes of the subfamily APHIDINAE

Spiracles of abdominal segments 1 and 2 placed far apert, abdominal segment 1 and 7 usually with lateral abdominal tubercles, apterae without any secondary rhinaria .... APHIDINI
- Spiracles of abdominal segments 1 and 2 usually placed close together, abdominal segments usually without tubercles on segments 1 and 7, apterae sometimes with secondary rhinaria..... MACROSIPHINI

Key to the species of the genus *Aphis* Linn-Apterous viviparous female

1. Ultimate rostral segment stilleto shaped..... ..... *kurosawai* Takahashi
- Ultimate rostral segment not stilleto shaped 2
2. First segment of hind tersus with 3 hairs 3
- First segment of hind tersus with 2 hairs 4
3. Siphunculi usually shorter than cauda bearing 5-8 hairs; u.r.s. about 0.81-1.01 x h.t. 2; p.t. 1.5-2.0 x base of antennal segment VI..... ..... *euphorbia* Kaltenbach
- Siphunculi longer than cauda bearing 10-12 hairs; u.r.s. about 1.2-1.4 x h.t. 2; p.t. about 3.8-4.3 x base of antennal segment VI..... .....*nerii* B.d.F
4. 8th abdominal tergite with 3-8 hairs 5
- 8th abdominal tergite with only 2 hairs 6
5. Dorsal abdominal hairs shorter, those on anterior abdominal tergites about 0.50-0.70 x b.d. III ..... *fabae* Scopoli
- Dorsal abdominal hairs longer, those on anterior abdominal tergites about 1.0-2.05 x b.d. III..... *achyranthi* Theobald
6. Abdominal dorsum completely selerotic. Posterior abdominal dorsum with a pale area around siphunculi and with distinct 'aphidine' type of polygonal reticulation, siphunculi longer than cauda ..... *craccivora* Koch
- Abdominal dorsum pale and smooth 7
7. Hairs on posterior abdominal tergites longer, never less than 3.0 x b.d. III ....*longisetosa* Basu
- Hairs on posterior abdominal tergites shorter, about 0.50-1.80 x b.d. III 8
8. Longest hair on hind femora as long as or longer than its maximum width .... *citricola* Van der Goot
- Longest hair on hind femora shorter than its maximum width 9
9. 2nd tarsal segment with only primary hairs. Cauda with 5 hairs on anterior abdominal tergites about as long as b.d. III, p.t. 1.8-2.4 x base of antennae segment VI..... .....*nasturtii* Kaltenbach
- 2nd tersal segment with both primary and secondary hairs 10
10. Cauda with 5-8 hairs 11
- Cauda with more than 8 hairs cauda dark brown to black, rarely pale secondary hairs on u.r.s. never more than 4 ....*verbasci* Schrank
11. Siphunculi shorter than to as long as cauda, p.t. as least 3 x base of antennal segment VI, cauda not constricted..... .....*rubifolii* (Thomas)
- Siphunculi always longer, upto 2 x cauda, p.t. usually less than 3 x base of antenal segment VI, cauda slightly constricted near the middle ..... *gossypii* Glover group

6. *Aphis achyranthi* Theobald

1929. *Aphis achyranthi* Theobald, *Entomologist*, **62** : 177-181.

1972. *Aphis achyranthi* Chakrabortim, S., Ghosh, A.K. and Raychaudhuri, D.N., *Oriental Ins.*, **6** : 387-400.

Distribution : India : North-western and Southern parts.

7. *Aphis citricola* Van der Goot

1912. *Aphis citricola* Van der Goot, Rec. Indian Mus., **13** : 175.

1990. *Aphis citricola* : Ghosh, L.K., *Mem, Zool. Surv. India*, **17**(3) : 16.

Distribution : India : Uttarakhand (Kumaon), and all over.

Elsewhere : Australia, Bhutan, Barmuda Island, China, Nepal, N.Z.; North America; Pakistan; Sri Lanka; Syria; Thailand and Viet Nam.

8. *Aphis craccivora* Koch

1854. *Aphis craccivora* Koch, *Die flan zenlause Aphiden*, **1** : 124.

1990. *Aphis craccivora* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 22.

Material examined : 6 apterae on Dolichos sp. Sri Nagar (Garhwal), 9.11.2000, coll. B.C. Das.

Diagnostic character : (Apterous viviparous female). Body Black. Head smooth. Antennae 6 segmented, about 0.50-0.7 x the body, p.t. about 1.5-2.5 x base of segment VI. Rostrum reaches hind coxae, u.r.s. about 0.84-1.0 x h.t. 2. Abdomen with a dark blackish patch with polygonal reticulations, tergal hair acuminate. Siphunculi dark, imbricated, cylindrical, about 0.14-0.20 x the body and about 1.5-2.0 x the cauda. Cauda, elongate, black, tapering, with 5-9 hais. F.T.C. 3, 3, 2.

Distribution : India : Uttarakhand (Garhwal), and widely distributed.

Elsewhere : Comopolitan.

Remarks : It mostly attack Leguminous plants, sometimes a pest of bean and cowpea.

9. *Aphis euphorbiae* Kaltenbach

1843. *Aphis euphorbiae* Kaltenbach, *Mon. Fam. Pflan*, 94.

1990. *Aphis euphorbia* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 28-29.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Australia; England; Germany; Nepal; South Africa and Spain.

10. *Aphis fabae* Scopoli Group

1763. *Aphis fabae* Scopoli, *Entomologia Carnioiica* : 139.

1990. *Aphis fabae* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 29-33.

Distribution : India : Uttarakhand and all over.

Elsewhere : Virtually cosmopolian.

11. *Aphis gossypii* Glover Group

1877. *Aphis gossypii* Glover, *Rept. Com. Agr. operation Dept. for* **1876** : 36.

1990. *Aphis gossypii* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 35-41.

Material examined : 4 apterae and 1 alata, *Lycopersium esenlantum*, Sri Nagar (Garhwal), 9.11.2000; 2 Alatae, undet host, Ranikhet, 26.11.99, coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Body pale, Antennae about $^1/_2$ x body, p.t. about 2-3.5 x base of segment VI. Rosturm reaches beyound mid coxae, u.r.s. longer than h.t. 2. Dorsum of abdomen pale. Siphunculi light brown, cylindrical, about 1.2-1.3 x cauda, contricted slightly at middle, bearing 5-6 hairs, F.T.C. - 3, 3, 2.

Distribution : India : Uttarakhand and widely distributed all over.

Elsewhere : Cosmopolitan.

Remarks : It is a most common polyphagus species infesting a large number of plants which crosses over 400 species. It also transmits many plant viral diseases.

12. *Aphis kurosawai* Takahashi

1921. *Aphis kurosawai* Takahashi, *Aphididae of Formosa*, **1** : 53.

1990. *Aphis kurosawai* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 41-43.

Distribution : India : Uttarakhand Assam, H.P., Kashmir, Manipur, Nagaland, Sikkim.

Elsewhere : Bhutan, China, Japan, Nepal, Taiwan and Thailand.

13. *Aphis longisetosa* Basu

1969. *Aphis rubrum longisetosa* Basu, A.N., Oriental Ins, **3** (4) : 356.

1990. *Aphis longisetosa* : Ghosh, L.K. Mem. Zool. Surv. India, **17** (3) : 43-45.

Distribution : India : Uttarakhand, Arunachal Pradesh, Haryana, H.P., Manipur, Meghalaya, Nagaland, Sikkim, W.B.

Elsewhere : America, Europe, U.K., Middle East, Nepal, Pakistan, Taiwan, U.S.A.

14. *Aphis nasturtii* Kaltenbach

1843. *Aphis nasturtii* Kaltenbach, *Mongr. Fam. Pflauz* : 76.

1990. *Aphis nasturtii* : Ghosh, L.K. *Mem. Zool. Surv. India*, **17**(3) : 45-48.

Distribution : India : Uttarakhand, Arunachal Pradesh, Haryana, H.P., Manipur, Meghalaya, Nagaland, Sikkim, W.B.

Elsewhere : Widely distributed.

15. *Aphis nerii* Boyer de Fouscolombe

1841. *Aphis nerii* Boyer de Fousclombe, *Annls. Soc. Ent. Fr.*, **10** : 179.

1990. *Aphis nerii* : Ghosh, L.K. *Mem. Zool. Surv. India*, 17(3) : 48-51.

Distribution : India : Uttarakhand and all over.

Elsewhere : Widely distributed.

16. *Aphis rubifolii* Thomas

1879. *Aphis rubifolii* Thomas, *Rep. Ill. Ent.*, **8** : 160.

1990. *Aphis rubifolii* : Ghosh, L.K. *Mem. Zool. Surv. India*, 17(3) : 62.

Distribution : India : Uttarakhand and Northeastern parts.

Elsewhere : Nepal, North America.

17. *Aphis verbasci* Schrank

1801. *Aphis verbasci* Schrank, *Fauna Boica. II, Ingtostadt*, **2** : 106.

1990. *Aphis verbaci* : Ghosh, L.K., *Mem. Zool. Surv. India*, 17(3) : 64-66.

Distribution : India : Uttarakhand, H.P., Punjab.

Elsewhere : Europe, Middle East.

Genus *Hysteroneura* Davis

1919. *Hysteroneura* Davis, *Canad, Ent.*, **51** : 263.

18. *Hysteroneura setariae* Thomas

1878. *Siphonophora setariae* Thomas, *Bull. Ill. St. Lab. nat. Hist.*, **2** : 5.

1980. *Hysteroneura setariae* (Thomas), Raychaudhuri, D.N. (ed.), Aphids of North East and Bhutan, Zoolgical Socity, Kol., 1-521.

Material examined : 1 aptera, 1 alata, grass, Almora, 22.11.99., 3 apterae, grass, Dehradun, 4.11.2000; 3 apterae, 5 alatae, grass, Kausani, 21.10.01; 1 aptera, grass, Almora, 12.10.01; 2 apterae, grass, Binsor, 14.10.01, coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) - Head smooth, brownish. Antennae 6 - segmented, p.t. about 5.0-7.0 x base of segment VI. Rostrum reaches upto hind coxae, u.r.s. short about as long as h.t. 2 with 2 secondary hairs. Abdomen pale with spinular striae. Siphunculi brown, cylindrical, imbricated, without apical flange. Cauda pale, subequal to siphunculi and with 4 hairs. Legs with apices of femora and tibiae brownish., F.T.C. - 3, 3, 2.

Distribution : India : Uttarakhand and all over.

Elsewhere : Cosmopolitan.

Genus *Melanaphis* Van der Goot

1917. *Melanaphis* Van der Goot, *Conti Faune Indes neerl.*, 1(3) : 60.

19. *Melanaphis pahanensis* (Takahashi)

1950. *Aphis pahanensis* Takahashi, *Ann. ent. Soc. Am.*, **43** : 596-597.

1969. *Melanaphis phahanensis* (Takahashi), David, S.K., Narayanan, K. and Raja Singh, S.G., Bull. ent., **10**(2) : 158-159.

Distribution : India : Uttarakhand (Kumaon).

Genus *Rhopalosiphum* Koch

1854. *Rhopalosiphum* Koch, *Die Pfl Aphiden*, **1** : 23.

Key to the species of genus *Rhopasiphum* Koch

1. Antennae 5-segmented, p.t. about 5.30-6.20 x base of last antennae segment, body about 7.70-11.20 x the siphuculi .... *rufiabdominalis* (Sasaki)

- Antennae 6-segmented p.t. about 1.80-2.50 x base of last antennal segment, body about 10.0-15.0 x the siphunculi ..... *maidis* (Fitch)

20. *Rhopalosiphum maidis* (Fitch)

1856. *Aphis maidis* Fitch, *Trans. N.Y. agric. Soc.*, **15** : 531.

1980. *Rhopalosiphum maidis* (Fitch), Raychaudhuri, D.N. (ed.), Aphids of North East and Bhutan, Zoolgical Socity, Kolkata, 1-521.

Material examined : 1 aptera, 1 alata, grass, Baggala (Haldwani), 30.11.99, coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Head smooth with weakly developed

lateral frontal tubercle. Antennae 6 segmented, p.t. about 1.80-2.50 x base of segment VI. Abdomen pale, spinulose reticulation present. Siphunculi cylindrical, dark, with a flange. Cauda slightly shorter than siphunculi with 4 hairs. F.T.C. 3, 3, 2.

Distribution : India : Uttarakhand (Kumaon) and all over.

Elsewhere : Cosmopolitan.

21. ***Rhopalosiphum rufiabdominalis*** (Sasaki)

1899. *Toxoptera rufiabdominalis* Sasaki, *Rep. Hokkaido natr. agric. Exp. Stn.*, **17** : 202.

1980. *Rhopalosiph rufiabdominalis* (Sasaki), Raychaudhuri, D.N. (ed.), *Aphids of North East and Bhutan*, Zoolgical Socity, : 70.

Distribution : India : Uttarakhand and all over.

Elsewhere : cosmopolitan.

Genus ***Schizaphis*** Borner

1931. *Schizaphis* Borner, *Anz. Schadlingsk.*, **7** : 10.

Key to the species of *Schizaphis* Borner Apterae

1. Cauda elongate, somewhat pale, siphunculi never more than 2 x cauda ..... ***graminum*** (Rondoni)

- Cauda constricted at middle, dark, siphunculi never less than 2 x cauda ..... ***rotundiventris*** (Signoret)

22. ***Schizaphis graminum*** (Rondoni)

1852. *Aphis graminum* Rondoni, Nour. Ann. Sci. Naat, bolonga, **6** (3) : 10.

1994. *Schizaphis graminum* (Rondoni), Ghosh, L.K. and Basu, R.C., State Fauna Series 3 (W.B.), pl. 5, Zool. Surv. India, : 168.

Distribution : India : Uttarakhand (Kumaon) and all over.

Elsewhere : Virtually cosmopolitan.

23. ***Schizaphis rotundiventris*** (Signoret)

1860. *Schizaphis rotundiventris* Sigoret, (full reference could not be traced).

1980. *Schizaphis rotundiventris* (Signoret), Raychaudhuri, D.N. (ed.), Aphids of North East and Bhutan, Zoolgical Socity, Kolkata, : 74.

Distribution : India : Uttarakhand, Meghalaya, Sikkim, South India, W.B.

Elsewhere : Widely distributed.

Genus ***Toxoptera*** Koch

1857. *Toxoptera* Koch, Die. Pfl. Aphiden, **3** : 10.

Key to the species of genus *Tozoptera* Koch

1. Longest hair on antennal segment III shorter than b.d. III, Siphunculi sparsely imbricated, cauda with 9-17 hairs ..... *aurantii* (B.d.F)

- Longest hair on antennal segment III equal to 1.5 times of b.d. III, siphunculi heavily imbricated, cauda with 26-36 hairs ....*citricidus* (Kirkaldy)

24. ***Toxoptera aurantii*** (B.d.F)

1841. *Aphis aurantii* B.d.F., *Annls. Soc. ent. tr.*, **10** : 178.

1980. *Toxoptera aurantii* (B.d.F.), Raychaudhuri, D.N. (ed.), *Aphids of North East and Bhutan*, Zoolgical Socity, Kolkata, : 76.

Distribution : India : Uttarakhand and all over.

Elsewhere : Cosmopolitan.

25. ***Toxoptera citricidus*** (Kirkaldy)

1907. *Myzus citricidus* Kirkaldy, *Proc. Hawaii ent. Soc.*, **1** : 100.

1994. *Toxoptera citricidus* (Kirkaldy), Ghosh, L.K. and Basu, R.C., *State Fauna Series 3* (W.B.), pl. 5, *Zool. Surv. India*, : 161.

Distribution : India : Uttarakhand and all over.

Elsewhere : cosmopolitan.

Tribe MACROSIPHINI

Key to the genera of the tribe *Aphis* Linn.

Tarsi atrophied and without claws .... ***Shinjia*** Takahashi

- Tarsi normal 1

1. Post siphuncular abdominal segment with prominent supracaudal process at least in apterae 2

- Supra caudal process absent 3

2. Tergite 7 and 8 in apterae with distinct process ..... ***Tricaudatus*** Narzikulov

- Only tergite 8 bears a hair bearing process ..... ***Cavariella*** del Guercio

3. Cauda hardly longer than width at base 4

- Cauda distinctly longer than width at base 6

4. Head and sometimes post siphuncular abdominal segment spinulose ..... ***Dysaphis*** Borner

- Spinal tubercles absent, venter of head smooth 5

5. Siphunculi slender, basal diameter nearly equal to the width at apex; u.rs. long more than 2 x $h.t._2$ ..... ***Oedisiphum*** V.d.G.

- Siphunculi stout, basal diameter more than 2 x width at apex; u.r.s. short less than 2 x $h.t._2$ ..... ***Brachycaudus*** V.d.G.

6. 2nd tarsal segment with spinules, sometimes also on 1st tarsal segment 7

- Tarsi without such spinules 8

7. F.T.C. 3, 3, 3 ..... ***Neoacrythosiphon*** Tao

- F.T.C. 5, 5, 5 ..... ***Neomesonaphis*** Remaunier & Remaudier

8. Some secondary hairs on u.r.s. as long as or longer than primary hairs ..... ***Macrosiphoniella*** del Guercio

- Secondary hairs on u.r.s. much shorter than primary hairs 9

9. Siphunculi reticulated 10

- Siphuculi not reticulated 11

10. Secondary rhinaria protuberent, abdominal dorsum with ..... ***Uroleucon*** Mordvilko

- Secondary rhinaria non protuberent, abdominal dorsum with hair bearing sclerites ..... ***Macrosiphum*** Passerini

11. Siphunculi warty 12

- Siphunculi not warty 13

12. Siphunculi in apterae dagger shaped, tapering to a point at apex and with oblique pore much basad to the apex ..... ***Acutosiphon*** Basu, Ghosh and Raychaudhuri

- Siphunculi not as above with apical pore ... ***Vesiculaphis*** del Guercio

13. Adbominal dorsum in apterae with a reticulated pattern 14

- Abdominal dorsum in apterae without such pattern 15

14. In apterae head smooth dorsally and with secondary rhinaria in antennal segment III ..... ***Sinomegoura*** Takahashi

- In apterae head with spinules, without secndary rhinaria, with fan shaped hairs on dorsum ..... ***Pentalonia*** Coquerel

15. Antennal segment I with finger like projection ..... ***Matsumuraja*** Schumachar

- Antennal segment I without such projection 16

16. Apterae with secondary rhinaria 17

- Apterae without secondary rhinaria 22

17. Dorsum of head in apterae with spinules .. ***Aulacorthum*** Mordvilko

- Dorsum of head in apterae without or with a few spinules 18

18. Apterae with median frontal prominence .. 19

- Apterae without median frontal prominence 21

19. Siphunculi clavate ..... ***Hyperomyzus*** Borner

- Siphuculi cylindrical 20

20. Caudal hair near apex short ..... ***Rhodobium*** H.R.L

- Caudal hairs of similar length ..... ***Metopolopium*** Mordvilko

21. Secondary rhinaria in apterae distributed over basal 0.70 portion ..... ***Impatientinum*** Mordivilko

22. Dorsum of head in apterae usually smooth or may be slightly winkled 23

- Dorsum of head in apterae spinulose or warty 30

23. Dorsal abdominal hairs in apterae with capitate apices ..... ***Capitophorus*** V.d.G

- Dorsal abdominal hairs in apterae not with capitate apices 24

24. Siphunculi shorter than cauda 25

- Siphunculi longer than cauda 27

25. Siphunculi barrel shaped, cauda triangular. ..... ***Brevicoryne*** V.d.G

- Siphunculi not as above, cauda not triangular rather digitiform 26

26. Mid thoracic furea in apterae with broad base ..... ***Hayhurstia*** del Guercio

- Mid thoracic furca in apterae with separate arms ..... ***Hydaphis*** Kirkaldy

27. Dorsal abdominal hairs long with acute apices; siphunculi without any flange .... ***Indiaphis*** Basu

- Dorsal abdominal hairs short and not with acute apices 28

28. Dorsal abdominal hairs with expanded apices ..... ***Indoidiopterous*** Chakraborti, Ghosh & Raychaudhuri

- Dorsal abdominal hairs short and not with expanded apices 29

29. Mid thoracic furca in apterae sessile, siphunculi subcylindrical, not clavate .... ***Lipaphis*** Mordvilko

- Mid thoracic furca in apterae with separate arms; siphunculi distinctly clavate in distal half ..... ***Liosomaphis*** Walker

30. Siphunculi with pore obliquely placed and often with hairs 31

- Siphunculi with pore not obliquely placed and never with hairs 33

31. Siphunculi with an apical flange .... ***Trichosiphonaphis*** Takahashi

- Siphunculi without flange 32

32. Apterae with head spinulose & with median frontal prominence; primary rhinaria on segment V slightly away from apex of the segment ..... ***Xenomyzus*** Aizenberg

- Apterae with head warty & without median frontal segment ..... ***Jacksonia*** Theobald

33. Forms in apterae with a subquadrate process on middle ..... ***Myzaphis*** V.d.G

- Apterae without median frontal prominence 34

34. Dorsal abdominal hairs in apterae low but on distinct tuberculate bases .... ***Eumyzus*** Shinji

- Dorsal abdominal hairs never on tuberculate bases 35

35. Segment I in apterae strongly angulated inward, abdominal dorsum wrinkled .... ***Ovatus*** Van der Goot

- Segment I in apterae not angulated inward; abdominal dorsum rugose & spinulose .... ***Myzus*** Passerini

Genus *Acutosiphon* Basu, Ghosh & Raychaudhuri

1970. *Acutosiphon* Basu, R.C., Ghosh, A.K. and Raychaudhuri, D.N., *Proc. Zool. Soc. Kol.*, **23** : 84.

26. *Acutosiphon obliquoris* Basu, Ghosh & Raychaudhuri

1970. *Acutosiphon obliquoris* Basu, R.C., Ghosh, A.K. & Raychaudhuri, D.N., *Proc. Zool. Soc. Kol.*, **23** : 84.

1980. *Acutosiphon obliquoris* : Raychaudhuri, D.N. (ed.), Aphids of North East India and Bhutan, *Zoolgical Socity, Kol.*, : 89.

Material examined : 1 alatoid nymph, Binsor, from Fern, 15.10.01, coll. B.C. Das.

Diagnostic characters : (Alatoid nymph) Body dark brown, corrugated, rugose, Antennae not fully segmented, u.r.s. reaches upto mid coxae, subequal to h.t. 2. Abdomen brownish, rugose. Siphunculi conical with a broad base and pointed apex with a pore below apex. Cauda bluntish. Hind tibiae with spinules. Wings not fully developed. F.T.C. 5. 5. 5.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Sikkim and West Bengal.

Remarks : Single specimen collected from Fern, not an usual host plant, may be vegrant from other plants.

Genus *Aulacorthum* Mordvilko

1914. *Aulacorthum* Mordgilko, *Fauna Russie*, **1** : 68.

27. *Aulacorthum solani* (Kaltenbach)

1943. *Aphis solani* Kaltenbach, *Monogr. Prl. lause*, **15**.

1969. *Aulacorthum solani* (Kaltenbach), Basu, A.N., *Oriental Ins,* **3**(4) : 357.

Distribution : India : Uttarakhand (Kumaon), and widely distributed.

Elsewhere : Virtually cosmopolitan.

Genus ***Brachycaudus*** Van der Goot

1913. *Brachycaudus* Van der Goot, *Tijdschr. Ent.,* **56** : 97.

28. ***Brachycaudus helicrysi*** (Kaltenbach)

1843. *Aphis helicrysi* Kaltenbach, *Mongr. Pfl Zen. lause,* : 102.

1980. *Brachycaudys helicrysi* (Kaltenbach), Raychaudhuri, D.N. (ed.), Aphids of North East India and Bhutan, *Zoolgical Socity, Kol.* : 107.

Material examined : 2 alater, *Lycopersicum esculantum,* Baggala (Haldwani), 30.11.99, 1 alate, undet plant, Ranikhet, 25.11.99, coll. B.C. Das.

Diagnostic characters : (Alate viviparous female) Body elongate, brownish. Antennae 6 segmented, segment III 21, segement IV with 6 round secondary rhinaria, p.t. about 4.6 x base of segment VI. Rostrum extends upto hind coxae, 1.20 x h.t. 2. Abdomen with dorsal patch on 2-6 segments, spiracular opening large, siphunculi short, subcylindrical, flanged, cauda subpentagonal with 4 hairs. Wings normal F.T.C. 3, 3, 2.

Distribution : India : Uttarakhand (Kumaon), and all over.

Elsewhere : Virtually cosmopolitan.

Genus ***Capitophorus*** Van der Goot

1913. *Capitophorus* Van der Goot, *Tijdschr, Ent.,* **56** : 84.

Key to the species of the genus *Capitophorus* V.d.G

1. Spinal and pleural hairs on dorsum of abdomen duplicated 2
- Spinal and pleural hairs on dorsum of abdomen not duplicated 3
2. Longest hair on a.s. III about 0.30-0.50 x b.d. III ..... *tricholepides* Chakraborti
- Longest hair on a.s. III about 0.70-1.20 x b.d. III ..... *formosartemisiae* (Takahashi)
3. Spinal hairs on abdominal dorsum almost of equal lengths ..... *indicus* Ghosh & Raychaudhuri
- Spinal hairs on abdominal dorsum gradually longer cauded 4
4. Spinal hairs longer (0.70-1.10 x b.d. III), u.r.s. longer, 1.05-1.20 x h.t. 2 .... *hippophaes mitegoni* Eastop
- Spinal hairs shorter (0.15-0.20 x b.d. III), u.r.s. shorter 0.80-1.0 x h.t. 2 .... *hippophaes javanicus* H.R.L

29. ***Capitophorus formosartemisiae*** (Takahashi)

1921. *Myzus formosartemisiae* Takahashi, *Aphididae of Formosa,* (1) : 25.

1980. *Capitophorus formosartemisiae* (Takahashi), Raychaudhuri, D.N. (ed.), Aphids of North East India and Bhutan, *Zoolgical Socity, Kol.* : 116.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Meghalaya, Sikkim, W.B.

Elsewhere : Bhutan, South East Asia.

30. ***Capitophorus indicus*** Ghosh & Raychaudhuri

1968. *Capitophorus hippophaes* indicus Ghosh, A.K. & Raychaudhuri, D.N., *Ann. ent. Soc. Am.,* **63** : 752.

1980. *Capitophorus indicus* Ghosh &, Raychaudhuri, D.N. (ed.), Aphids of North East India and Bhutan, *Zoolgical Socity, Kol.* : 117.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Meghalaya, Sikkim, W.B.

31. ***Capitohorus hippophaes javanicus*** H.R.L.

1953. *Capitophorus hippophaes javanicus* Hille Ris Lambers, Temminckia, **9** : 156.

1980. *Capitophorus hippophaes javanicus,* Raychaudhuri, D.N. (ed.), *Aphids of North East India and Bhutan, Zoolgical Socity,* : 117.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Manipur, Meghalaya, Sikkim.

Elsewhere : Australia, China, Europe, Java, Korea, New Zealand, Pakistan, Taiwan.

32. ***Capitohorus hippophaes mitegoni*** Eastop

1956. *Capitohorus hippophaes mitegoni* Eastop, *Entomologist,* **89** : 9.

1980. *Capitohorus hippophaes mitegoni* : Raychaudhuri, D.N. (ed.), *Aphids of North East India and Bhutan, Zoolgical Socity, Kol.*, : 117.

Material examined : 4 apterous viviparous females, undet, Dehra Dun, 6.11.2000, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body elongated, length 2.0 mm, width 0.92 mm. Dorsal cephalic hair with capitate apices. Antennae 6 segmented, p.t. about 9.0 x base of segment VI, Rostrum reaches mid coxae, u.r.s. about equal to h.t. 2. Abdomen pale, rugose, segment 7th & 8th with a pair of capitate hairs, longer cauded. Siphunculi long, clavate, about 2.20 x conical cauda bearing 6 hairs. F.T.C. 3, 3, 2.

Distribution : India : Uttarakhand (Garhwal), H.P., Meghalaya, Sikkim, W.B.

Elsewhere : Africa, Australia.

33. *Capitophorus tricholepidis* Chakraborti

1976. *Capitophorus tricholepidis* Chakraborti, S., *Zool. J. Linn. Soc.*, **58** : 267.

Distribution : India : Uttarakhand (Kumaon).

Genus *Chaetosiphon* Mordvilko

1914. *Chaetosiphon* Mordvilko, Fauna de la Russ. Ins. Ham., **1** : 71.

Key to the species of the genus *Chaetosiphon* Mordvilko

1. Siphunculi usually bearing capitate hairs Anterior abdominal tergites with spinal hairs in group of three or four ..... *gracillicornis* David, Rajasingh & Narayan

- Siphunculi without hairs. Anterior abdominal tergites with spinal hairs not more than two 2

2. Cauda with 6 or more hairs. Siphunculi 1.50 to 2.50 times the cauda. Lateral hairs on anterior tergites duplicated. Each tergite with 10 hairs ..... *tetrahoda* (Walker)

- Cauda with 5 hair 3

3. Siphunculi 2.50 to 3 times the cauda. Lateral hairs on anterior tergites usually single ..... *fragaefolii* (Cockerell)

- Siphunculi 3.0-3.15 times the cauda. Lateral hair on tergites usually two..... *heterotrichus* Chakraborti, Ghosh & Raychaudhuri

34. *Chaetosiphon fragaefolii* (Cockerell)

1901. *Myzus fragaefolii* Cockerell, *Cand. Ent.*, **33** : 101.

1970. *Chaetosiphon fragaefolii* (Cockerell) David, S.K., Rajasingh, S.G. and Narayan, S. *Oriental Ins.*, **4** (4) : 395-406.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Europe, Australia, North & South America, West Asia, East & South Africa.

35. *Chaetosiphon gracilliconis* David, Raja Singh & Narayan

1970. *Chaetosiphon gracilliconis* David, S.K., Rajasingh, S.G. and Narayan, *S. Oriental Ins.*, 4(4) : 395-406.

Material examined : 2 apterous nymphs, Rosa sp., Kausani, 19.10.2001, coll. B.C. Das.

Diagnostic characters : Body pale, elongate, length 1.30 mm, width 0.65 mm. Dasal cephalic hairs captitate, about 1.0 x b.d. III. Antennae 6 segmented, p.t. about 3.40 x base of segment VI, Abdomen pale, rugose, with capitate hair on tuberculate bases, Rosturm reaches upto mid coxae, equal to h.t. 2. Siphunculi cylindrical with 4 hairs near base. Cauda not fully developed.

Distribution : India : Uttarakhand (Kumaon), H.P.

Remarks : This species is a new record for the state.

36. *Chaetosiphon (Pentatrichopus) heterotrichus* Chakraborti, Ghosh & Raychaudhuri

1971. *Chaetosiphon (Pentatrichopus) heterotrichus* Chakraborti, S, Ghosh, A.K. & Raychaudhuri, D.N., *Kontyu*, **39**(4) : 369.

Material examined : 1 Aptera, *Salix* sp., Nainital 23.v.69, Coll. S. Chakraborti.

Diagnostic characters : (Apterous viviparous female) Body pale brown, length 2.1 mm, width 0.90 mm. Head with spinules.

Antennae 6 segmented p.t. about 5.0 x base of segment VI, flagellar hair capitate. Rostrum reaches beyod mid coxae, u.r.s. about 0.75 x h.t. 2, with 6 secondary hairs. Abdomen rugose, pale, Siphunculi cylindrical, about 3.0 x elongated cauda, bearing 5 hairs.

Distribution : India : Uttarakhand (Kumaon).

37. *Chaetosiphon (Pentatrichopus) tetrachoda* (Walker)

1849. *Aphis tetrarhoda* Walker, *Ann. Mag. nat. Hist.*, 2(3) : 42.

1971. *Chaetosiphon (Pentatrichopus) tetrachoda* (Walker), Chakraborti, S, Ghosh, A.K. & Raychaudhuri, *D.N., Sci. & Cult.*, 37 : 247-248.

Distribution : India : Uttarakhand (Kumaon), H.P., T.N.

Elsewhere : South East Asia, N.Z., East Africa, West Asia, Europe, North America.

Genus *Cavariella* del Guercio

1911. *Cavariella* dei Guercio, Redia, 7 : 323.

38. *Cavariella aegopodii* (Scopoli)

1763. *Aphis aegopodii* Scopoli, Ent. Carniolica, 137.

1980. *Cavariella aegopodii* (Scopoli), Raychaudhuri, D.N. (ed), *Aphids of North India & Bhutan, Zoological Society* : 121.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Jammu & Kahsmir, Manipur, Meghalaya, W.B.

Elsewhere : America, Australia, Europe, Japan, Korea, Middle East, New Zealand and Rhodesia.

Genus *Dysaphis* Borner

1931. *Dysaphis* Borner, Ans. Schaldingsk, 7 : 9.

39. *Dysaphis foeniculus* Theobald

1923. *Anuraphis foeniculus* Theobald, Ent. Mon. Mag. 9 : 23-28.

1972. *Dysaphis foeniculus* (Theobald), Chakraborti, S., Ghosh, A.K., and Raychaudhuri, *D.N., Oriental Ins.*, 6 : 387-400.

Distribution : India : Uttarakhand (Kumaon).

Genus *Eumyzus* Shinji

1929. *Eumyzus* Shinji, Lausania, 1 : 111.

40. *Eumyzus darjeelingensis* Basu and Raychaudhuri

1974. *Eumyzus darjeelingensis* Basu, R.C. & Raychaudhuri, D.N., *Oriental Ins.*, 8 : 491.

1985. *Eumyzus darjeelingensis* : Chakraborti, S., & Bhattacharya, D.K., *Systematic Entomology*, 10 : 389.

Distribution : India : Uttarakhand, W.B.

Genus *Hyadaphis* Kirkaldy

1904. *Hyadaphis* Kirkaldy, Entomologist, 37 : 279.

41. *Hyadaphis coriandri* (Das)

1918. *Brevicorvne coriandri* Das, *B., Mem. Indian Mus.*, 64 (4) : 180.

1994. *Hyadaphis coriandri* (Das), Ghosh, L.K. and Basu, R.C., State Fauna Series (W.B.), pt. 5, *Zool. Surv. India* : 189.

Distribution : India : Uttarakhand (Kumaon), Bihar, H.P., Manipur, Meghalaya, Sikkim, South India.

Elsewhere : Egypt, Nigeria, Pakistan and South Africa.

Genus *Hayhurstia* del Guercio

1917. *Hayhurstia* del Guercio, *Redia*, 12 : 206.

42. *Hayhurstia atriplicis* (Linn.)

1761. *Aphis atriplicis* Linnaeus, Fauna Suecica (2nd ed) : 262

1994. *Hayhurstia atriplicis* (Linn.), Ghosh, L.K. & Basu, R.C., State Fauna Series, (W.B.), p.t. 5, *Zool. Surv. India* : 188.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Meghalaya, South India.

Elsewhere : China, Europe, Japan, Korea, Middle East, North America, Taiwan.

Genus *Hyperomyzus* Borner

1933. *Hyperomyzus* Borner, *Klina Mitt. Blattlaus* : 2.

43. *Hyperomyzus carduellinus* (Theobald)

1915. *Rhopalosiphum carduellinus* Theobald, *Bull. Ent. Res.*, 6 : 113.

1994. *Hyperomyzus carduellinus* (Theobald), Ghosh, L.K. and Basu, R.C., *State Fauna Series (W.B.), pt. 5, Zool. Surv. India* : 190.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Assam, H.P., J. & K., Manipur, Meghalaya, Nagaland, Sikkim, South India and W.B.

Elsewhere : Widley distributed.

Genus *Indiaphis* Basu

1969. *Indiaphis* Basu, A.N., *Oriental Ins.*, **3** : 175.

44. *Indiaphis crassicornis* Basu

1969. *Indiaphis crassicornis* Basu, A.N., *Oriental Ins.*, **3** : 175.

1980. *Indiaphis crassicornis* : Raychaudhuri, D.N. (ed), Aphids of North India & Bhutan, *Zoological Society, Kol.*, 150.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, W.B.

Genus *Impatientinum* Mordvilko

1914. *Impatientinum* Mordvilko, *Fauna Russia Insecta, Hem*, **1** : 72.

45. *Impatientinum impatiens* (Shinji)

1922. *Tuberosiphum impatiens* Sinji, *Zool. Mag., Tokyo*, **34** : 789.

1980. *Impatientinum impatiens* (Shinji), Raychaudhuri, D.N. (ed), Aphids of North India & Bhutan, *Zoological Society, Kol.*, 149.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., J. & K., Sikkim, W.B.

Elsewhere : Japan, Korea and Taiwan.

46. *Impatientinum impatiens dalhousiensis* Verma

1969. *Impatientinum impatiens dalhousiensis* Verma, K.D, *Bull. Ent.*, **10** (2) : 134-140.

Distribution : India : Uttarakhand (Kumaon), H.P.

Genus *Indoidiopterus* Chakraborti, Ghosh & Raychaudhuri

1972. *Indoidiopterus* Chakraborti, S., Ghosh, A.K. and Raychaudhuri, D.N., *Oriental Ins.*, **6** : 387-400.

47. *Indoidiopterus geranii* (Chowdhury, Basu, Chakrabori & Raychaudhuri)

1969. *Capitophorus gerani* Chowdhury, Basu, Chakraborti, & Raychaudhuri, *Oriental Ins.*, **3** (1) : 83-92.

1975. *Indoidiopterus geranii* (Chowdhury, Basu, Chakraborti, & Raychaudhuri) Chakraborti, S., Ghosh, A.K. and Raychaudhuri, D.N., *Oriental Ins.*, **6** : 387-400.

Distribution : India : Uttarakhand (Kumaon), & H.P.

Genus *Jacksonia* Theobald

1923. *Jacksonia* Theobald, *Scott. Nat.*, 19.

48. *Jacksonia campanulata* Chakrabori & Raychaudhuri

1978. *Jacksonia campanulata* Chakraborti, S. & Raychaudhuri, D.N., *Entomon.*, **3** : 95-103.

Distribution : India : Uttarakhand (Kumaon).

Genus *Liosomaphis* Walker

1868. *Liosomaphis* Walker, *Zoologist*, **2**(3) : 119.

49. *Liosomaphis atra* Hille Ris Lambers

1966. *Liosomaphis atra* Hille Ris Lambers, *Tijdschr. Ent.*, **109**(8) : 193-220.

1975. *Liosomaphis atra* H.R.L., Chakraborti, S. and Raychaudhuri, D.N., *Oriental Ins.*, **9**(2) : 195-211.

Distribution : India : Uttarakhand (Kumaon),

Elsewhere : Pakistan.

50. *Liosomaphis himalayensis* Basu

1964. *Liosomaphis himalayensis* Basu, A.N., *Zool. J. Linn. Soc.*, **45** : 231.

1994. *Liosomaphis himalayensis* : Ghosh, L.K. and Basu, R.C., State Fauna Series, (W.B.), pt. 5, *Zool. Surv. India*, 191.

Distribution : India : Uttarakhand (Kumaon), & H.P, Meghalaya, W.B.

Elsewhere : Nepal.

Genus *Lipaphis* Mordvilko

1928. *Lipaphis* Mordvilko, *Key to the Russian insects* : 200.

51. ***Lipaphis erysimi*** (Kaltenbach)

1843. *Aphis erysimi* Kaltenbach, *Mon. fam. Pfl.*, 99.

1994. *Lipaphis erysimi* (Kaltenbach), Ghosh, L.K. and Basu, R.C., State Fauna (W.B.), pt. 5, *Zool. Surv. India*, : 191.

Material examined : Several apterae & alatae, *Brassica Comprestris*, Baggala (Haldwani), 30.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body pale, length 2.50 mm, width 1.60 mm, median frontal prominence distinct. Antennae 6 segmented, flagellum imbricated, flagellar hair short, about 0.66 x b.d. III, without secondary rhinaria, pt. about 2.50 x base of segment VI. Rostrum reaches beyound fore coxae, about 0.75 x h.t. 2 with 4 secondary hairs. Abdomen pale, targal hair short with incrassate apices, with faint reticulation. Siphunculi subcylindrical, brownish, constricted apically, flanged, about 1.33 x cauda. Cauda painted apically, with 6 hairs.

Distribution : India : Uttarakhand (Kumaon), and widely distributed.

Elsewhere : Virtually cosmopolitan.

Genus ***Longicaudus*** Van der Goot

1913. *Longicaudus* V.d.G. *Tijdschr. Ent.*, **56** : 105.

52. ***Longicaudus dunlopi*** Hille Ris Lambers

1965. *Longicaudus dunlopi* Hille Ris Lambers, *Tijdschr. Ent*, **108** : 196.

1972. *Longicaudus dunlopi* : Chakraborti, S., Ghosh, A.K. and Raychaudhuri, D.N., *Curr. Sci.*, **41** : 70-71.

Distribution : India : Uttarakhand.

Elsewhere : Netherlands.

Genus ***Macrosiphoniella*** del Guercio

1911. *Macrosiphoniella* del Guercio, *Redia*, **7** : 331.

Key to the species of the genus *Macrosiphoniella* del Guercio

1. Secondary rhinaria on antennal segment III never less than 10, antesiphuncular sclerite well developed, dorsal abdominal hairs usually on sclerotic base ..... *sanborni* (Gillette)

- Secondary rhinaria on antennal segment III at most 9; antesiphuncular selerite not well developed, dorsal abdominal hairs not on sclerotic base 2

2. Flagellum entirely black, tibiae entirely dark, cauda with 14-18 hair.... *Yomogifoliae* (Shinji)

- Flagellum pale to brownish, tibiae not dark, cauda with 9-14 hairs .... *pseudoartemesiae* Shinji

53. ***Macrosiphoniella sanborni*** (Gillette)

1908. *Macrosiphum sanborni Can. Ent.*, **40** : 65.

1980. *Macrosiphoniella sanborni* (Gillette) Raychaudhuri, D.N. (ed), Aphids of North India and Bhutan, *Zoological Society*, : 74.

Material examined : 4 apterae, Chrysanthemum, Kausani, 19.10.01; 3 apterae, Chrysanthemum, Binsor, 14.10.01, 4 apterae, Chrysanthemum, Ranikhet, 25.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Head brown. Body length 2.10 mm, Antennae 6 segmented, III segment with 20-24 protuberant secondary rhinaria, p.t. about 4.10 x base of srgment VI. Rostrum reaches beyound hind coxae, stilleto shaped, about 0.96 x h.t. 2, with 6 secondary hairs, targat hairs long, about 3.20 x b.d. III. Siphunculi dark brown, reticulated at apical half, calf shaped, about 0.70 x brownish elongated cauda with 8 hairs.

Distribution : India : Uttarakhand (Kumaon), and widely distributed.

Elsewhere : Virtually cosmopolitan.

54. ***Macrosiphoniella pseudoartemesiae*** Shinji

1933. *Macrosiphoniella pseudoartemesiae* Shinji, *Kontyu.* **7**(5 & 6) : 216.

1975. *Macrosiphoniella pseudoartemesiae* . Chakraborti, S. and Raychaudhuri, D.N., *Oriental Ins.*, **9**(2) 195-211.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Sikkim, South India, W.B.

Elsewhere : Bhutan, China, Japan, Korea.

55. ***Macrosiphoniella Yomogifoliae*** (Shinji)

1922. *Macrosiphum yonogifoliae* Shinji, *Zool. Mag Tokeyo*, **34** : (407).

1980. *Macrosiphoniella yonogifoliae* (Sinji), Raychaudhuri, D.N. (ed), Aphids of North East India & Bhutan, *Zoological Society, Kol.*, 175.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Meghalaya, Sikkim, South India.

Elsewhere : China, Japan, Korea, Malayasia and Taiwan.

Genus ***Macromyzus*** Takahashi

1960. *Macromyzus* Takahashi, *Kontyu*, **28** : 225.

56. *Macromyzus (Macromyzus) woodwardiae* Takahashi

1921. *Myzus woodwardiae* Takahashi, *Aphididae of Formosa*, **1** : 20.

1994. *Macromyzus (Macromyzus) woodwardiae* (Takahashi), Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), pt. 5, Zool. Surv. India*, : 193.

Material examined : 3 apterae & 4 apterous nymphs, Fern, Kausani, 20.10.01, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Head spinulose, body length 2.40 mm, width 1.46 mm. Antennae 6 segmented, segment III with 8 protuberant secondary rhinaria, p.t. about 4.37 x base of segement VI. Rostrum reaches beyond fore coxae, with 4 secondary hairs. Abdomen spinulose with spinal, pleural and marginal brownish patches. Siphunculi brownish, cylindrical with 5/6 rows of cells near apex, about 3.42 x pale, elongate cauda, with 4 hairs.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Meghalaya, Sikkim, W.B.

Elsewhere : Japan, Nepal, Taiwan.

Remarks : This is a new record of this species from the state.

Genus ***Macrosiphum*** Passerini

1860. *Macrosophum* Passerini, *Gli Afidi., Parma*, : 27.

Key to the species of the genus *Macrosiphum* Passerini

1. Processus terminalis shorter than antennal segment III 2

- Processus terminalis longer than antennal segment III 4

2. Secondary rhinaria over the entire length of antennal segment III ..... *rosae* (Linn.)

- Secondary rhinaria fewer on antennal segment III and restricted to base 3

3. Hairs on abdominal dorsum always shorter than b.d. III, siphunculi slender 0.20-0.30 x body ..... *rosaeformis* Das

- Hairs on abdominal dorsum always longer than b.d. III, siphunculi stouter 0.19-0.21 x the body ..... *pachysiphon* H.R.L

4. Dorsum of abdomen with no central patch. Dorsum abdominal hairs short. Antennal segment III smooth excepting the very base ..... *miscanthi* Takahashi

56. *Macromyzus (Sitobion) miscanthi* Takahashi

1921. *Macrosiphum miscanthi* Takahashi, *Aphididae of Formosa*, **1** : 8.

1994. *Macrosiphum (Sitobion) miscanthi* Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), p.t. 5, Zool. Surv. India*, : 202.

Material examined : 1 aptera, grass, Kausani, 22.10.01, 1 aptera, grass, Binsor, 14.10.01, 1 Alata, grass, Ranikhet, 27.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body elongate, length 3.08mm, width 1.40 mm. Head smooth, pale. Antennae 6 segmented, segments III with 4-5 secondary rhinaria near base, flagellum imbricated, p.t. about 5.50 x base of segment VI. Rostrum reaches upto mid coxae, u.r.s. heart shaped, about 0.83 x h.t. 2 and with 4 secondary hairs. Abdomen pale, with faint spinules, targal hairs fine & short. Siphunculi dark, cylindrical with several rows of cells near constricted apex. Cauda pale, elogated, slightly constricted near base with 12 hairs. Apices of femur and tibiae brownish.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, W.B.

Elsewhere : Australia, China, England and Taiwan.

58. *Macrosiphum (Macrosiphum) pachysiphon* Hille Ris Lambers

1966. *Macrosiphum pachysiphon* Hille Ris Lambers, *Tijdschr. Ent.*, **109** : 213.

1980. *Macrosiphum (Macrosiphum) pachysiphon* : Raychaudhuri, D.N. (ed), Aphids of North East India & Bhutan, *Zoological Society, Kol.*, 181.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Manipur, Meghalaya, Sikkim, W.B.

Elsewhere : Pakistan.

59. *Macrosiphum (Macrosiphum) rosae* (Linn.)

1758. *Aphis rosae* Linnaeus, *Syst. Nat.*, (10 ed.) **1** : 452.

1980. *Macrosiphum (Macrosiphum) rosae* (L.) Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zoological Society, Kol.*, 181.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Assam, H.P., Manipur, Meghalaya, Sikkim, South India, W.B.

Elsewhere : Virtually cosmopolitan.

60. *Macrosiphum (Sitobion) rosaeiformis* Das

1918. *Macrosiphum rosaeiformis* Das. *Mem. Indian Mus.*, **6**(4) : 158.

1994. *Macrosiphum (Sitobion) rosaeiformis* : Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), p.t. 5, Zool. Surv. India;* : 202.

Material examined : 5 aptera and 4 alatae, *Rosa* sp., Kausani, 21-22.10.01, 1 aptera + 1 alata, *Rosa* sp., Almora, 12.10.01, 1 Aptera + 1 Alata, *Rosa* sp., Binsor, 16.10.01, 1 aptera, *Rosa* sp. Hardwar, 11.11.2K; 2 apterae & 3 alatae, *Rosa* sp., Dehra Dun, 4.11.2k, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body elongate, length 2.30 mm, width 0.96 mm. Head pale, smooth Antennae 6 segmented, segments III with 2-3 secondary rhinaria p.t. about 6.0 x base of segment VI. Rostrum elongate, reaches beyond mid coxae, u.r.s. about 0.88 x h.t. 2. Abdomen pale, targal hairs acute. Siphunculi dark brown, cylindrical with a few rows of cells near apex. Cauda elogated, pointed, slightly constricted near base with 6 hairs. Apices of tibiae and femur brownish.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Nagaland, Sikkim, South India, W.B.

Elsewhere : Africa, Japan and Taiwan.

Genus *Matsumuraja* Schumacher

1921. *Matsumuraja* Schumacher, *Zool. Auz.*, **53** : 186.

61. *Matsumuraja capitophoroides* Hille Ris Lambers

1966. *Matsumuraja capitophoroides* Hille Ris Lambers, *Tijdschr. Ent*, **109** : 215.

1980. *Matsumuraja capitophoroides* : Raychaudhuri, D.N. (ed), Aphids of North East India & Bhutan, *Zoological Society, Kol.*, 192..

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Manipur, Meghalaya, Sikkim, W.B.

Elsewhere : Pakistan.

Genus *Metopolopium* Mordvilko

1914. *Metopolopium* Mordvilko, *Faune Russie.*, **1** : 82.

62. *Metopolopium dirhodum* Walker

1849. *Metopolopium dirhodum* Walker, *Ann. Mag. nat. Hist.*, **3** : 82.

1997. *Metopolopium dirhodum* : Remaudier & Remaudier, *Catalogue of the world's Aphididae* : 120.

Distribution : India : Uttarakhand (Kumaon).

63. *Metopolopium (Metopolopium) rubi* (Narzikulov)

1957. *Acrythosiphon rubi Narzikulov, Ent. Obozr.*, **36** : 673.

1975. *Metopolopium (Metopolopium) rubi* (Narzikulov), Raychaudhuri, D.N., Ghosh, M.R. & Basu, R.C., *Proc. zool. Soc., Kol.*, **28** : 124.

Distribution : India : Uttarakhand (Kumaon), Sikkim, W.B.

Elsewhere : Bhutan, Russia.

Genus *Myzus* Passerini

1860. *Myzus* Passerini, *Gli Afidi.*, Fabricius, 1775.

Key to the species of the genus *Myzus* Passerini

Apterous viviparous female

1. Ultimate rostral segment short, with obtuse apex, about 0.70-0.80 x h.t. 2 ..... *obtusirostris* David, Narayanan & Rajasingh

- Ultimate rostral segment long, as long as to 1.65 x h.t. 2 2

2. Siphunculi never exceding 0.06-0.08 x the body and slightly shorter to slightly longer than cauda ..... *brevisiphon* Basu

- Siphunculi never less than 0.10 x the body and at least 1.50 x cauda 3

3. Siphunculi strongly clavate 4

- Siphunculi usually cylindrical or may be weakly swollen on inner margin 5

4. Distance between 6th & 7th spiracles distinctly shorter than that between 5th & 6th ..... *persicae* (Sulzer)

- Distance between 6th & 7th spiracles distinctly shorter than that between 5th & 6th ..... *ascalonicus* Doncater

5. Siphunculi as long as or longer than width of head across outer margin of eyes 6

6. Dorsum of head uniformly spinulose or warty ..... *cerasi* (Fabricius)

- Dorsum of head spinulose or warty only laterally ..... *ornatus* Laing

64. *Myzus ascalonicus* Doneaster

1946. *Myzus ascalonisus* Doncasterm *Proc. R. ent. Soc. Lond.* (B), **15** : 27.

1994. *Myzus ascalonisus* : Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), pt. 5 : Zool. Surv. India* : 212.

Distribution : India : Uttarakhand (Kumaon), H.P., Meghalaya, W.B.

Elsewhere : America, Australia, Canada, Europe, Far East and N.E.

65. *Myzus brevisiphon* Basu

1969. *Myzus brevisiphon* Basu, *Oriental Ins.*, **3** : 180.

1980. *Myzus brevisiphon* : Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zoological Society, Kol.*, 212.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, W.B.

66. *Myzus cerasi* (Fabricius)

1775. *Aphids cerasi* Fabricius, *Syst. Ent.* : 734.

1994. *Myzus cerasi* (Fabricius), Ghosh, L.K. and Basu, R.C., State Fauna (W.B.), pt. 5 : *Zool. Surv. India* : 213.

Distribution : India : Uttarakhand (Kumaon), H.P., Meghalaya, W.B.

Elsewhere : Virtually cosmopolitan.

67. *Myzus obtusirostris* David, Narayanan & Rajasingh

1971. *Myzus obtusirostris* David, Narayanan & Raja Singh, *Oriental Ins.*, **5** : 563.

1997. *Myzus obtusirostris* : Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zoological Society, Kol.*, 216.

Distribution : India : Uttarakhand (Kumaon), H.P., Meghalaya, W.B.

68. *Myzus ornatus* Laing

1932. *Myzus ornatus* Laing, *Ent. mon. Mag.*, **68** : 52.

1994. *Myzus ornatus* : Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), Pt. 5 : Zool. Surv. India,* : 215.

Distribution : India : Uttarakhand (Kumaon), and all over.

Elsewhere : Virtually cosmopolitan.

69. *Myzus persicae* (Sulzer)

1776. *Aphis persicae* Sulzer, *Abgekurzte Gesch. Insckten.*, 105.

1976. *Myzus persicae* (Sulzer), Basu, R.C., and Raychaudhuri, D.N., *Oriental Ins.*, **10**(1) : 107.

Material examined : 1 Aptera & 1 alatae, *Brassica comprestris*, Almora, 11.10.01; 3 alatae, *Lycopersicum esculantusm*, Haldwani, 30.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body pale, elongate, length 2.26 mm, width 1.40 mm. Head spinulose, lateral frontal tubercles well developed. Antennae 6-segmented, flagellum imbricated, hairs short with Myzine type of apices, p.t. about 4.0 x base of segment VI. Rostrum reaches upto mid coxae, u.r.s. about 0.93 x h.t. 2. Abdomen rugose, pale; siphunculi cylindrical, slightly clavate towards apex, flanged, pale, imbricated. Cauda pale, thumb shaped, with 4 hairs, legs pale.

Distribution : India : Uttarakhand (Kumaon), and all over India.

Elsewhere : Virtually cosmopolitan.

70. *Myzus umifoliae* (Shinji)

1924. *Myzus umifoloae* Shinji, *Zool. Mag. Tokyo,* **36** : 348.

1980. *Myzus umifoliae* (Shinji), Raychaudhuri, D.N. (ed), Aphids of North East India & Bhutan, *Zoological Society, Kol.,* 218.

Distribution : India : Uttarakhand (Kumaon), W.B.

Elsewhere : Japan.

33. Genus *Myzaphis* V.d.G.

1913. *Myzaphis* Van der Goot, *Tijdschr. Ent.,* **56** : 96.

Key to the species of the genus *Myzaphis* V.d.G.

Apterous viviparous female

1. Median tubercle on head more rounded. Hair on head and 8th abdominal tergite long, slinghtly less than basal diameter of antennal segment III ..... *turanica* Nevskii
- Median tubercle on head rectangular. Hairs on head and 8th abdominal tergite short, about 1/4 basal diameter of antennal segment III. ..... *rosarum* (Kaltenbach)

71. *Myzaphis rosarum* (Kaltenbach)

1843. *Myzaphis rosarum* Kaltenbach, *Monogr. Fam. Pflanzenlause,* 101.

1970. *Myzaphis rosarum* (Kaltenbach), David, S., Raja Singh, S. and Narayanan, K., *Oriental Ins.,* **4**(4) : 398.

Distribution : India : Uttarakhand (Kumaon), H.P.

Elsewhere : Europe, North America, N.Z.

72. *Myzaphis turanica* Navasky

1926. *Myzaphis turanica* Navasky, *Bull. Pl. Prot. Sta. Uzbekistan,* **16** : 150.

1976. *Myzaphis turanica* : Ghosh, L.K., *Bull. Ent.,* **10**(2) : 108.

Material examined : 3 apterae *Rosa* sp. Ranikhet, 27.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female) Body corrugated, elongate oval, pale. Hairs on head minute with blunt apices. Head with prominent rounded median tubercle. Antennae less than half of the body length, imbricated, hair on III segment small, blunt about 2/7 of base of III antennal segment. Rostrum reaches upto mid coxae, about 0.71 x ht. 2, with 4 secondary hairs. Abdomen corrugated, tergal hair blunt, small, Siphunculi clavate, imbricated, flanged, about 1.63 x cauda. Cauda elongate, tapering at apex with 5 hairs. Tarsi slightly imbricated. F.T.C. 5, 5, 5.

Distribution : India : Uttarakhand (Kumaon), H.P.

Elsewhere : Central Asia, Middle East.

Genus *Nasonovia* Mordvilko

1914. *Nasonovia* Mordvilko, *Faune Russie Ins. Hem.,* : **1** : 72.

73. *Nasonovia (Nasonovia) rostrata* David and Hameed

1974. *Nasonovia (Nasonovia) rostrata* David, K. and Hameed, S.F., *Oriental Ins.,* **8**(2) : 195-198.

Distribution : India : Uttarakhand (Kumaon).

Genus *Neohalomyzus* Basu, Ghosh, & Raychaudhuri

1976. *Neohyalomyzus* Basu, Ghosh & Raychaudhuri, *Entomon.,* **1** : 60.

74. *Neohyalomyzus raoi* (H.R.L.)

1973. *Hyalomyzus raoi* Hille Ris Lambers, *Oriental Ins.,* **7** : 242.

1980. *Neohylomyrus raoi* (H.R.L.), Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zoological Society,* : 222.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Sikkim, W.B.

Genus *Neomegouropsis* Ghosh, Basu, Raychaudhuri

1977. *Neomegouropsis* Ghosh, M.R., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.,* **11** : 584.

75. *Neomegouropsis dooarsis* (Ghosh and Raychaudhuri)

1969. *Megouropersus dooarsis* Ghosh & Raychaudhuri, *Ann. ent. Soc. Am.,* **62** : 952.

1980. *Neomegouropsis dooarsis* (Ghosh & Raychaudhuri), Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zoological Society, Kol.*, 226.

Distribution : India : Uttarakhand (Kumaon), H.P., W.B.

Genus *Neomasonaphis* Remaudier & Remaudier

1997. *Neomasonaphis* Remaudier, G. and Remaudier, M., *Catalogue of the world's Aphididae, Homoptera, Aphididae;* 132, 308.

Key to the species of the genus *Neomasonapis* Remaudier & Remaudier

1. Dorsal body hairs with capitate apices & on strong tuberculate bases. Caudal hairs more in number (45-60) .... *tuberculata* Chakraborti, Mondal & Raha

- Dorsal body hairs not with capitate apices and not on strong tuberculate bases. Caudal hairs less in number (below 35) 2

2. Siphunculi subcylindrical, u.r.s. with more secondary hairs (18-20) ..... *rhododendris* Chakraborti, Mondal & Raha

- Siphunculi clavate; u.r.s. with less secondary hairs (2-12) 3

3. u.r.s. with 2 secondary hairs. Caudal hairs less in number (15) .... *rumicis* Chakraborti & Raychaudhuri

- u.r.s. with 9-12 secondary hairs. Caudal hairs more in number (25-32) .... *anaphilidis* Basu

76. *Neomasonaphis anaphilidis* (Basu)

1964. *Masonaphis anaphilidis* Basu, A.N., *J. Linn. Soc.* (Zool.)., **45** : 229.

1997. *Neomasonaphis anaphilidis* (Basu), Remaudier, G. & Remaudier, M; *Catalogue of the world's Aphididae,* : 132, 308.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Sikkim, W.B.

Elsewhere : Bhutan.

77. *Neomasonaphis rhododendris* (Chakraborti, Mondal & Raha)

1983. *Mesonaphis rhododendris* Chakraborti, Mondal & Raha, *J. Linn. Soc.* (Zool.)., **78** : 357-359.

1997. *Neomesonaphis rhododendris* (Chakraborti, Mondal & Raha), Remaudier, & Remaudier, Catalogue of the world's Aphididae, : 132, 308.

Distribution : India : Uttarakhand.

78. *Neomasonaphis rumicis* (Chakraborti & Raychaudhuri)

1975. *Masonaphis (Neomasonaphis) rumicis* Chakraborti, S. & Raychaudhuri, D.N. (ed.) *Oriental Ins.*, **9**(2) : 195-211.

1997. *Neomasonaphis rumicis* (Chakraborti & Raychaudhuri), Remaudier, G. & Remaudier, M; *Catalogue of the world's Aphididae,* : 132, 308.

Distribution : India : Uttarakhand (Kumaon).

79. *Neomasonaphis tuberculatus* (Chakraborti, Mondal & Raha)

1983. *Masonaphis tuberculatus* Chakraborti, S, Mondal & Raha, *J. Linn. Soc. (Zool.).*, **78** : 351-354.

1997. *Neomasonaphis tuberculatus* (Chakraborti, Mondal & Raha), Remaudier, G. & Remaudier, M; Catalogue of the world's Aphididae, : 132, 308.

Distribution : India : Uttarakhand.

Genus *Neomyzus* Van det Goot

1915. *Neomysus* Var der Goot, *Beiter Kenut. Blattlause* : 7.

80. *Neomyzus (Neomyzus) circumflexus* (Buckton)

1876. *Siphonophora circumflexus* Buckton, *Mongr. Br. Aphids* **1** : 30.

1994. *Neomyzus (Neomyzus) circumflexus* (Buckton) Ghosh, L.K. and Basu, R.C., State Fauna (W.B.), p.t. 5, Zool. Surv. India; : 219.

Distribution : India : Uttarakhand, Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Nagaland, Sikkim, South India.

Elsewhere : Virtually cosmopolitan.

Genus *Oedisiphum* Van det Goot

1917. *Oedosiphum* Var der Goot, *Contr. Fauna Indes Neerl,* **1** : 112.

81. *Oedisiphum soureni* (Basu)

1964. *Oedisiphum soureni* Basu, A.N., *J. Linn. Soc.* (Zool.), **45** : 238.

1994. *Oedisiphum soureni* : Ghosh, L.K. and Basu, R.C., *State Fauna* (W.B.), p.t. 5, *Zool. Surv. India;* : 220.

Distribution : India : Uttarakhand (Kumaon), W.B.

Elsewhere : Nepal.

Genus *Ovatus* Van det Goot

1913. *Ovatus* Var der Goot, *Tidjschr. Ent.*, **56** : 84.

82. *Ovatus cretaegarius* (Walker)

1850. *Aphis cretaegarius* Walker, *Ann. Mag, nat. Hist.* 5.

1972. *Ovatus cretaegarius* (Walker), Chakraborti, S., Ghosh, A.K. & Raychaudhuri, D.N., *Oriental Ins.;* **6** : 387-490.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Hotarctive.

Genus *Paczoskia* Mordvilko

1914. *Paczoskia* Mordvilko, *Faune Russii.*, **1** : 63.

83. *Paczoskia budium* Banerjee, Ghosh & Raychaudhuri

1969. *Paczoskia budium* Banerjee, H., Ghosh, A.K. & Raychaudhuri, D.N., *Oriental Ins.*, **3** : 259.

1994. *Paczoskia budium* : Ghosh, L.K. and Basu, R.C., State Fauna (W.B.), Pt. 5, *Zool. Surv. India;* : 220.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, W.B.

Genus *Pentalonia* Coquerel

1859. *Pentalonia* Coquerel, *Ann. Soc. ent. Fr.*, **3** : 259.

84. *Pentalonia nigronervosa* Coquerel

1859. *Pentalonia nigronervosa* Coquerel, *Ann. Soc. ent. Fr.*, **3** : 260.

1994. *Pentalonia nigronervosa* : Ghosh, L.K. & Basu, R.C., *State Fauna* (W.B.), pt. 5, *Zool. Surv. India;* : 221.

Distribution : India : Uttarakhand (Kumaon) & throughout India.

Elsewhere : Virtually cosmopolitan.

Genus *Pleotrichophorus* Borner

1930. *Pleotrichophorus* Borner, Arch. Klass. *Phyl. Ent.*, **1** : 138.

85. *Pletrichophorus glandulosus* (Kaltenbach)

1846. *Aphis glandulosa* Kaltenbach, *Stettin. ent. Zig.*, **7** : 170.

1994. *Pletrichophorus glandulosus* (Kaltenbach), Ghosh, L.K. & Basu, R.C., *State Fauna* (W.B.), pt. 5, *Zool. Surv. India;* : 222.

Distribution : India : Uttarakhand (Kumaon), W.B.

Elsewhere : Bhutan, China, Europe, Japan, Korea and Taiwan.

Genus *Pseudoacyrthosiphon* Ghosh & Raychaudhuri

1969. *Pseudoacyrthosiphon* Ghosh, A.K. & Rachaudhuri, D.N., *Oriental Ins.;* **3** : 94.

86. *Pseudoacyrthosiphon (Anacyrthosiphon) takahashi* (Ghosh)

1969. *Neoacyrthosiphon (Anacyrthosiphon) takahashi* Ghosh, A.K. *Proc. zool. Soc. Kolkata*, **22** : 121.

1994. *Pseudoacyrthosiphon (Anacyrthosiphon) takahashi* (Buckton) Ghosh, L.K. and Basu, R.C., *State Fauna* (W.B.), p.t. 5, *Zool. Surv. India;* : 219.

Distribution : India : Uttarakhand (Kumaon), W.B.

Genus *Rhodobium* Hill Ris Lambers

1947. *Rhodobium* Hille Ris Lambers, *Temminckia*, **7** : 300.

87. *Rhodobium porosum* (Sanderson)

1901. *Myzus porosum* Sanderson, *Rep. del. Univ. agric. Exp. Stn.*, **12** : 205.

1980. *Rhodobium porosum* (Sanderson), Raychaudhuri D.N. (ed.) Aphids of North East India & Bhutan, *Zoological Socity, Kol.*, : 244.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, South India, W.B.

Elsewhere : Cosmopolitan.

Genus *Shinjia* Takahashi

1938. *Microtarsus pteridifoliae* Shinji, *Lansonia*, **1** : 44.

88. *Shinjia pteridifoliae* (Shinji)

1929. *Microtarsus pteridifoliae* Shinji, *Lansonia*, **1** : 44.

1975. *Microtarsus pteridifoliae* (Shinji), Chakraborti, S, and Raychaudhuri, D.N., *Oriental Ins.*, **9**(2) : 195-211.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Assam, Meghalaya, Sikkim, W.B.

Elsewhere : Australia, China, Korea, Nepal.

Genus ***Tricaudatus*** Narzikulov

1957. *Tricaudatus* Narzikulov, *Ent. oborz* : 683.

89. ***Tricaudatus polygoni*** (Narzikulov)

1953. *Rhopalosiphoninus polygoni* Narzikulov, *Ivz. Akad. Nauk. tadzhik, SSR.*, 4(4) : 62.

1994. *Tricaudatus polygoni* (Narzikulov), Ghosh, L.K. and Basu, R.C., *State Fauna (W.B.), pt. 5, Zool. Surv. India,* : 227.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Meghalaya, Sikkim, W.B.

Elsewhere : Japan, Korea, Taiwan and Russia.

Genus ***Trichosiphonaphis*** Takahashi

1922. *Trichosiphonaphis* Takahashi, *Proc. ent. Soc. Wash.*, **24** : 205.

90. ***Trichosiphonaphis polygoni*** (Van der Goot)

1975. *Trichosiphonaphis polygoni* (V.d.G.), Chakraborti, S. and Raychaudhuri, D.N., *Oriental Ins.*, **9** (2) : 195-211.

Distribution : India : Uttarakhand (Kumaon).

Genus ***Uroleucon*** Mordvilko

1914. *Uroleucon* Mordvilko, *Fauna de la Russie*, **1** : 64.

Key to the species of the genus *Uroleucon* Mordvilko

1. Cauda pale 2

- Cauda blackish on basal 0.50 portion and rest pale. Hair on tergite 1.60-2.10 x b.d. III, caudal hair 14-20 ..... *fuscaudatus* Chakraborti & Raychaudhuri

2. Hair on anterior tergite short, 0.76-1.21 x b.d. III, Caudal hair 20-30 ..... *sonchi* (Linn.)

   Hair on anterior tergite more than 1.60 x b.d. III 3

3. Hair on anterior tergite long, 2.75-3.00 x b.d. III, Caudal hair 12-17 .... *longisetosus* Chakraborti & Verma

- Hair on anterior tergite short, 1.60 x b.d. III, Faudal hair 7-8 ..... *kashmiricus* (Verma)

91. ***Uroleucon fuscaudatus*** Chakraborti & Raychaudhuri

1978. *Uroleucon fuscaudatus* Chakraborti, S. and Raychaudhuri, D.N., *Entomon.*, **3** : 95-103.

Distribution : India : Uttarakhand (Kumaon).

92. ***Uroleucon longisetosus*** Chakraborti & Verma

1975. *Uroleucon longisetosus* Chakraborti, S. & Verma, K.D., *Oriental Ins.*, **9**(2) : 169-171.

Distribution : India : Uttarakhand (Kumaon), H.P.

93. ***Uroleucon kashmiricus*** (Verma)

1966. *Dactynotus kashimiricus* Verma, *Indian J. Ent.*, **28** : 265.

1992. *Uroleucon kashmiricus* (Verma), Ghosh, L.K., *Oriental Ins.*, **6**(2) : 172.

Distribution : India : Uttarakhand (Kumaon), H.P., Jammu.

94. ***Uroleucon sonchi*** (Linn.)

1767. *Aphis sonchi* Linnaeus, Syst. Nat. (12 ed.) **1** : 735.

1994. *Uroleucon (Uroleucon) sonchi* (Linnaeus), Ghosh, L.K. & Basu, R.C., *State Fauna* (W.B.), pt. 5, *Zool. Surv. India* : 230.

Material examined : 2 apterae, Almora, 12.10.01, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Body elongate, length 3.00 m, width 1.60 mm. Head brownish, lateral frontal tubercles well developed. Antennae 6 segmented, segment III with 12-15 protuberant round secondary rhinaria distributed over basal half, p.t. about 4.70 x base of segment VI. Rostrum reaches mid coxae, u.r.s. about 0.77 x h.t. 2 and with 8 secondary hairs. Abdomen pale, tergal hairs like flagellar hairs. Siphunculi dark brown, cylindrical, with reticulated cells towards apical half. Cauda pale, elongate, tapering with 10 hairs. Apices of tibiae and femora dark brown.

Distribution : India : Uttarakhand (Kumaon); H.P., Manipur, Meghalaya, Sikkim, South India, W.B.

Elsewhere : Africa, Australia, Egypt, Europe, South America.

50. Genus *Vesiculaphis* del Guercio

1911. *Vesiculaphis* del Guercio, *Redia*, **7** : 463.

Key to the species of the genus *Vesiculaphis* del Guercio Apterae

1. Processus terminalis shorter to as long as base of last antennal segment .....*pieridis* Basu

- Processus terminalis always longer than base of last antennal segment ....*versbasci* (Chowdhury *et al.*)

95. *Vesiculaphis pieridis* Basu

1964. *Vesiculaphis pieridis* Basu, A.N., *J. Linn. Soc.* (zool.), **45** : 237.

1994. *Vesiculaphis pieridis* : Ghosh, L.K., and Basu, R.C., *State Fauna* (W.B.), pt. 5, *Zool. Surv. India* : 233.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, West Bengal.

96. *Vesiculaphis verbasci* Chowdhury, Basu, Chakraborti & Raychaudhuri

1969. *Vesiculaphis verbasci* Chowdhury, Basu, R.C., Chakrabroti, S. & Raychaudhuri, D.N., *Oriental Ins.*, **3**(1) : 90.

1994. *Vesiculaphis verbasci* : Ghosh, L.K., and Basu, R.C., *State Fauna* (W.B.), pt. 5, *Zool. Surv. India* : 234.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, H.P., Manipur, Meghalaya, Nagaland, Sikkim, W.B.

Genus *Xenomyzus* Aisenberg

1935. *Xenomyzus* Aizenberg, *Zap. biol. Sta. Bolchera*, **7-8** : 152.

97. *Xenomyzus scabripes* Basu, Ghosh & Raychaudhuri

1976. *Xenomyzus scabripes* Basu, R.C., Ghosh, M.R. & Raychaudhuri, D.N., *Entomon.*, **1**(1) : 64.

1994. *Xenomyzus scabripes* : Ghosh, L.K., & Basu, R.C., *State Fauna (W.B.), pt. 5, Zool. Surv. India* : 235.

Distribution : India : Uttarakhand, Arubachal Pradesh, W.B.

Subfamily DREPANOSIPHINAE

Key to the genera of the subfamily Drepanosiphinae

1. Body and appendages usually with conspicuous dorsal hairs. Wax plates absent. Eyes large. Siphunculi truncate with reticulation ..... *Periphyllus* Van der Hoven

- Body and appendages without conspicuous hairs. Wax plates present or absent. Eyes of apterae sometimes 3 faceted. Siphunculi truncate or ring like 2

2. Rudimentary gonopophyses 3. alatae with fore femora enlarged. Siphunculi cylindrical, as long as head or longer..... 3

- Rudimentary gonapophyses 2, 4 or fused. Alatae with fore femora normal. Siphunculi as long as cauda 4

3. Accessary rhinaria closely attached to primary rhinarium of antennal segment VI. Secondary rhinaria narrow, elliptical. Siphunculi reticulated at apex .... *Yamatocallis* Matsumura

- Accessary rhinaria in part separated from primary rhinarium of antennal segment VI. Secondary rhinarium oval. Siphunculi not reticulated at apex ..... *Drepanosiphum* Koch

4. Fore coxae normal. Antennal segment III. mostly with at least 3 hairs. Alatae without spinal finger like process. Anal rounded, indented or bilobed. 5

- Antennal segment III never with more than 1-2 hairs. Fore coxae often enlarged. Alatae often with spinal finger liker processi. Anal plate deeply incised 7

5. Dorsal body hairs in clusters; lateral abdominal hairs 3-5 pairs or more on each tergite. Anal plate rounded or slightly indented ..... *clethrobius* Mordvilko

- Dorsal body hairs one pair on each tergite. Anal plate bilobed. Cauda triangular without constriction..... 6

6. Processus terminalis shorter to base of segment VI. Apterae without secondary rhinaria ..... *Betulaphis* Glendenning

- Processus terminalis shorter to base of segment VI. Apterae with secondary rhinaria ..... *Taoia* Quednau

7. Head without epicranial suture. More than 2 pairs of hairs per tergite. Siphunculi cylindrical 8

- Head with epicranial suture. Single pair of hair per tergite. Siphunculi of various shape 10

8. Processus terminalis longer than the base of antennal segment VI. .... *Myzocallis* Passerini

- Processus terminalis subequal to or shorter than the base of antennal segment VI 9

9. Abdominal dorsum with transverse sclerotic bars that are broken into spinal, pleural or marginal portions. Some blister like papillae in clusters on spinal and marginal sclerites .... *Serratocallis* Quednau and Chakraborti

- Abdomen with spinal sclerites which are partially fused to form horse shoe shaped patches. Dorsum without blister shaped papillae ..... *Hoplocallis* Pinter

10. Lateral abdominal hairs in 3 pairs on each terminal shorter than the base of antennal segment VI. 11

- Lateral abdominal hairs 1 pair in each tergite. Processus terminalis of various lengths 12

11. Siphunculi selerotised. Anal plate deeply incised ..... *Panaphis* Kirkaldy

- Siphunculi not selerotised, with a few hair. Anal plate indented ..... *Chromaphis* Walker

12. Dorsal body hairs stout, capitate with spinulose surface, Secondary rhinaria round to oval ..... *Pterocallis* Passerini

- Dorsal body hairs if stout and capitate with smooth surface 13

13. Rostrum elongate reaching beyond fore coxae, apical segments slender, longer than its greatest width 14

- Rostrum reaching a beyond fore coxae, apical segment as long as greatest basal width. Clypeus with nose like press. Frontal tubercles weakly developed. Empodial hairs flagellate. Siphunculi cylindrical, sometimes with a hair ..... *Takecallis* Matsumura

14. Head often, with epicranial suture and without transverse black band on ventral side. Knob of cauda globular .... *Tinocallis* Matsumura

- Head in alate mostly without epicranial suture and with a black transverse band on ventral side. Knob of cauda elongate .... *Therioaphis* Walker

Genus *Betulaphis* Glendenning

1926. *Betulaphis* Glendenning, *Can. Ent.*, **58** : 96.

Key to the species of the genus *Betulaphis* Glendenning Apterae

1. Lateral lobes of thorax and abdominal tergites 1-5 spinulose. Antennae about 0.50 x the body. Siphunculi densely spinulose .... *hissarica* Narzikulov

- Lateral lobes of thorax and abdominal tergites 1-5 smooth. Antennae almost as long as body. Siphunculi scabrous .... *longicornis* Quednau & Chakraborti

98. *Betulaphis hissarica* Narzikulov

1962. *Betulaphis hissarica* Narzikulov, *Fauna Tadzhink S.S.S.R.* (Dusjambe) **9** : 202.

1990. *Betulaphis hissarica* Narzikulov, Ghosh, A.K., & Quednau, F.W., *Fauna of India (Aphidoidea) pt. 5, Zool. Surv. India* : 34.

Material examined : 2 apterous, viviparous females, *Betula alnoides*, Ghangaria, 30.v.80, Coll. A. Mondal.

Diagnostic characters : (Apterous viviparous female). Body pale brown, length 1.85 mm width 0.90 mm. Frontal hair capitate. Antennae 6 segmented, pt. subequal to base of segment VI. Rostrum reaches beyond mid coxae, equal to ht. 2. Abdominal tergal hair capitate, siphunculi short, tubular, flanged, spinulose. Cauda triangular spinulose, with 10 hairs.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Central Asia.

99. *Betulaphis longicornis* Quednau & Chakrabokrti

1980. *Betulaphis longicornis* Quednau, F.W. & Chakrabokrti, S., *Can. Ent.*, **112** : 8.

1990. *Betulaphis longicornis* : Ghosh, A.K., & Quednau, F.W., Fauna of India (Aphidoidea) pt. 5, *Zool. Surv. India* : 38.

Material examined : 4 apterous, viviparous females, *Betula* sp. 12.vi.78, Valley of Flower, Coll. D. Bhattacharjee.

Diagnostic characters : (Apterous viviparous female). Body pale brown, length 2.40 mm width 1.08, Antennae 6 segmented, pt. subequal to base. Rostrum reaches upto mid coxae, u.r.s. 1.2 x ht. 2. Abdominal tergite with 6-10 hairs arranged in transverse row. Siphunculi tapering and flared apically. Cauda tongue shaped.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, W.B.

Genus ***Clethrobius*** Mordvilko

1928. *Clethrobius* Mordvilko, A.K., *In philip Jev.*, : 181.

100. ***Clethrobius dryobius*** Chakraborti & Raychaudhuri

1976. *Clethrobius dryobius* Chakraborti, S. and Raychaudhuri, D.N., *Oriental Ins.*, **10** : 443.

1990. *Clethrobius dryobius* : Ghosh, A.K., & Quednau, F.W., *Fauna of India* (Aphidoidea) pt. 5, *Zool. Surv. India* : 64.

Material examined : 1 alate viviparous female, *Betula alnoides*, 15.vi.80, Janikichoti, Coll. D. Bhattacherjee.

Diagnostic characters : (Alate viviparous female). Head brown. Body length 4.34 mm width 1.70 mm. Antennal 6 segmented, segment III with 46 secondary rhinaria, pt. shorter than base of segment VI. Rostrum short, reaches beyond fore coxae, u.r.s. about 0.77 x ht. 2 and with 20 secondary hairs. Abdominal sorsum pale with brownish marginal sclerite siphunculi brownish cone like, wider than long with hairs. Cauda weakly knobbed with many hairs.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Meghalaya, Sikkim, W.B.

Genus ***Chaitophorus*** Koch

1854. *Chaitophorus* Koch, *Die Pflanzeulause, Nuruberg*, 1.

101. ***Chaitophorus himalayensis*** (Das)

1918. *Eichaitophorus himalayensis* Das, *Mem. Indian Mus.*, **6** : 240.

1980. *Chaitophorus himalayensis* (Das), Ghosh, A.K., Fauna of India (Aphidoidea) pt. 1 : 29.

Distribution : India : Uttarakhand (Garhwal), North East India.

Elsewhere : Korea, Pakistan, Taiwan.

Genus ***Chromaphis*** Walker

1870. *Chromaphis* Walker, *Zoologist*, **2(5)** : 2001.

Key to the species of the genus *Chromaphis* Walker Alatae

1. Dorsal body hairs 2.50-4.0 x b.d. III; hind tibiae with longest hairs 4-5 x as long as apical width of tibiae. Wing veins with dark bordering near apices .... *hirsutustibis* Kumar & Lavigne

\- Dorsal body hairs 1.50-2.0 x b.d. III. Hind tibiae with longest hairs 2-2.5 x as long as apical width of tibiae. Wing veins without dark marking near apices..... ..... *Juglandicola* (Kaltenbach)

102. ***Chromaphis hirsutustibis*** Kumar & Lavigne

1970. *Chromaphis hirsutustibis* Kumar, R. & Lavigne, R., *Pan Pacif. Entomol.*, **46** : 120.

1990. *Chromaphis hirsutustibis* : Ghosh, A.K., & Quednau, F.W., *Fauna of India (Aphidoidea) pt.* **5** : 44.

Material examined : 2 alate, viviparous females. *Juglans regia*, 30.v.81, Hanumanchoti, Coll. S.P. Maity.

Diagnostic characters : (Alate viviparous female). Body pale, length 2.20 mm width 1.04 mm. Dorsal Cephalic hair fine. Antennae 6 segmented, segment III with 12, segment VI with 4 secondary rhinaria, pt. shorter than base. Rostrum short, reaches beyond fore coxae, u.r.s. shorter than ht. 2. Abdomen with spinopleured sclerotic bar, hairs on marginal lobes. Siphunculi short, with hairs of base. Cauda knobbed with many hairs. Tip of wing veins bordered with brown.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nepal.

103. *Chromaphis juglandicola* (Kaltenbach)

1843. *Lachnus juglandicola* Kaltenbach, J.H., *Monog. Fam. Pflanzenlause, Aachen,* 151.

1870. *Chromaphis juglandicola* (Kaltenbach), Walker, F; *Zoologist,* **5** : 2000.

1990. *Chromaphis juglandicola* (Kaltenbach) : Ghosh, A.K., & Quednau, F.W., *Fauna of India (Aphidoidea) pt.* **5** : 51.

Material examined : 2 alate, viviparous females. *Juglans regia,* 1.vi.81, Janakichoti, Coll. S. Saha.

Diagnostic characters : (Alate viviparous female). Body pale, length 1.04 mm width 0.85 mm. Antennae 6 segmented, segment III with 7-8, secondary rhinaria, pt. shorter than base. Rostrum short, reaches beyond fore coxae, u.r.s. shorter than ht. 2. Abdomen pale, hairs on lateral lobes. Siphunculi short with hairs at base. Cauda knobbed with many hairs. Wing venation normal.

Distribution : India : Uttarakhand (Garhwal), H.P., J. & K.

Elsewhere : Europe, Central Asia, Middle East, U.S.A.

Genus *Drepanosiphum* Koch

1855. *Drepanosiphum* Koch, C., *Die Pflanzenlaure Aphiden.,* : 201.

Key to the species of the genus *Drepanosiphum* Koch

1. Ocelli often ringed with dark brown. Antennal segment III with 12-26 secondary rhinaria .. .. *platanoides* (Schrank)

- Ocelli often ringed with dark brown. Antennal segment III with 12-26 secondary rhinaria.. ..... *Oregonensis* Granovsky

104. *Drepanosiphum oregonensis* Granovsky

1939. *Drepanosiphum oregonensis* Granovsky, A, *Proc. ent. Soc. Wash,* **41** : 143.

1990. *Drepanosiphum oregonensis* Granovsky, Ghosh, A.K., & Quednau, F.W., *Fauna of India (Aphidoidea) pt.* **5** : 80.

Material examined : 2 alate, viviparous females. *Acer oblongum,* 24.v.78, Mussorie, Coll. S.P. Maity.

Diagnostic characters : (Alate viviparous female). Body length 3.40 mm width 1.40 mm. Antennae 6 segmented, longer than body, segment III with 19 secondary rhinaria, pt. about 7.5 x base of segment VI. Rostrum short, reaches beyond fore coxae, shorter than h.t. 2. Abdomen with a pair of spinal hairs. Siphunculi tubular and flanged. Cauda knobbed with 5 hairs. Wing venation normal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Turkey, Crimea, Europe, Western North America.

105. *Drepanosiphum platanoides* (Schrank)

1801. *Aphis platanoides* Schrank, *E.V.P., Fauna Boica II, Inogolstadt.,* **2** : 112.

1876. *Drepanosiphum platanoides* (Schrank) Buckton, G.B., *Mon. Br. Aphids;* **1** : 183.

1982. *Drepanosiphum platanoides* (Schrank) Bhagat, R.C., *Geobios News Rept.,* **1** : 33.

Material examined : 1 alate, viviparous females. Bamboo, 14.vi.80, Jamunotri, Coll. S. Chakraborti.

Diagnostic characters : (Apterous viviparous female). Body length 3.70 mm width 1.10 mm. Antennae 6 segmented, longer than body, segment III with 28 secondary rhinaria, pt. longer than base. Rostrum reaches beyond fore coxae, u.r.s. equal to h.t. 2. Abdomen with brownish sipnopleural sclerites on tergite 2-7. Siphunculi tubular and flanged. Cauda knobbed with 5 hairs. Wing venation normal.

Distribution : India : Uttarakhand (Garhwal), Kashmir.

Elsewhere : Central Asia, Turkey, Europe, Great Britain, North America, North Africa, Tasmania, N.Z.

Genus *Hoplocallis* Pintera

1952. *Hoplocallis* Pintera, A., *Zool. ent. Listy.,* **3** : 151.

106. *Hoplocallis microsetosus* (Quednau & Chakraborti)

1976. *Myzocallis (Hoplocallis) microsetosus* Quednau, F.W. and Chakraborti, S, *Can. Ent.,* **108** : 466.

1990. *Hoplocallis microsetosus* (Quednau & Chakraborti), Ghosh, A.K., & Quednau, F.W., *Fauna of India (Aphidoidea) pt.* **5** : 98.

Material examined : 1 alate, viviparous females. *Quercus incana*, 7.iv.70, Nainital, Coll. S. Chakraborti.

Diagnostic characters : (Alate viviparous female). Body length 2.46 mm width 1.16 mm. Antennae 6 segmented, shorter than body, segment III with 8 secondary rhinaria, pt. shorter than base. Rostrum pointed, reaches beyond fore coxae, u.r.s. 2.80 x h.t. 2 with 4 secondary hairs. Abdomen with short lateral process on 2-5 segments. Siphunculi short, truncate. Cauda knobbed with many hairs. Wing venation normal.

Distribution : India : Uttarakhand (Kumaon).

Genus ***Panaphis*** Kirkaldy

1904. *Panaphis* Kirkaldy, *Entomologist*, **37** : 279.

107. ***Panaphis juglandis*** (Geoze)

1778. *Aphis juglandis* Geoze, *Ent. Beit. Natur.*, **2** : 311.

1952. *Panaphis juglandis* Palmer, Aphids of the Rocky Mountain Region, 79.

Material examined : 1 alate, viviparous females. *Juglans* sp. 4.iv.70, Chaubatia, Coll. B.P. Gupta.

Diagnostic characters : (Alate viviparous female). Body length 4.16 mm width 1.60 mm. Antennae 6 segmented, segment III with 20 secondary rhinaria, segment III longer than than IV + V + VI, pt. shorter than base. Rostrum reaches beyond fore coxae, u.r.s. equal to h.t. 2. Abdomen with dark marginal sclerits on 1-7, transverse bands on 3-7 segment. Siphunculi truncate. Cauda knobbed with many hairs. Wing veins dark.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Europe, Middle East, Central Asia, North America.

Genus ***Periphyllus*** Van der Hoeven

1863. *Periphyllus* Van der Hoeven, *Tijdschr. Ent.*, **6** : 7.

Key to the species of the genus *Periphyllus* Van der Hoeven Apterae

1. First tarsal segement with 7, 7, 7 hairs 2
- First tarsal segment with 5, 5, 5 hairs 3

2. Processus terminalis 1.43-1.77 x base of segment VI. Ultimate rostral segment with 6 secondary hairs. Siphunculi reticulated over entire length ..... *aesculi* H.R.L

   Processus terminalis 3.5 x base of segment VI. Ultimate rostral segment with 12 secondary hairs. Siphunculi reticulated over distal 0.40 portion ..... *villosi* Chakraborti

3. Hairs on flagellum short, about 0.50 x b.d. III, processus terminalis 2.0 x base of segment VI, ultimate rostral segment with a pair of secondary hairs; siphunculi reticulated over distal 0.60 portion ..... *pusillus* Quednau & Chakraborti

108. ***Periphyllus aesculi*** H.R.L.

1993. *Periphyllus aesculi* Hille Ris Lambers, *Stylops;* **2** : 200.

1972. *Periphyllus aesculi* : Chakraborti, S; Ghosh, A.K. & Raychaudhuri, D.N., *Oriental Ins*, **6** (3) : 395.

Material examined : 2 apterae and 2 apterous oviparous females, undet host; Almora, 23.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous oviparous female). Body length 2.60 mm, width 1.30 mm. Head pale with long hairs. Dorsal cephalic hairs long, about 6.0 x base of antennal segment III. Antennae 6 segmented, flagellar hairs fine, the longest one about 6.0 x base of antennal segment III, flagellum gradually imbricated apical, segment III without any sec ndary rhinaria. Rostrum reaches upto hind corae, u.r.s. about 0.90 x h.t. 2 and with 6 secondary hairs. Abdominal dorsum pale, hairs long and fine, anterior tergal hair about 7.10 x b.d. III, Siphunculi brownish, cone shaped, about 1.20 x h.t. 2, reticulated forming honey comb like cells on distal half and flanged. Cauda semioval with many hairs. Legs pale, hairs on femora and tibiae long and fine; hind tibiae swollen with many pseudosensoria, F.T.C. 7, 7, 7.

Measurement : of a specimen (in mm). Body 2.60, width 1.30, Antennal segments (III + IV + V + VI - 0.57 + 0.34 + 0.30 + 0.19 + pt. broken), siphunculous 0.23, u.r.s. - 0.15, h.t. 2 0.19.

Distribution : India : Uttarakhand (Kumaon), Kashmir.

109. *Periphyllus pusillus* Quednau & Chakraborti

1976. *Periphyllus pusillus* Quednau & Chakraborti, S; *Can. Ent.*, **108**(5) : 461.

1980. *Periphyllus pusillus* : Ghosh, A.K. *Fauna of India (Aphidoidea) pt. I, Zool. Surv. India* : 82.

Distribution : India : Uttarakhand (Kumaon).

110. *Periphyllus villosi* Chakraborti

1977. *Periphyllus villosi* Chakraborti, S, *Oriental Ins.*, **11**(2) : 209.

1980. *Periphyllus villosi* : Ghosh, A.K. *Fauna of India (Aphidoidea) pt. I, Zool. Surv. India* : 87.

Distribution : India : Uttarakhand (Kumaon).

Genus *Pterocallis* Passerini

1860. *Pterocallis* Passerini, G., *Gli Afidi Parma*, 28.

111. *Pterocallis affinis* Chakraborti

1988. *Pterocallis affinis* Chakraborti, S, *Oriental Ins.*, **22** : 38.

1980. *Pterocallis affinis* : Ghosh, A.K. and Quednau, F.W. *Fauna of India (Aphidoidea) pt.* 5, : 176.

Distribution : India : Uttarakhand (Garhwal).

Genus *Serratocallis* Quednau & Chakraborti

1976. *Serratocallis* Quednau, F.W. and Chakraborti, S; *Can. Ent.*, **108** : 461.

112. *Serratocallis takahashi* Que4dnau & Chakraborti

1976. *Serratocallis takahashi* Quednau, F.W. and Chakraborti, S; *Can. Ent.*, **108** : 461.

1990. *Serratocallis takahashi* : Ghosh, A.K. and Quednau, F.W. *Fauna of India (Aphidoidea) pt.* 5, : 186.

Material examined : 2 alatoid nymphs, Quereus sp. 11 x 70. Dhakuri, Coll. S. Chakraborti.

Diagnostic characters : (Alatoid nymphs). Body length 1.70 mm, Antennae 6 segmented, p.t. shorter than base. Body hair spine like. Rostrum reaches upto mid coxae 1.30 x ht. 2. Abdominal hairs arranged mostly on spinopleural and marginal clusters. Siphunculi and cauda not well developed.

Distribution : India : Uttarakhand (Kumaon),

Elsewhere : Afganistan.

Genus *Takeeallis* Matsumura

1917. *Takeeallis* Matsumura, S, *J. Coll. Agric. Tohoku imp. Univ.*, **7** : 373.

113. *Takeeallis himalayensis* Chakraborti

1988. *Takeeallis himalayensis* Chakraborti, S, *Oriental Ins.*, **22** : 47.

1990. *Takecallis himalayensis* : Ghosh, A.K. and Quednau, F.W. *Fauna of India (Aphidoidea) p.t.* 5, : 236.

Distribution : India : Uttarakhand (Garhwal), H.P.

Genus *Taoida* Quednau

1973. *Taoida* Quednau, F.N. *Can. Ent.*, 105.

114. *Taoia indica* (Ghosh & Raychaudhuri)

1972. *Euceraphis indica* Ghosh, A.K. & Raychaudhuri, D.N., *Oriental Ins.*, **6** : 373.

1994. *Taoia indica* (Ghosh & Raychaudhuri), Ghosh, L.K. & Basu, R.C., *State Fauna (F.W.) pt. 5, Zool. Surv. India* : 244.

Material examined : 3 apterous vivparous females, 1 alate vivparous female, *Alnus* sp., Kausani 19.10.01, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Body elongate : Head pale, frons concave with well developed frontal tubercles. Antennae 6-segmented, longer than body, flagellum imbricated, segment III with 5-8 secondary rhinaria, hairs on flagellum about 0.50 x b.d. III, processus terminalis about 0.66 x base of the segment. Rostrum reaches mid coxae, u.r.s. about 0.70 x h.t. 2 and with 6 secondary hairs. Abdomen pale, anterior tergal hair about 2.0 x b.d. III, lateral abdominal lobes bear 1 pair of hairs. Cauda nobbed with about 15-16 hairs. Sub anal plate biolobed. Legs with brownish femora, basal tibiae and tarsi. F.T.C. 7, 7, 7.

Distribution : India : Uttarakhand (Kumaon), Manipur, Meghalaya, Sikkim and W.B.

Genus *Tinocallis* Matsumura

1919. *Tinocallis* Matsumura, S., *Trans. Sapporo nat. Hist. Soc.*, **7** : 100.

115. *Tinocallis nevskyi* Remaudier & Quednau

1988. *Tinocallis nevskyi* Remabdier, F.W; *Can. Ent.*, **120** 211.

1990. *Tinocallis nevskyi* : Ghosh, A.K. and Quednau, *F.W. Fauna of India (Aphidoidea) p.t.* 5, : 282.

Distribution : India : Uttarakhand (Kumaon).

Genus ***Tinocalloides*** Basu

1970. *Tinocalloides* Basu, A.N., *Oriental Ins.*, **3** : 367.

116. ***Tinocalloides montanus*** Basu

1969. *Tinocalloides montanus* Basu, A.N. *Oriental Ins.*, **3** : 36.

1990. *Tinocalloides montanus* : Ghosh, A.K. & Quednau, F.W., *Fauna of India (Aphidoidea) pt.* **5** : 287.

Material examined : 8 alatae, *Prunus* sp., Ranikhet, 24.ii.99, Coll. B.C. Das.

Diagnostic characters : (Alate viviparous female). Body elongate, length 2.50 mm, width 1.00 mm. Head pale, dorsal cephalic hairs fine, flagellum imbricated, segment III with 15-21 elongated oval secondary rhinaria; p.t. subequal to base of segment VI. Rostrum reaches mid coxae u.r.s. elongate, slightly shorter than h.t. 2, with 4-6 secondary hairs. Abdominal dorsum, pale, bearing on each tergite a pair of marginal and a pair of spinopleural selerotic patch; sclerites with wax gland pore. Dorsal abdominal hairs acute, longer cauded. Siphunculi truncate, with a hair. Cauda knobbed, short with 11-17 hairs. Subanal plate bilobed. Apices of tibiae and tarsi brown. F.T.C. 7, 7, 7. Wing venation normal.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, Manipur, H.P., Sikkim, W.B.

Remarks : This species is a new record for this state.

Genus ***Yamatocallis*** Matsumura

1917. *Yamatocallis* Matsumura, S., *J. Coll. Agric. Hokkaido Imp. Univ.*, **3** : 366.

117. ***Yamatocallis brevicauda*** Chakraborti

1988. *Yamatocallis brevicauda* Chakraborti, S. *Oriental Ins.*, **22** : 62.

1990. *Yamatocallis brevicauda* : Ghosh, A.K. and Quednau, F.W. *Fauna of India (Aphidoidea) p.t.* 5, : 320.

Distribution : India : Uttarakhand (Harhwal).

Subfamily GREENIDEINAE

Key to the genera of subfamily *Greenideinae*

1. Cauda transversely oval, with a median stylus, siphunculi reticulated with transversely elongated cells on one or both surfaces .... *Greenidea* Schouteden
- Cauda never with median stylus, siphunculi never reticulated as above 2
2. Hind tibiae with stridulatory ridges, flagellar and siphuncular hairs long and fine ....*Mollitrichosiphum* Suenaga
- Hind tibiae without any stridulotory ridges, flagellar hairs long and short, with various apices ..... *Eutrichosiphum* Essig & Kuwana

Genus ***Eutrichosiphum*** Essig & Kuwana

1918. *Eutrichosiphum* Essig and Kuwana, *Proc. Calif. Acad. Sci.*, **8** : 97.

Key to the species of the genus *Eutrichosiphum* Essig & Kuwana Apterae

1. Dorsal hairs on abdomen not with furcated apices 2
- Dorsal hairs on abdomen with furcated apices 3
2. U.r.s. smaller, 1.0-1.30 x h.t. 2 ..... *tapatii* Mondal, Chatterjee & Raychaudhuri
- U.r.s. longer, 1.90-2. 40 x h.t. 2 .... *pyri* Chakraborti, Ghosh & Raychaudhri
3. Most of the dorsal hairs on abdomen with branched apices .... *pseudopassaniae* Szelegiewicz
- Some of the dorsal hairs on abdomen with branched apices 4
4. Dorsum of head spinulose .... *khasyanum* (Ghosh & Raychaudhuri)
- Dorsum of head smooth 5
5. U.r.s. long and acute ....*tattakanum* (Takahashi)
- U.r.s. obtuse or long and tapering or acute 6
6. Most of the dorsal hairs of abdomen with blunt apices ..... *querciphaga* Chakraborti & Maity

- Most of the dorsal hairs of abdomen with acute, acuminate apices 7

7. Dorsum of abdomen locally spinulose ..... *quercifoliae* Raychaudhuri, Ghosh, Banerjee & Ghosh

- Dorsum of abdomen smooth 8

8. Antennae 5 segmented, u.r.s. obtuse .... *assamense* Ghosh, Basu & Raychaudhri

- Antennae 6 segmented, u.r.s. longer or short, acute or tapering ..... *alnicola* (Basu)

118. *Eutrichosiphum assamense* Ghosh, Basu & Raychaudhri

1969. *Eutrichosiphum assamense* Ghosh, Basu & Raychaudhri, *Oriental Ins.*, 3 : 247.

1993. *Eutrichosiphum assamense* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 84.

Distribution : India : Uttarakhand (Garhwal), Assam.

119. *Eutrichosiphum alnicola* (Basu)

1967. *Paratrichosiphim alnicola* Basu, A.N., *Bull. Ent.*, 18 : 14.

1993. *Eutrichosiphum alnicola* (Basu), Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 76.

Material examined : 3 alatae oviparae and 1 alatoid nymph, *Alnus* sp., Almora, 21.11.99, Coll. B.C. Das.

Diagnostic characters : (Alate oviparous female). Body brownish, length 2.70 mm, width 2.00 mm. Antennae 6 segmented, segment III with 15-19 round secondary rhinaria, pt. about 1.70 x base of segment VI, flagellar hair long, acute, about 4.6 x bd. III, Rostrum acute, reaches upto mid coxae, about 1.75 x h.t. 2 with 8 secondary hairs. Abdomen brownish, anterior tergal hairs long, acute. Siphunculi long, cylindrical about 4.6 x its base, 2.50 x flagellum, Siphuncular hair long, acute. Cauda semioval with many hairs. Measurement of an egg, length 0.66 mm, width 0.20 mm.

Distribution : India : Uttarakhand (Kumaon), Sikkim, W.B.

120. *Eutrichosiphum khasyanum* (Ghosh & Raychaudhuri)

1962. *Paratrichosiphim (Neoparatrichosiphum) khasyanum* Ghosh, A.K., and Raychaudhuri, D.N., *J. Asiat. Soc.*, 4 : 108.

1993. *Eutrichosiphum khasyanum* (Ghosh and Raychaudhuri), Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 104.

Distribution : India : Uttarakhand, Arunachal Pradesh, Meghalaya.

Elsewhere : Nepal.

121. *Eutrichosiphum pseudopassania* Szelegiewicz

1968. *Eutrichosiphum pseudopassania* Szelegiewicz, H. *Annals. Zool. Warsz;* 25 : 466.

1993. *Eutrichosiphum pseudopassaniae* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 119.

Distribution : India : Uttarakhand, Manipur, Meghalaya, W.B.

Elsewhere : Nepal, Vietnam.

122. *Eutrichosiphum pyri* Chakraborti, Ghosh & Raychaudhuri

1972. *Eutrichosiphum pyri* Chakraborti, S, Ghosh, A.K. and Raychaudhuri, D.N. *Oriental Ins.* 6 : 389.

1993. *Eutrichosiphum pyri* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 123.

Distribution : India : Uttarakhand (Kumaon), Meghalaya.

123. *Eutrichosiphum guercifoliae* Raychaudhuri, Ghosh, Banerjee & Ghosh

1973. *Eutrichosiphum guercifoliae* Raychaudhuri, Ghosh, Banerjee & Ghosh, *Kontyu*, 41 : 57.

1993. *Eutrichosiphum guercifoliae* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) Zool. Surv. India,* : 125.

Material examined : 1 apterous, 1 alatae viviparous and 1alate oviparous female, *Quercus* sp., Kilbery (Nainital), 18.ii.99, Coll. B.C. Das.

Diagnostic characters : (Alate viviparous female). Body elongate, length 3.20 mm, width 0.90

mm. Head brownish, dorsal cephalic hairs acute, long, about 3.25 x b.d. III. Antennae with 12 circular secondary rhinaria, segment IV + V + VI broken, flagellar hair long, acute, about 2.50 x b.d. III. Rostrum long, acute extends beyond hind coxae, u.r.s. with 8 secondary hairs. Abdomen brownish, anterior targal hairs long, acute, about 2.25 x b.d. III. Siphunculi brownish, long, cylindrical, slightly swollen from middle toward apex, more spinulose toward apex, with long, acute hairs, about 5.20 x b.d. III. and 2.10 x base of siphunculi, siphunculi less hairy and nearly smooth basally. Cauda semioval, with 8 hairs, Legs brownish, wings normal, F.T.C. 7, 7, 7.

Distribution : India : Uttarakhand (Kumaon), W.B.

Remarks : This species is a new record for the state, so far known from eastern India. The unknown alate vivparous female is described for the first time.

124. *Eutrichosiphum guerciphaga* Chakraborti, & Mairy

1980. *Eutrichosiphum guerciphaga* Chakraborti, S. and Mairy, S.P., *Anals. Zoological*, **35** : 97.

1993. *Eutrichosiphum guerciphaga* : Ghosh, A.K. and Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6, Zool. Surv. India*, : 128.

Distribution : India : Uttarakhand (Garhwal).

125. *Eutrichosiphum tapatii* Mondal, Chatterjee & Raychaudhuri

1979. *Eutrichosiphum (Eutrichosiphum) tapatii* Mondal, P.K., Chaktterjee, M. and Raychaudhuri, D.N., *Entomon*, **4** : 77.

1993. *Eutrichosiphum tapatii* : Ghosh, A.K. and Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6, Zool. Surv. India*, : 148.

Distribution : India : Uttarakhand, H.P. and Sikkim.

126. *Eutrichosiphum tattakanum* (Takahashi)

1925. *Greenidea tattakanum* Takahashi, *Apididae of Formosa*, **4** : 30.

1993. *Eutrichosiphum tattakanum* (Takahashi) Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6, Zool. Surv. India*, : 149.

Distribution : India : Uttarakhand, H.P.

Elsewhere : Taiwan.

Genus *Greenidea* Schouteden

1905. *Greenidea* Schouteden, *spolia Zeylan.*, **2** : 181.

1. Hind tibiae with transverse cuts .... *Paragreenidea* 2
- Hind tibiae without any transverse cuts 2
2. Siphunculi in apterae reticulated near the base on one surface ..... *Trichosiphum*
- Siphunculi in apterae reticulated on both surfaces throughout the length ..... *Greenidea* S.S.

Key to the species of subgenus *Trichosiphum*

1. Antennal segment III and tibiae partly or entirely smooth 2
- Antennal segment III and tibiae imbricated .. 3
2. P.t. 1.62-2.0 x base of last antennal segment, segment III entirely smooth .... *halderi* Maity & Chakraborti
- P.t. 2.40 x base of last antennal segment: segment III smooth near the base ....*kumaoni* Chakraborti & Raychaudhri
3. P.t. longer than antennal segment III 4
- P.t. short to subequal of antennal segment III ..... *bucktonis* Ghosh, Basu & Raychaudhuri
4. Siphunculi 0.19-0.24 x as long as body, caudal process not distinct.....*anonae* Pargande
- Siphunculi 0.26-0.33 x as long as body, caudal process distinct ....*formosana formosana* (Maki)

127. *Greenidea (Trichosiphum) anonae* Pargandee

1906. *Trichosiphum anonae* Pargandee, *Th. Ent. News, Philad.*, **17** : 208.

1993. *Greenidea (Trichosiphum) anonae* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India*, : 207.

Distribution : India : Uttarakhand, Arunachal Pradesh, Central India, W.B.

Elsewhere : Indonesia, Japan, Malayasia.

128. *Greenidea (Trichosiphum) bucktonis* Ghosh, Basu, and Raychaudhuri

1970. *Greenidea (Trichosiphum) bucktonis* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, 4 : 69.

1993. *Greenidea (Trichosiphum) bicktonis* : Ghosh, A.K. and Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6, Zool. Surv. India,* : 212.

Distribution : India : Uttarakhand, Meghalaya, Sikkim and W.B.

129. *Greenidea (Greenidea) ficicola* Takahashi

1916. *Trichosiphum formosanum* Maki, M., *Essays for Nawa Gifu* : 13 (partim).

1921. *Greenidea ficicola* Takahashi, R., *Aph. of Formosa,* 1 : 66.

1993. *Greenidea ficicola* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 181.

Distribution : India : Uttarakhand, Delhi, H.P., Sikkim, Tamil Nadu, W.B.

Elsewhere : Australia, Bangladesh, East China, Indonesia, Malayasia, Nepal, Russia, Taiwan.

130. *Greenidea (Trichosiphum) formosana formosana* (Maki)

1916. *Trichosiphum formosanum* Maki, M., *Coll. Essays for Nawa Gifu* : 13 (partim).

1993. *Greenidea (Trichosiphum) formosana formosana* (Maki), Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 217.

Material examined : 2 apterae, *Psidium guyava*, Haridwar, 12.11.2k, 3 apterae, 1 alata, *Psidium guyava,* Bagjala (Haldwani), 30.11.99, Coll. B.C. Das.

Diagnostic characters : (Apterous viviparous female). Body length 2.80 mm, width 1.00 mm. Head brow. Antennae 6 segmented, flagellum gradually imbricated towards apex, longest flageller hair about 3.0 x b.d. III, pt. about 2.70 x base of segment VI. Rostrum reaches beyond hind coxae, u.r.s. about 2.0 x h.t. 2. Abdominal dorsum brownish, sclerotised, anterior tergal hair about 2.60 x b.d. III. Siphunculi pale brown, about 3.70 x its maximum width, hairs furcated near base and acute near apex, with more spinules near apex. Cauda oval with a median process and 4 hairs. Legs brownish.

Distribution : India : Uttarakhand, Manipur, Meghalaya, W.B.

Elsewhere : Bangladesh, China, Indonesia, Japan, Nepal, Taiwan.

131. *Greenidea (Trichosiphum) haldari* Maity & Chokraborti

1980. *Greenidea (Trichosiphum) haldari* Maity, S.P. and Chakraborti, S, *Annals Zoology,* 35 : 310.

1993. *Greenidea (Trichosiphum) haldari* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 225.

Distribution : India : Uttarakhand (Garhwal).

132. *Greenidea (Trichosiphum) kumaoni* Chokraborti & Raychaudhuri

1978. *Greenidea (Trichosiphum) kumaoni* Chakraborti, S. & Raychaudhuri, D.N. *Entomon,* 3 : 95.

1993. *Greenidea (Trichosiphum) kumaoni* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 228.

Distribution : India : Uttarakhand (Kumaon).

133. *Greenidea (Paragreenidea) parthenocissi* Saha & Chokraborti

1988. *Greenidea (Paragreenidea) parthenocissi* Saha, S. & Chakraborti, S, *Proc. Zool. Sco., Kol,* 37 : 49.

1993. *Greenidea (Paragreenidea) parthenocissi* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 202.

Distribution : India : Uttarakhand (Garhwal).

Genus *Mollitrichosiphum* Suenaga

1934. *Mollitrichosiphum* Snenaga, *Bull. Kagoshima imp. Coll. Agric. For.,* 1 : 798.

Key to the species of the genus *Mollitrichosiphum* Suenaga Apterae

1. Longest hair on antennal segment III 5.50-6.50 x b.d. III ..... *montanum* (V.d.G)

- Longest hair on antennal segment III 2.30-4.70 x b.d. III ....., *buddleiae* Ghosh, Banerjee & Raychaudhuri

134. *Mollitrichosiphum (Metatrichosiphon) buddleiae* Ghosh, Banerjee & Raychaudhuri

1971. *Mollitrichosiphum (Metatrichosiphon) buddleiae* Ghosh, A.K., Banerjee, H. & Raychaudhuri D.N., *Proc. zool. Soc. Kol.*, **26** : 107.

1993. *Mollitrichosiphum (Metatrichosiphon) buddleiae* : Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 281.

Material examined : 2 alatoid *Alnus* sp., Kausani, 21.10.01, Coll. B.C. Das.

Diagnostic characters : (Alatoid nymph). Body pale, length 1.70 mm, width 0.54 mm. Antennae 6 segmented, flagellum imbricated, flagellar hair long, acute, about 2.60 x b.d. III, pt. about 2.50 x base of segment VI. Rostrum reaches hind coxae, u.r.s. about 2.0 x h.t. 2. Abdomen pale, tergal hairs long, fine, 2.30 x b.d. III. Siphunculi long, about 12 x its base, siphuncular hair long and fine. Cauda semioval, with 6 hairs. Hind tibiae with stridulatory ridges, wings not fully developed.

Distribution : India : Uttarakhand (Kumaon), Sikkim.

135. *Mollitrichosiphum (Metatrichosiphon) montnum* (V.d.G.)

1917. *Trichosiphum montanum* Van der Goot, *Rec. Indian Mus.*, **13** : 179.

1993. *Mollitrichosiphum (Metatrichosiphon) montnum* (V.d.G.), Ghosh, A.K. & Agarwala, B.K., *Fauna of India (Aphidoidea) pt. 6 Zool. Surv. India,* : 287.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Sikkim, W.B.

Elsewhere : Nepal.

Subfamily HORMAPHIDINAE

Key to the genera of the Subfamily HORMAPHIDINAE

1. Frons in both apterae and alatae normal without any process or tubercles 4
- Frons in apterae and sometimes in alatae with distinct frontal process or lowly elevated tubercles 2
2. Pronotum in apterae with two pleural groves, separated by a median ridge. 1st instar larvae of two types ..... *Pseudoregma* Buckton
- Pronotum without deep pleural grooves, evenly rounded in apterae. Wax gland groups variable, 1st instar larvae of one type 3
3. At least marginal wax gland groups on abdomoen with transversely oval cells arranged in a row. Siphunculi on elevated cones with a few hairs around the base .... *Astegopteryx* Koch
- Wax gland groups composed of rounded cells or some irragularly shaped ones. Siphunculi poriform, often with a sclerotic rim .... *Ceratovacuna* Zehntner
4. Body aleurodeform in a apterae, with row of wax glands arranged along the entire margin. Head and prothorax fused in apterae, separated from fused meso and metathorax and fused abdominal segments (1-7), 8th segment separated ..... *Aleurodaphis* Van der Goot
- Head, thorax and 1st abdominal segment often fused, 2-7 abdominal segments variably fused and rounded. Siphunculi pore like or absent 5
5. Body in apterae with wax thread or powder. Siphunculi absent in apterae. Alatae with 5 segmented antennae and siphunculi. Fore wing with media simple ..... *Hamamelistes* Shimer
- Antennae and legs often atrophid. Alatae normal with annular and legs often atrophid. Alatae normal with annular secondary rhinaria. Siphunculi present. Fore wing with media once branched 6
6. Legs with normal tarsi of 2 segments and with claws. Submarginal hair absent on prosoma ... . *Pseudothoracapis* Raychaudhuri, Ghosh & Das
- Either all legs with rudimentary tarsi or only hind legs with such tarsi and other legs without tarsi ..... *Neothoracapis* Takahashi

Genus *Aleurodaphis* Van der Goot

1917. *Aleurodaphis* Van der Goot, *Contr. Fauna Indes neerl,* **1**(3) : 240.

136. *Aleurodaphis antennata* Chakraborti & Maity

1982. *Aleurodaphis antennata* Chakraborti, S. & Maity, S.P., *Proc. zool. Soc. Kol.*, **33** : 56.

1988. *Aleurodaphis antennata* : Ghosh, A.K. *Fauna of India Aphidoidea pt. 4 Zool. Surv. India,* : 252.

Distribution : India : Uttarakhand (Garhwal).

Genus ***Astegopteryx*** Karsch

1890. *Astegopteryx* Karsch, *Ber. dt. bot. Ges.,* **8** : 51.

137. ***Astegopteryx bambusae*** (Buckton)

1893. *Oregma bambusae* Buckton, *Indian Mus. Notes,* **3** : 87.

1966. *Astegopteryx bambusae* (Buckton) Doncaster, *Entomologist,* **99** : 157.

Distribution : India : Uttarakhand and Meghalaya.

Genus ***Ceratovacuna*** Zehntner

1897. *Ceratovacuna lanigera* Zehntner, *Meded. Proefstu Oost. Java,* (N.S.), **37** : 29.

138. ***Ceratovacuna lanigera*** Zehntner

1897. *Ceratovacuna lanigera* Zehntner, *Meded. Proefstu Oost. Java,* (N.S.) **37** : 29.

1980. *Ceratovacuna lanigera* : Raychaudhuri, D.N. (ed), Aphids of North East India and Bhutan, *Zool. Soc. Kol.,* : 371.

Distribution : India : Uttarakhand, Assam, Sikkim, Tripura, W.B.

Elsewhere : Indonesia, Japan, Philippines and Sri Lanka.

Genus ***Hamamelistes*** Shimer

1867. *Hamamelistes* Shimer, *Trans. Am. ent. Soc.,* **1** : 284.

139. ***Hamamelistes miyabei*** (Matsumura)

1917. *Mansakia miyabei* Matsumura, A collection of Essays for Nawa, *Gifu,* **3** : 59,

1983. *Hamamelistis miyabei* (Matsumura), Bhattacherjee. Mondal & Chakraborti, *Entomon,* **8**(1) : 15.

Distribution : India : Uttarakhand.

Elsewhere : Japan.

Genus ***Neothoracapis*** Takahashi

1958. *Neothoracapis* Takahashi, *Bull. Univ. Osaka Prefect.,* (B)**8** : 1.

140. ***Neothoracapis garhwalensis*** Chakraborti & Raha

1985. *Neothoracapis garhwalensis* Chakraborti, S. and Raha, S, *Ann. zool.*

1988. *Neothoracapis garhwalensis* : Ghosh, A.K., *Fauna of India (Aphidoidea) pt. 4, Zool. Surv. India* : 168.

Distribution : India : Uttarakhand (Garhwal).

Genus ***Pseudoregma*** Doncaster

1966. *Pseudoregma* Doncaster, *Entomologist,* **99** : 159.

141. ***Pseudoregma bucktoni*** Ghosh, Pal & Raychaudhuri

1976. *Pseudoregma bucktoni* Ghosh, M.R., Pal, P.K., and Raychaudhuri, D.N., *Proc. zool. Soc., Cal.,* **27** : 113.

1988. *Pseudoregma bucktoni* : Ghosh, A.K., *Fauna of India (Aphidoidea) pt. 4, Zool. Surv. India* : 373.

Distribution : India : Uttarakhand (Garhwal), Manipur, Meghalaya, Sikkim, South India, W.B.

Elsewhere : Sri Lanka, Taiwan and Vietnam.

Genus ***Pseudothoracapis*** Raychauduri, Ghosh & Das

1980. *Pseudothoracapis* Raychauduri, Ghosh and Das, *Ins. matsum,* **20** : 36.

142. ***Pseudothoracapis himachali*** Raychaudhuri, D.N., Ghosh, & Das

1980. *Pseudothoracapis himachali* Raychaudhuri, D.N., Ghosh, L.K. & Das, S.K., *Ins. matsum,* **20** : 36.

1988. *Pseudothoracapis himachali* : Ghosh, A.K., Fauna of India (Aphidoidea) pt. 4, Zool. Surv. India : 206.

Distribution : India : Uttarakhand (Garhwal), H.P.

Subfamily LACHNINAE

Key to the genera of the Subfamily Lachninae

1. Rostrum pointed at apex, segment 4 & 5 distinct ..... *Cinara* Curtis

- Rostrum usually blunt at apex, segment 4 & 5 not distinctly separated 2

2. Fore wing with pterostigma rather short, radial sector curved, hind leg much elongated .... *Lachnus* Burmeister

- Fore wing with pterostigma elongate, radial sector curved or straight 3

3. Ocular tubercles absent in the eyes of adult .....*Nippolachnus* Matsumura

- Ocular tubercles distinct in the eyes of adult .... *Pyrolachnus* Basu & Hille Ris Lambers

Genus *Cinara* Curtis

1835. *Cinara* Curtis, J. *Br. Ent.*, **12** : 576.

Key to the species of the genus *Cinara* Curtis

1. Legs with femora pale, tibiae dark at apices, 2nd segment of hind tarsus always longer than the basal diameter of siphuncular cone. Rostrum segment 4, 1.4-1.8 x as long as segment 5 .... *comata* Doncaster

- Legs with femora at least partiallly pigmented, tibiae variably pigmented, 2nd segment of hind tarsus may be shorter or longer than the basal diameter of siphuncular cone. Rostral segment 4, 1.8-2.4 x as long as segment 5 .... *indica* Verma

143. *Cinara comata* Doncaster

1956. *Cinara (Lachniella) comata* Doncaster, J.P., *Proc. R. ent. Soc. London (B)*, **25** : 111.

1982. *Cinara comata* Doncaster; Ghosh, A.K. *Fauna of India (Aphidoidea) pt. 2 Zool. Surv. India, Kol.* : 26.

Distribution : India : Uttarakhand (Garhwal), H.P.

144. *Cinara indica* Verma

1970. *Cinara indica* Verma, K.D., *Bull. Ent.*, **11** (2) : 96.

1982. *Cinara indica* : Ghosh, A.K. *Fauna of India (Aphidoidea) pt. 2 Zool. Surv. India,* : 41.

Distribution : India : Uttarakhand (Garhwal), H.P.

Genus *Lachnus* Burmeister

1835. *Lachnus* Burmeister, *H.C.C. Handb. Ent.*, **2** : 91.

145. *Lachnus tropicalis* (V.d.G.)

1916. *Pterochlorus tropicalis* Van der Goot, *Rec. Indian Mus*, **12** : 3.

1994. *Lachnus tropicalis* (V.d.G.), Ghosh, L.K., & Basu, R.C., *State Fauna (W.B.) pt. 5, Zool. Surv. India* : 276.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Manipur, Sikkim.

Elsewhere : Malaya, China, Japan, Korea, Vietnam, and Indonesia.

Genus *Nippolachnus* Matsumura

1917. *Nippolachnus* Matsumura, *J. Coll. Agric. Tohoku Univ.* 7(6) : 328.

146. *Nippolachnus piri* Matsumura

1971. *Nippolachnus piri* Matsumura, S.J. *Coll. Agric. Tohoku Univ.*, 7(6) : 382.

1980. *Nippolachnus piri* : Raychaudhuri, D.N. (ed), Aphids of North East India & Bhutan, *Zoological Society, Kol.*, 405.

Material examined : One alate viviparous female *Pyrus* sp. 22.10.01, Kausani Coll. B.C. Das.

Diagnostic characters : (Alate viviparous female). Body brownish, length 3.40 mm, width 1.30 mm. Head brown with fine hairs (Antennae broken). Eyes without triomatidia. Rostrum elongate, reaches upto mid coxae with 15 secondary hairs. Thoracic tergum brown. Abdominal dorsum pale, bearing marginal sclerites on 1st-5th tergites and a dark spinal patch on 3rd-5th tergites, Hair on dorsum of abdomen fine. Siphunculi on dark hairy cone. Cauda semioval, brown with many fins hairs. Pterostigms brown, simple. Legs brown, tip of hind femora and tibiae more darker.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, W.B.

Elsewhere : Japan, Korea and Taiwan.

Remarks : This species is a new record for the state.

Genus *Pyrolachnus* Basu and Hille Ris Lambers

1968. *Pyrolachnus* Basu, A.N. and Hille Ris Lambers, *Ent. Ber. Amst.*, **28** : 13.

147. *Pyrolachnus pyri* (Buckton)

1899. *Lachnus pyri* Buckton, *Indian Mus. Notes*, **4** : 274.

1994. *Pyrolachnus pyri* (Buckton), Ghosh, L.K., and Basu, R.C., *State Fauna (W.B.) pt. 5, Zool. Surv. India* : 278.

Distribution : India : Uttarakhand, Meghalaya, W.B.

Elsewhere : Sri Lanka.

Subfamily PEMPHIGINAE

Key to the tribes of the Subfamily Pemphiginae

1. Siphuculi present as cones or as rings, surrounded by hairs ..... Tribe-Eriosomatini

- Siphuculi absent or very feebly developed, without any hairs 2

2. Wax gland groups in apterae bearing a hair. Apterae usually with trochanter and femora separate ..... *Tribe* Pemphigini

- Wax gland absent or inconspicuous, in apterae never with hair or only the 8th tergite wax glands may bear hair. Apterae may have fused femora and trochanter ..... *Tribe* Fordini

Tribe **Eriosomatini**

Key to the genera

1. Abdominal tergites with spinal and marginal wax gland groups, pleural glands absent. Wax glands composed of subcircular cells surrounding a central space ..... *Eriosoima* leach

- Abdominal tergites with spinal, pleural and marginal wax gland groups. Wax glands usually with an irragular or large central space 2

2. In apterae primary rhinarium on antennal segment V with a bifurcate structure. Antennal segment III in alatae distinctly longer than other segments ..... *Kaltenbachiella* Schouteden

- In apterae primary rhinarium on antennal segment V with a trifurcate structure. Antennal segment III in alatae equal to segment V. Tarsi one segmented in apterae .... *Tetraneura* Hartig

Tribe *Fordini*

1. Secondary rhinaria large ovoid, one on each segment (III-VI), wax gland groups distinct on head, mesonotum and abdominal dorsum..... .....*Kaburagia* Takagi

- Secondary rhinaria not as above 2

2. Primary or secondary rhinaria without any cilia. Marginal wax glands on 1st - 5th tergite absent in alatae and evident in apterae..... ..... *Forda* Heyden

3. Primary or secondary rhinaria variably ciliated. Marginal wax glands on 1st to 5th tergites present .....*Baizongia* Rondani

Tribe **Pemphigini**

Antennal segment III may be with a denticle near the base.....*Prociphilus* Koch

- Antennal segment III never with a denticle 2

2. Emphodial hair short, usually 0.33-0.40 X the claws. Fundatrix without wax glands. Siphunculi hardly discernable..... .....*Epipemphigus* H. R. L

- Emphodial hairs may be short or upto 2/3 X claws. Fundatrix with wax glands 3

3. Mesothoracic wax glands not evident. Siphunculi ging like, usually present in alatae. Fundatrix with 4 segmented antennae..... ..... *Pemphifus* Hartig

- Mesothoracic wax glands evident. Siphunculi absent. Fundatrix with 5-6 segmented antennae ..... *Thecabius* Koch

Genus ***Baizongia*** Rondani

1848. *Baizongia* Rondani, Nuovi *Annale, Sci. nat. Boklogua,* **9** : 35.

148. ***Baizongia pistaciae*** (Linn.)

1767. *Aphis pistaciae* Linnaeus, *Syst. Nat. XIII.* **3** : 737.

1984. *Baizongia pistaciae* (L.) Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 347.

Distribution : India : Uttarakhand, H. P. and Punjab.

Elsewhere : Pakistan, Meditarranean region, Central Europe, U. K.

Genus ***Eriosoma*** Leach

1818. *Eriosoma* Leach., Trans. *hort. Soc. Lond.,* **3** : 60.

149. ***Eriosoma (Schizoneura) Kashmiricum*** Ghosh, Verma & Raychaudhuri

1776. *Eriosoma kashmiricum* Ghosh, Verma and Raychaudhuri, Oriental Ins., **10**(4) : 530.

1984. *Eriosoma (Schizoneura) Kashmiricum* : Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 20.

Material examined : 1 alate viviparous female, *Alnus nepalensis,* 10.vi.78, Ghangaria, Coll. S. Chakraborti.

Diagnostic Character : (Alate viviparous female). Head brown. Body length 2.80 mm, width 1.20 mm. Antennae 6 segmented, segments III, IV, V, VI, with linear secondary rhinaria, segment III about 1.30 X as long as segment IV, V, VI taken together, pt. about 0.70

X base of segment VI. Rostrum reaches mid coxae, about 0.90 X h. t. 2. Abdomen pale, targal hair short, siphunculi ring like, encircled by hairs. Cauda short with 2 hairs. Legs browinsh with apices of tibiae and tarsi spinulose. Media once branched.

Distribution : India : Uttarakhand, (Garhwal), Kashmir.

150. *Eriosoma (Schizoneura) longipilosum* Chakraborti Raychaudhuri

1975. *Eriosoma longipilosum* Chakraborti, S. and Raychaudhuri, D. N., *oriental Ins.*, 9(2) : 209.

1984. *Eriosoma (Schizoneura) longipilosum* : Ghosh, A. K., Fauna of (Aphidoidea) pt. 3, *Zool. Surv. India* : 42.

Material examined : 1 alate sexupara, pteriss sp., Loharkhet, Almora, 26.x.70, S. Chakraborti.

Diagnostic Character : (Alate sexupara). Head brown, Antennae 6 segmented, segments III, IV, V with annular secondary rhinaria, Flagellar hair fine, about 1.70 x bd. III, Rostrum reaches upto mid coxae, about 0.83 x ht. 2 with 14 secondary hairs. Abdomen pale, targal hairs fine, about 2.10 x bd. III. Siphunculi pore like, surrounded by hairs. Cauda small and with 2 hairs. F. T. C. 3,3,2. Legs brown, apices of tibiae and tarsi spinulose. Fore wing with pterostigma short and media once branched.

Remarks : This sexupara in characterised by presence of long hairs on body and also on u.r.s.

Distribution : India : Uttarakhand, (Kumaon).

151. *Eriosoma lanigerum* (Hausmann)

1802. *Aphis lanigerum* Hausmann, Illiger's *Mag. Insekt.*, 1 : 440.

1984. *Eriosoma Lanigerum* (Hausmann), Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 25.

Material examined : 1 alate viviparous female, *Lycopersicum esculantum*, Almora, 23.11.99, Coll. B. C. Das.

Diagnostic Character : (Alate viviparous female). Body elongate. Antennae 6 segmented, segment III longer than segment IV, V, VI taken together, linear secondary rhinaria on segment III, IV, V, base of segment III imbricate, rest of flagellum spinulose. Rostrum reaches mid coxae, about 1.40 x ht. 2 and 10 secondary hairs. Abdomen pale. with wax plates on segments 1-9, targal hairs fine, about 1.60 x b.d. III. Siphunculi ring like with chitinised rims. Cauda semilunar with 2 hairs. Legs brownish, tip of tibiae and tarsi spinulose. Wings fuscous, media once branched.

Distribution : India : Uttarakhand, (Kumaon) H. P., Meghalaya.

Elsewhere : Widely distributed.

152. *Eriosoma (Schizoneura) phaenax* (Mordvilko)

1921. *Eriosoma phaenax* Mordvilko, *Izv. pterogr. obl. st. Zasc. Rost.*, 3(3) : 1-72.

1984. *Eriosoma (Schizoneura) phaenax* : Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 45.

Distribution : India : Uttarakhand.

Elsewhere : Pakistan, Russia.

Genus *Epipemphigus* Hille Ris Lambers

1966. *Epipemphigus* Hille Ris Lambers, *Tijdschr. Ent.*, **109** : 204.

153. *Epipemphigus imaicus* Cholodkovsky

1912. *Pemphigus imaicus* Cholodkovsky. *Revne Ruses d Entom.*, **12** : 495.

1984. *Epipemphigus imaicus* (Cholodkovsky), Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 172.

Material examined : 1 alate viviparous female, *populus* sp., 10.6.78, Ghangaria, Coll. S. P. Maity.

Diagnostic character : (Alate viviparous female). Body elongate, length 2.00 mm width 0.90 mm. Head brown. Antennae 6 Segmented, segment III equal to segments IV + V taken together, segment III and IV with secondary rhinaria, p.t. 0.33 X base of segment VI. Rostrum reaches mid coxae, about 0.50 x h. t. 2. Abdomen pale, marginal wax gland present, targal hair sparse. Siphunculi not descernable. Cauda short with 3 hairs. Wings with pterostigma brown, media simple.

Distribution : India : Uttarakhand (Garhwal), H. P., Sikkim.

Elsewhere : Pakistan, Japan.

Genus *Forda* von Heyden

1837. *Forda* von Heyden, *Ent. Beitr. Mus. Senckenb.*, **2** : 291.

154. *Forda riccobonii* (Stefani)

1899. *Pemphigus riccobonii* Stefanii, *Riv.* Ital Sci. nat., **19** : 1.

1984. *Forda riccobonii* (Stefani), Ghosh, A. K., Fauna of India (Aphidoidea) pt. 3, *Zool. Surv. India* : 381.

Distribution : India : Uttarakhand.

Elsewhere : Sicily, Spain, Canary island, Morocco, Algeria, Israel, Turkey.

Genus *Kaburagia* Takagi

1937. *Kaburagia* Takagi, G, *Bull Forest Exp. stn. Chosen,* **26** : 20.

155. *Kaburagia ailanthi* Chowdhury, Basu, Chakraborti, and Raychaudhuri

1969. *Kaburagia ailanthi* Chowdhuri, A. N., Basu, R. C., Chakraborti, S & Raychaudhuri, D. N., *oriental Ins.,* 3(1) : 86.

1975. *Kaburagia ailanthi* : Chakraborti, S. and Raychaudhuri, D. N., oriental Ins., 9(2) : 210.

Distribution : India : Uttarakhand (Kumaon), H. P.

Genus *Kaltenbachiella* Schoutedon

1906. *Kaltenbachiella* Schoutedon, H., *Men. Soc. r. ent.* Belg., **12** : 194.

156. *Kaltenbachiella carpinicola* Ghosh, Chakraborti Bhattacherjee

1981. *Kaltenbachiella carpinicola* Ghosh, A. K., Chakraborti, S. and Bhattacherjee, D. K. *Bull. Zool. Surv. India,* 4(3) : 319-330.

1984. *Kaltenbachiella carpinicola* : Ghosh A. K., *Fauna of India* (Apphidoidea) pt. 3, *Zool. Surv. India* : 65.

Material examined : 3 alate viviparous females, *Carpinus* sp., Trijuginarayan, 5.6.78, Coll. D. Bhattacherjee.

Diagnostic characters : (Alate viviparous female). Head brown, Body length 2.30 mm, width 1.23 mm, Antennae 6 segmented, flagellar segments with annular secondary rhinaria, p. t. shorter than base. Rostrum reaches beyond fore coxae, u.r.s. shorter than ht. 2. Abdomen pale, tergal hairs fine. Siphunculi ring like. Cauda semilunar with many hairs. Fore wing with simple media.

Distribution : India : Uttarakhand (Garhwal).

Genus *Pemphigus* Hartig

1839. *Pemphigus* Hartig. *Th., Jber. Fortschr. Forstwiss u. forsth. naturk. in. Jhare* 1836 1837, 1(4) : 645.

157. *Pemphigus mordvilkoi* Cholodkovsky

1912. *Pemphigus mordvilkoi* Cholodkovsky, N., *Russk. Zoo. Zh.,* 12(3) : 493.

1984. *Pemphigus mordvilkoi* : Ghosh A. K., *Fauna of India* (Apphidoidea) pt. 3, *Zool. Surv. India* : 105.

Material examined : 3 apterous viviparous female, 2 alate viviparous female, *Populus* sp. Mussorie, 16.10.76, Coll. S. P. Maity.

Diagnostic characters : (Apterous viviparous female). Body oval, Head small, brown. Antennae 4 segmented, segment III equal in length to segments I, II & IV taken together. Rostrum reaches beyond fore coxae and without any secondary hair. Abdomen pale with wax plates. Siphunculi absent. Cauda sclerotic, small with 2-3 hairs.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Pakistan.

158. *Pemphigus nainitalensis* Cholodkovsky

1912. *Pemphigus nainitalensis* Cholodkovsky, N., *Russk. Zoo. Zh.,* 12(3) : 494.

1984. *Pemphigus nainitalensis* : Ghosh A. K., *Fauna of India* (Apphidoidea) pt. 3, *Zool. Surv. India* : 212.

Distribution : India : Uttarakhand (Kumaon).

Genus *Prociphilus* Koch

1857. *Prociphilus* Koch, C. L., *Die pflanzenlause Aphiden, Nuruberg* : 279.

159. *Prociphilus (Stagona) xylostei* (De Geer)

1773. *Aphis xylosteri* De Geer, C., *Memoir pour servir a 'h' historic des insectes,* 3 : 96.

1984. *Prociphilus (Stagona) xylostei* (De Geer), Ghosh A. K., *Fauna of India* (Apphidoidea) pt. 3, *Zool. Surv. India* : 303.

Material examined : 1 alate viviparous female, *Lorices* sp., 13.vi.78, Gobinda Ghat, Coll. D. Bhattacherjee.

Diagnostic characters : (Alate viviparous female). Body brownish. Head dark. Antennae 6 segmented, segments III, IV, V with linear secondary rhinaria. Rostrum reaches mid coxae, about 0.60 x ht. 2 and with 10-11 secondary hairs. Abdomen pale, transverse band on 7th segment, wax plates not discernable. Siphunculi absent. Cauda small, semioval, with a few hairs.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Holarctic.

Genus *Thecabius* Koch

1857. *Thecabius* Koch, C. L., *Die pflanzenlause Aphiden, Nuruberg* : 294.

160. *Thecabius affinis* Kaltenbach

1843. *Pemphigus affinis* Kaltenbach, *J. Mon. Fam. pffauz.*, 182.

1978.*Thecabius affinis* (Kaltenbach), Chakraborti, S. and Maity, S. P. *Entomon*, 3(2) : 27.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Palearctic region.

Genus *Tetraneura* Hartig

1841. *Tetraneura* Hartig, *T. Z. ent.*, (Germer) 3 : 366.

161. *Tetraneura (Indoterraneura) lambersi* Chakraborti and Maity

1978. *Tetraneura (Indotetraneura) lambersi* Chakraborti, S. and Maity. S. P., *Entomon*, 3(2) : 269.

1984.*Tetraneura (Indoretraneura) lambersi* : Ghosh. A. K., *Fauna of India* (Aphidoidea) pt. 3, *Zool Surv. India* : 102.

Material examined : 1 Alate viviparous female, Grass root, 22.6.76, Mussorie, Coll. S. P. Maity.

Diagnostic character : (Alate viviparous female). Body pale. Antennae 6 segmented, segment III, IV and V with annular secondary rhinaria, pt. spinulose. u.r.s. 0.70 x ht. 2 and with 6-8 secondary hairs. Abdomen pale, targal hair fine. Siphunculi brown, truncate. cauda semioval with 4 hairs.

Distribution : India : Uttarakhand (Garhwal).

162. *Tetraneura (Indoterraneura) utpali* Chakraborti Maity & Bhattacherjee

1982. *Tetraneura (Indotetraneura) utpali* Chakraborti, S. Maity. S. P. and Bhattacherjee, D. K., *Oriental Ins.*, 16(1) : 108.

1984.*Tetraneura (Indoretraneura) utpali* : Ghosh. A. K., *Fauna of India* (Aphidoidea) pt. 3, *Zool Surv. India* : 150.

Distribution : India : Uttarakhand (Garhwal).

162. *Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki)

1899. *Schizoneura abdominalis* Sasaki, C., *Manual of Insect pests of crops in Japan* (In Japanese) : 1435.

1994.*Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki), : Ghosh. L. K., and Basu, R. C., *Fauna of W. B.*, pt. 5, *Zool Surv. India* : 282.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, W. B.

Elsewhere : Widely distributed.

SUMMARY AND CONCLUSION

The present work reveals a total of 163 species of aphids belonging to 90 genera distributed over 7 subfamilies of the family Aphididae occuring in the State of Uttarakhand. The family Aphididae includes subfamilies Anoeciinae, Aphidinae, Drepanosiphinae, Greenideinae, Hormaphidinae, Lachninae and Pemphiginae. From the distribution of species it reveals that almost all the species belonging to subfamily Aphidinae and more of Greenideinae are recorded from Kumaon range, where as Hormaphidinae, Lachninae, Anoecinae and Pemphiginae are predominently recorded from Garhwal range. This shows a clear range of distribution of these species in two regions.

An analysis of the number of species reveals that Uttarakhand aphid fauna contributes 18% of Indian aphid fauna. Among the recorded species from Uttarakhand 12% species are endemic to this area.

In conclusion it can be said that Uttarakhand presents a rich aphid fauna considering its climatological condition and varied floral assemblage.

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REFERENCES

Agarwala, B.K. and Ghosh, A.K. 1984. A checklist of Aphidoidea of India, *Rec. zool. Surv. India,* occ. Paper No. 50, 1-71.

Banerjee, H., Ghosh, A.K. and Raychaudhuri, D.N. 1969. On a collection of aphids (Homoptera) from Kuti Valley, West Himalaya, Oriental Ins., 3(3) : 255.

Basu, A.N. 1964. New genera and species of aphidas from Darjeeling district, India (Homoptera : Aphididae) J. Linn. Soc. (Zool.), **45** : 223-243.

Chakraborti, S., Ghosh, A.K. and Raychaudhuri, D.N. 1971. New record of aphids (Insecta : Homoptera) from Uttar Pradesh, *Sci. Cult.,* **37** : 247-248.

Chakraborti, S., Ghosh, A.K. and Raychaudhuri, D.N. 1972. On some undescribed morphs and new records of aphids (Homoptera : Insecta) from Kumaon Himalaya, India, *Curr. Sci.,* **41** : 70-71.

Chakraborti, S., Ghosh A.K. and Raychaudhuri, D.N. 1972. A new genus, a new species and further records of aphids (Homoptera : Aphididae) from the Kumaon Hills, Northwest Himalaya, India. Oriental Ins., **6** : 387-400.

Chakraborti, S. and Raychaudhuri, D.N. 1975. Aphids (Homopters : Aphididae) from Sunderdange Valley, Kumaon Himalaya, India, Oriental Ins., 9(2) : 195-211.

Chakraborti, S. 1976. Two new species of aphids (Homoptera : Aphididae) from North-west India. *Zool. J. Linn. Soc.,* **58** : 263-271.

David, S.K. 1969. Some rare aphids in new region in India. J. Bombay, *nat. Hist. Soc.* **66**(2) : 323-326.

David, S.K. Raja Singh, S.G. and Narayan, S. 1970. The Myzaphidines (Homoptera) of India with description of three new species, oriental Ins., 4(4) : 395-406.

Dacid, S.K. and Hamid, S.F. 1974. Second species of *Nasonovia* Kakamia complex (Hom : Aphididae) from N.W. India. oriental Ins., 8(2) : 195-198.

Ghosh, A.K. 1980. The fauna of India and adjacent countries, (Homoptera : Aphidoidea) part I. Subfamily Chaitophorinae, *Zool. Surv. India,* 1-124.

Ghosh, A.K. 1982. The Fauna of India and adjacent countries. (Homoptera : Aphidoidea) part II, Subfamily - Lachninae, *Zool. Surv. India,* 1-167.

Ghosh, A.K. 1984. The Fauna of India and adjacent countries, (Homoptera : Aphidoidea) part III, Subfamily pemphiginae, *Zool. Surv. India,* 1-430.

Ghosh, A.K. 1988. The fauna of India and adjacent countries, (Homoptera : Aphidoidea) part IV. Subfamily phaloemyzinae, Anoceiinae and Hormaphidinae, *Zool. Surv. India,* 1-429.

Ghosh, A.K. and Quednau, F.W. 1990. The Fauna of India and adjacent countries, (Homoptera : Aphidoidea), part V, subfamily Drepanosiphinae, *Zool. Surv. India,* 1-336.

Ghosh, A.K. and Agarwala, B.K. 1993. The Fauna of India and adjacent countries, (Homoptera : Aphidoidea), Part VI, subfamily Greenideinae, *Zool. Surv. India,* 1-323.

Ghosh, L.K. 1969. On a collection of aphids (Homoptera : Aphididae) from Uttar Pradesh, India. *Sci. & Cult.,* **35** : 493.

Ghosh, L.K. 1990 A taxonomic review of the genus *Aphis* Linnaeus (Homoptera : Aphididae) in India. *Mem. Zool. Surv. India,* **17**(3) : 1-159.

Raychaudhuri, D.N. (ed.) 1980. Aphids of North East India and Bhutan, The Zoological society, kolkata, 1-521.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, 18(Part-2), 2010 : 175-193.

INSECTA : HEMIPTERA : HOMOPTERA : CICADELLOIDEA

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INTRODUCTION

The Cicadellids are commonly known is leaf - hoppers and they are dwelling in huge numbers among the plants. They cause considerable damage by sucking the sap as well as by transmitting different viral diseases to the infected plant. Therefore these insects are considered as one of the most economically important insects from agricultural point of view. Some species are serious pests to a number of agricultural crops in India. The Cicadellids are belonging to the Superfamily Cicadelloidea under the Series Auchenorrhyncha of the suborder Homoptera under the Order Hemiptera.

Because of their immense agricultural importance serious taxonomical and faunistic researches on Cicadellid insects have been carried out in India and abroad for a pretty long period, which has recorded so far more than 15,000 species in the world, while India has 680 species. The present paper has the aim to bring out a faunistic as well as taxonomic account of cicadellids of Uttarakhand. The work is based upon the collections received from the various survey parties of Zoological Survey of India as well as named collections housed in the National Collection present in the Hemiptera section. Earlier recorded species are also incorporated in the present work.

Among pioneer workers on Cicadellids of India Distant (1908, 1916, 1918) and Pruthi (1930, 1934, 1936, 1940) made major contributions to focus on the systematics of this group. Afterwards Ghauri (1963, 1975), Bindra and Joginder (1970), Datta (1969, 1973, 1988), Datta *et al.*, (1979, 1884), Virakthamath (1976, 1979, 1980, 1981, 1982, 1983), Ghosh and Ghosh (1994, 1999) have done excellent systematics as well as taxonomic studies to enrich the Indian fauna of Cicadellids.

The present paper has 43 species under 28 genera, distributed in 12 subfamilies and families of the superfamily Cicadelloidea. Out of these 16 species are being recorded for the first time from the state. The present study deals with taxonomic key to different taxa, diagnostic characters of each species with distributed in Uttarakhand and other states of India as well as in other countries.

SYSTEMETIC ACCOUNT

Super Family CICADELLOIDEA
Family TYPHLOCYBIDAE
Sub family TYPHLOCYIBINAE
Genus ***Bolanusoides*** Distant

1. *Bolanusoides ornatus* Distant
2. *Bolanusoides modesta* Distant
3. *Bolanusoides heros* Distant

Family EVACANTHIDAE
Sub family EVACANTHINAE
Genus ***Vangama*** Distant

4. *Vangama steneossaura* Distant

Genus ***Mainda*** Distant

5. *Mainda praeculta* Distant

Genus ***Evacanthus*** Distant

6. *Evacanthus repexus* (Distant)

Family MACROPSIDAE
Sub family MACROPSINAE
Genus ***Macropsis*** Lewis

7. *Macropsis garuda* (Distant)

Family AGALLIDAE
Sub family AGALLINAE
Genus ***Durgades*** Distant

8. *Durgades mirabilis* Pruthi

Genus ***Agallia*** Curtis

9. *Agallia robusta* Pruthi

Family CICADELLIDAE
Sub family CICADELLINAE
Genus ***Soibanga*** Distant

10. *Soibanga bella* Walker

Genus ***Bothrogonia*** Melichar

11. *Bothrogonia leopardina* Distant
12. *Bothrogonia ferruginea* Fabricius
13. *Bothrogonia indistincta* Fabricius

Genus ***Atkinsoniella*** Distant

14. *Atkinsoniella opponens* (Walker)

Genus ***Kolla*** Distant

15. *Kolla insignis* Distant

Genus ***Cofana*** Melichar

16. *Cofana specta* (Distant)
17. *Cofana mimica* (Distant)
18. *Cofana unimaculata* (Signoret)

Family NIRVANIDAE
Sub family NIRVANINAE
Genus ***Sophonia*** Walker

19. *Sophonia linealis* (Distant)

Family COLIDIIDAE
Sub family COLIDINAE
Genus ***Coelidia*** Germar

20. *Coelidia indica* (Walker)

Family KRISHNIDAE
Sub family KRISHNINAE
Genus ***Krisna*** Kirakaldy

21. *Krisna strigicollis* (Spinola)
22. *Krisna striata* Kirby

Family IASSIDAE
Sub family IASSINAE
Genus ***Drabescus*** Stal

23. *Drabescus angulatus* Signoret

Genus ***Betrachomorphus*** Lewis

24. *Betrachomorphus chlorophana* (Melichar)
25. *Betrachomorphus indica* Lethierry

Family HECALIDAE
Sub family Hecalinae
Genus ***Hecalus*** Stal

26. *Hecalus* paykulli (Stal)
27. *Hecalus albomaculatus* (Distant)
28. *Hecalus porrectus* (Walker)
29. Hecalus arcuatus (de Motschulsky)

Family PENTHIMIDAE
Sub family PENTHIMINAE
Genus ***Penthimia*** Germar

30. *Penthimia maculosa* Distant
31. *Penthimia compacta* Walker

Genus ***Neodartus*** Melichar

32. *Neodartus acocephaloides* Melichar

Family DELTOCEPHALIDAE
Sub family DELTOCEPHALINAE
Genus ***Scaphoideus*** Uhler

33. *Scaphoideus zhangi* Viraktamath & Mohon

Genus ***Deltocephalus*** Burmeister

34. *Deltocephalus infirmus* Melichar

Genus ***Paternus*** Distant

35. *Paternus khewrensis* Pruthi

Genus ***Viridomarsus*** Distant

36. *Viridomarsus capitatus* Distant

Genus ***Coroticus*** Distant

37. *Coroticus* tessellates Distant

Genus ***Goniagnathus*** Fieber

38. *Goniagnathus punctifer* Walker

Genus ***Nephotettix*** Matsumura

39. *Nephotettix nigropicta* (Stal)
40. *Nephotettix virescens* Fabricius

Genus ***Exitianus*** Ball

41. *Exitianus nanus* (Distant)
42. *Exitianus coronatus* (Distant)
43. *Exitianus indicus* (Distant)

Key to the family of Super family CICADELLOIDEA

1. Vein at base of front wings indistinct, no forked or corium ..... TYPHLOCYBIDAE

   Vein at base front wings distinct corium more or less branched and connected by transverse veins 2

2. Face tumid, ocelli situated on vertex 3

   Face not tumid, ocelli may or may not be situated on vertex 4

3. Face centrally carinate; hind wings always with four apical cell ..... EVACANTHIDAE

Face not centrally carinate; hind wings always with three apical cells ..... MACROPSIDAE

4. Ocelli placed on disc of vertex; head rounded 5

Ocelli placed not on disc of vertex, placed on face below the anterior edge of the head, head, not rounded, entirely deflexed ..... AGALLIDAE

5. Head not produced; lateral suture extending over crown ..... CICADELLIDAE

Head usually forward, lateral facial suture not briefly extending on to crown 6

6. Head porrect, twice as long as pronotum, ocelli small, indistinct, situated lateral margin of vertex ..... NIRVANIDAE

Head not porrect, broad short strongly rounded as pronotum; ocelli large distinct situated on anterior margin of vertex 7

7. Pronotum large anteriorly very strongly roundly, submarginaly produced ..... COELIDIDAE

Pronotum transverse, not strongly rounded produced, obtuse anteriorly convex 8

8. Tegmina extending beyond the abdominal apex, apically narrow, irregularly veined 9

Tegmina not beyond the abdominal apex, valvate behind the clavus regularly veined 10

9. Submarginal vein in hind wing continued over Jugam ..... KRISNIDAE

Submarginal veins in hind wings is not continued over Jugam ..... IASSIDAE

10. Body dorso ventrally flattend; pronotum with lateral margin carinate ..... HECALIDAE

Body not dorso ventrally flattened, rather robust, broad and compressed; lateral margin of pronotum not carinate 11

11. Clypeus is convex, extend over the base of antennae, antennal ledges is distinct ..... PENTHIMIDAE

Clypeus is not convex or swollen ; antennal ledges is not distinct ..... DELTOCEPHALIDAE

Family TYPHLOCYBIDAE
Subfamily TYPHLOCYBINAE
Genus *Bolanusoides* Distant 1918

1918. *Bolanusoides* Distant , *Fauna Brit . India, Rhynchota* VII : 90.

Key to the species of the genus *Bolanusoides*

1. Scutellum with a transverse series of four black spots ..... *ornatus*

Scutellum without transverse series spots, with a large black spots 2

2. Vertex conically narrowed anteriorly, very strongly transversely impressed near middle ..... *modesta*

Vertex not conically narrowed anteriorly, without transverse impression ..... *heros*

1. *Bolanusoides ornatus* (Distant)

1918. *Camulus ornatus* Distant, *Fauna Bri. India, Rhynchota* VII : 97.

1968. *Bolanusoides ornatus :* Metcalf, *General Catalogue of Homp.* Part 17 : 1045.

Diagnostic characters : Vertex silvery white at anterior margin at posteriorly a narrow black line; pronotum with a central black sufussion; scutellum with a series of black spots; tegmina with obliquely transverse black line and a large central costal spot crossed by transverse line.

Length : 4 mm.

Distribution : India : Uttarakhand (Dist. - Almora); Eastern Himalayes; Northern India; North-western India.

Elsewhere : United Provinces.

Remarks : Distant (1918) recorded this species from Almora district.

2. *Bolanusoides modestus* (Distant)

1918. *Camulus modestus* Distant, *Fauna Brit. India, Rhynchota*, VII : 98.

1968. *Bolanusoides modestus :* Metcalf, *General Catalogue of Homp* Part XVII : 1046.

Diagnostic characters : Vertex conically narrow anteriorly, and at middle a transverse impression; pronotum with dark spots; scutellum with dark spot at based margin; tegmina with transverse oblique fascia.

Length : 4 mm.

Distribution : India : Uttarakhand (Dist. Almora), United Provinces.

Remarks : This species was not available in the present collection. It was recorded by Distant (1918) from Almora district.

3. ***Bolanusoides heros*** Distant

1918. *Bolanusoides heros* Distant, *Fauna Brit. India. Rhynchota*, **VII** : 90.

1968. *Bolanusoides heros :* Metcalf, *General Catalogue of Homp.*, Part **XVII** : 1045.

Diagnostic characters : Anterior margin of vertex stramineous with narrow black margin; pronotum with dark central spots; scutellum with a large black spot at basal margin; tegmina blackish with dark linear markings.

Length : 4mm.

Distribution : India : Uttarakhand (Dist. - Almora); Eastern Himalayas; Northern India; North Western India.

Elsewhere : United Province

Remarks : Distant (1918) recorded this species from Almora district.

Family EVACANTHIDAE
Subfamily EVACANTHINAE

Key to the genera of subfamily Evacanthinae

1. Vertex much longer than pronotum and scutellum together, scutellum shorter than pronotum ..... ***Vangama***

   Vertex not much longer than pronotum and scutellum together, scutellum not shorter, broadly triangulate 2

2. Vertex with two fine longitudinal ridge which angularly diverge at base ..... ***Mainda***

   Vertex crossed by more or less straight ridge from near one ocellus to other ..... ***Evacanthus***

Genus ***Vangama*** Distant 1908

1908. *Vangama* Distant, *Fauna. Birt. India, Rhynchota* **4** : 260.

4. ***Vangama steneossaura*** Distant

1908. *Vangama steneossaura* Distant, *Fauna. Brit. India, Rhynchota*, **4** : 260.

1988. *Vangama steneossaura* : Datta, *Rec. zool. Surv. India. Occ. Paper No.* **90** : 57.

Material examined : 1ex : Kumaoon, Bhimtal, Dist. Nainital (Distant coll).

Diagnostic characters : Cephalic process of head longly produced; vertex of its anterior surface with centrally longitudinally ridged; its apical area strongly upwardly recurved; pronotum with centrally longitudinally ridged; scutellum subtriangular; tegmina long and narrow, apical area four.

Length : 19 mm

Distribution : India : Uttarakhand (Dist. - Nainital); Assam; North-West India.

Genus ***Mainda*** Distant 1908

1908. *Mainda* Distant, *Fauna Brit. India, Rhynchota* **4** : 229.

5. ***Mainda praeculta*** Distant

1908. *Mainda praeculta* Distant, *Fauna. Brit. India, Rhynchota* **4** : 230.

1963. *Mainda praeculta:* Metcalf, *General Catalogue of Homp.* **VI** : 51.

Diagnostic characters : Vertex with four black spots arranged in pairs two at base and two at apex; pronotum reddish brown, with a brownish central line; scutellum with subangulate spot at each basal angle, and a central line bifurcated posteriorly, and a minute black subapical spots, tegmina thickly reddish marked; and three transverse fasciae; legs piceous.

Length : 8 mm

Distribution : India : Uttarakhand (Dist. - Kumaoon); N.W. India.

Remarks : Specimens of this species were not available in the present collection. It was recorded from Kumaoon by Distant (1908).

Genus ***Evacanthus*** Distan

6. ***Evacanthus repexus*** (Distant)

1908. *Eucanthus repexus* Distant, *Fauna Brit India, Rhynchota*, **4** : 228.

2003. *Evacanthus repexus :* Ghosh & Ghosh, *State Fauna Series 9 : Fauna of Sikkim* (Part 2) : 446.

Material examined : 2exs : Kumaoon, Bhowali, Dist. Nainital; 6exs : Kumaoon, Ranikhet, Dist.

Almora; 28.ix.2000, A.Bal & Party coll.; 2exs : Kousani, F.R.H., Dist. Almora; 3.x.2001; A. Bal & Party coll.

Diagnostic characters : Vertex with fine distinct ridge, face with a distinct central longitudinal ridge; pronotum finely and transversly striate; scutellum strongly transverse impressed before apical area; tegmina with finely punctate and upper surface pubescent; legs spinulosa.

Length : 7.5 mm.

Distribution : India : Uttarakhand (Dist. - Almora, Nainital), Himachal Pradesh; Meghalaya; North-Bengal; Punjab; Uttar Pradesh; West Bengal.

Family MACROPSIDAE
Sub family Macropsinae
Genus ***Macropsis*** Lewis 1834

1834. *Macropsis* Lewis, *Roy. Ent. Soc., London., Trans* : 49.

7. ***Macropsis garuda*** (Distant)

1916. *Pediopsis garuda* Distant, *Fauna Brit. India Rhynchota*, **7** : 239.

1966. *Macropsis garuda* : Metcalf, *General Catalogue of Homp*, **XIII** : 67.

Material examined : 2exs : Kumaon, Bhowali, Dist. Nainital; 16. iv. 2002; S. Roychowdhury & Party coll.

Diagnostic characters : Vertex subangulate, sparingly punctate; pronotum twice as broad as long, thickly coarsely, darkly punctate, posterior margin subtruncate; scutellum slightly punctate and two small black spots; tegmina brownish, the vein finely grayish white spotted.

Length : 4 mm

Distribution : India : Uttarakhand (Dist. - Nainital); Chennai.

Family AGALLIDAE
Sub family AGALLINAE

Key to the genera of the subfamily Agallinae

1. Tegmina moderately broad, extending beyond abdominal apex, costal margin convexly rounded, venation distinct ..... ***Durgades***

   Tegmina not moderately broad, not extending beyond abdominal apex, costal margin not rounded, venation not distinct ..... ***Agallia***

Genus ***Durgades*** Distant 1912

1912. *Durgades* Distant, *A. M. N. H. (8)* **10** : 609.

8. ***Durgades mirabilis*** Pruthi

1930. *Durgades mirabilis* Pruthi, *Mem. Indian Mus.*, **2** : 12.

1966. *Durgadem mirabilis* : Metcalf, *General Catalogue of Homp.*, **XIV** : 107.

Material examined : 1ex : Mussorie, Dist. Dehra Dun; 15. vi .to 1. vii. 1930; B.N. Copra coll.

Diagnostic characters : Vertex short, with three black fasciae which continued on the face; clypeus with dark longitudinal fascia; pronotum short with two minute dark spots near anterior margin and a median longitudinal black stripe on the disc; scutellum with transversely impressed; tegmina longer than body, more or less pointed apices legs very long and stout.

Length : 4 mm

Distribution : India : Uttarakhand (Dist. - Dehra Dun); Sikkim; West Bengal.

Genus ***Agallia*** Curtis 1833

1833. *Agallia* Curtis, *Ent. Mag.*, **1** : 193.

9. ***Agallia robusta*** Pruthi

1930. *Agallia robusta* Pruthi, *Mem. Ind. Mus.*, **11** : 10.

1966. *Agallia robusta* : Metcalf, *General Catalogue of Homp.*, **XIV** : 58.

Material examined : 3 exs : Garhwal Hills, Chamba; Dist. Theri Garhwal, 16. ix. 2000; G.C. Sen & Party coll.

Diagnostic characters : Vertex with a pair of black spots, and two black strips on each side of median line; pronotum with pair of black spots on anterior margin; scutellum with a black spot at each basal angle.

Length : 3.5 mm

Distribution : Indian : Uttarakhand (Dist. Tehri Garhwal); Muree hills; N.W. Himalayas; West Bengal.

Family CICADELLIDAE
Subfamily CICADELLINAE

Key to the genera of subfamily Cicadellidinae

1. Wings wider than tegmina and their apices truncate ..... ***Soibanga***

Wings not wider narrower than tegmina and their apices not truncate, rounded 2

2. Face flatten, medially smooth, distinctly transversely straite, foveate on disk 3

   Face not flatten, elongate moderately globose without striation, not foveate on disk ..... ***Bothrogonia***

3. Vertex very short, little more than half the length of pronotum, prominently foveate ..... ***Atkinsoniella***

   Vertex not very short, as the length of pronotum, not prominently more or less foveate 4

4. Vertex strongly produced, anterior margin conicate ..... ***Kolla***

   Vertex not strongly produced as above, anterior margin rounded ..... ***Cofana***

Genus ***Soibanga*** Distant 1908

1908. *Soibanga* Distant, *Fauna Brit. India, Rhynchota*, **4** : 236.

10. ***Soibanga bella*** Walker

1851. *Soibanga bella* Walker, *List Hom*, **111** : 778.

2003. *Soibanga bella :* M. Ghosh & L.K. Ghosh, *State Fauna Series 9, Fauna of Sikkim*, Part - **2** : 443.

Material examined : 1ex : Binsur, Dist. Almora; 24. ix. 2001; A. Bal & Party coll.

Diagnostic characters : Vertex with one central longitudinal brownish line two transverse discal lines, at its anterior margin with macular motting; between eyes a brownish spot present; pronotum with two broadly transverse brownish discal fasciae; scutellum with four small discal brownish spots; clypes with two spots; tegmina black and apical margin grayish brown with different brownish maculation; legs brown.

Length : 5 mm.

Distribution : India : Uttarakhand (Dist. - Nainital); Assam; Himachal Pradesh; Northern India, Sikkim; Uttar Pradesh.

Genus ***Bothrogonia*** Melichar

1926. *Bothrogonia* Melichar, *Ann. Mus. Nat. Hist. Hung*; **23** : 341.

Key to the species of the genus *Bothrogonia*

1. Pronotum with five spots and scutellum with four black spots ..... ***leopardina***

   Pronotum with three spot not five and scutellum with one spot not four 2

2. Abdomen and sternum light reddish ..... ***ferruginea***

   Abdomen and sternum not reddish, its blackish ..... ***indistincta***

11. ***Bothrogonia bopardina*** (Distant)

1908. *Tettigoniella leopardina* Distant, *Fauna Brit. India*, Rhynchota **4** : 204

1926. *Bothrogonia leopardina :* Melichar, *Ann. Mus . Wat. Hist. Hunge* **23** : 341

1998. *Bothrogonia leopardina :* Ghosh, M. & L.K. Ghosh, *State Fauna Series 4 : Fauna of Meghalaya*, **4** : 6.

Material examined : 3exs : Ranikhet, Dist. Almora; 28. ix. 2001; A. Bal & Party coll.

Diagnostic characters : Vertex with five black spots, two, on anterior and basal margin and one central; pronotum castaneous with a black spots on its claval suture.

Length : 11.5 mm.

Distribution : India : Uttarakhand (Dist. - Almora); Assam, Meghalaya.

Elsewhere : Java; Myitta; Tenasserium.

12. ***Bothrogonia ferruginea*** (Fabricius)

1794. *Tettigoniella ferruginea* Fabricius, *Entomologia. Syst.*, **4** : 32

1926. *Bothrogonia ferruginea:* Melichar, *Ann. Mus. Nat. Hist. Hung.* **23** : 341

2004. *Bothrogonia ferruginea* : Ghosh, M. & L.K. Ghosh, *State Fauna Series 10 : Fauna of Manipur Part* - **2** : 256

Material examined : 18exs : 12exs: Koshi, Dist. Almora; 3.x.01; B. Mitra & Party coll; 6exs : Ranikhet, Dist. Almora; 18.ix.03; A. Bal & Party coll.

Diagnostic characters : Vertex with three black spots, one spot at apex and others between ocelli; pronotum with three black spots, One spots at anterior margin and other two at base; scutellum

centrally with a black spot tegmina purplish red, with a black spot at base, at apex a broadly black patch; legs blackish.

Length : 12 mm

Distribution : India : Uttarakhand (Dist. - Almora) Maharastra, Manipur; Meghalaya; Sikkim; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Borneo; Dutch East Indies; Japan; Java; Korea; Malay Peninsula; Myanmar; Nepal; Philippines; Singapore; Sri Lanka.

13. ***Bothrogonia indistincta*** (Walker)

1851. *Tettigoniella indistincta* Walker., *List. Hom. B. M.*, : 739.

1926. *Bothrogonia indistincta :* Melichar, *Ann. Mus. Nat. Hist. Hung.*, **23** : 341.

2004. *Bothrogonia indistincta :* Ghosh M. & L.K. Ghosh, *State Fauna Series 10 : Fauna of Manipur* **2** : 257.

Material examined : 10exs : 6 exs : Ranikhet, Dist. Almora; 28.ix.2001; 3exs : Kousani, F.R .H., Dist. Almora; 3.x.2001; A. Bal & Party coll; 1ex : Kumaon, Malwali Tal, Dist. Nainital; 5.x.2004. M. Ghosh. & Party coll.

Diagnostic characters : Vertex with two black spots, one spot at apex, and other at base; pronotum with three black spots, two spots at base and one spot at middle of anterior margin; scutellum with subapical black spots; face black; tegmina brownish yellow, its apices pitchy colour, legs black.

Length : 13.5 mm.

Distribution : India : Uttatanchal (Dists. - Almora, Nainital); Assam; Manipur; Meghalaya; Sikkim; Uttar Pradesh.

Elsewhere : Borneo; China; Japan; Myanmer; Phillipines; Sumatra; Sri Lanka.

Genus ***Atkinsoniella*** Distant 1908.

1908. *Atkinsoniella* Distant, *Fauna Brit. India, Rhynchota*, **4** : 235.

14. ***Atkinsoniella opponens*** (Walker)

1851. *Tettigonia opponens* Walker, *List. Hom. B. M.* **3** : 757.

1908. *Kola opponens :* Walker, *Fauna Brit. India, Rhynchota*, **4** : 225.

1986. *Atkinsiniella opponens :* Young, *Agr. Res. Serv., Uni. Tech. Bul. North Carolina State* : 281.

Material examined : 10 exs : Kumaoon, Bhimtal, Dist. Nainital; 5.x.2004.; M. Ghosh. & Party coll.

Diagnosistic character : Vertex with three black spots two anterior margin and one transversely at base; face with a red spot; anterior margin of pronotum black, being connected with angulated basal margin; a large black spot on each basal angle of scutellum; tegmina with broad longitudinal fascia; legs brownish.

Length : 8.5 mm.

Distribution : India : Uttarakhand (Dist. - Nainital); Assam; Meghalaya; Sikkim; Uttar Pradesh; West Bengal.

Elsewhere : Myanmar; Netherlands.

Genus ***Kolla*** Distant 1908

1908. *Kolla* Distant, *Fauna Brit. India, Rhynchota*, **4** : 223.

15. ***Kolla insignis*** Distant

1908. *Kolla insignis* Distant, *Fauna Brit. India, Rhynchota*, **4** : 223.

1998. *Kolla insignis :* Ghosh M. & L.K. Ghosh, *State fauna Series 4 : Fauna of Meghalaya*, Part **4** : 9.

Material examined : 4exs : Kausani, Dist. Almora; 19.ix.2004; M. Ghosh & Party coll.

Diagnostic characters : Vertex with two large spots united anteriorly, three angulated central black spots connected by a black line and a transverse spots in front of eyes; pronotum with wavy transverse fascia close to anterior margin; scutellum with a black spots at each basal angle; tegmina shiny black.

Length : 5 mm.

Distribution : India : Uttarakhand (Dist. - Almora); Manipur; Meghalaya; Sikkim; Uttar Pradesh; West Bengal.

Elsewhere : Nepal.

Genus ***Cofana*** Melichar1726

1726. *Cofana* Melichar, *Ann. Mus. Nat. Hist.*, **23** : 345.

Key to species of genus *Cofana*

1. Vertex with central dark spot present at junction of vertex and face, usually white ... . *spectra*

Vertex without central dark spot at junction of vertex and face, usually pale green 2

2. Scutellum more or less greenish yellow, with a distinct dark longitudinal line ..... *mimica*

Scutellum pale testaceous, without distinct line, with two elongate black spots .... *unimaculata*

16. *Cofana spectra* (Distant)

1910. *Cicadella spectra* Distant, *Insect. Trans.*, **10** : 234.

1990. *Cofana spectra :* Partact, *Cicadomorpha*, **3** : 76.

Material examined : 14exs : 8exs : Koshi, Dist. Almora; 18.ix.2003; B. Mitra & Party coll; 6exs : Malwa Tal, Dist. Nainital; 28.ix.2001; A. Bal & Party coll.

Diagnostics Characters : Vertex with four black spots, two at central one at base and one at apex; tegmina pale fuscous.

Length : 9 mm.

Distribution : India : Uttarakhand (Dists. - Almora, Nainital); Andhra Pradesh; Bihar; Karnataka; Madhya Pradesh; Meghalaya; Mizoram; Orissa; Sikkim; Tripura; West Bengal.

Elsewhere : Australia; Bangladesh; Nepal; Sri Lanka.

17. *Cofana mimica* (Distant)

1908. *Kolla mimica* Distant, *Fauna Brit. India, Rhynchota*, **4** : 225.

1990. *Cofana mimica :* Partact, *Cicadomorpha*, **3** : 76.

Material examined : 8exs : Jolly grant, Dist. Dehra Dun; 16.ii.2000; G.C. Sen & Party coll.

Diagnostic characters : Body covered with white pubescens, vertex with three black spots in tranverse series; pronotum with fine transverse impression; scutellum with distinct dark longitudinal line; tegmina greenish white, veins dark gray brown.

Length : 5.5 mm.

Distriution : India : Uttarakhand (Dist.- Dehra dun); Andhra Pradesh; Bihar; Manipur; Meghalaya; Mizoram; Sikkim; Tripura; Uttar Pradesh; West Bengal.

18. *Cofana unimaculate* (Signoret)

1854. *Tettigonia unimaculata* Signoret, *Ann. Soc. ent. Fr.* **2**(3) : 26.

1908. *Kolla unimaculata* Distant, *Fauna Brit. India, Rhynchota*, **4** : 224.

1990. *Cofana unimaculata* Partact, *Cicadomorpha* , **3** : 76.

Material examined : 5exs : Mussoorie, Dist. Dehra Dun; 30.vi. 3.vii.1930; B.N. Chopra & party coll.

Diagnostic characters : Vertex with two dark black spots at anterior margin and two small black spots on disk; pronotum, its basal margin black, triangularly produced at middle; scutellum at base two black elongate spots; tegmina black, its costal margin brown longitudinal band.

Length : 5.5 mm

Distribution : India : Uttarakhand (Dist. - Dehra Dun); Karnataka; Meghalaya; West Bengal.

Elsewhere : Myanmar; Java; Malacca; Philippins; Sri Lanka.

Family NIRVANIDAE
Sub family NIRVANINAE
Genus *Sophonia* Walker 1870

1870. *Sophonia* Walker, *Linn. Soc. London Jour. Zool.* **10** : 327.

19. *Sophonia linealis* (Distant)

1908. *Nirvana linealis* Distant, *Fauna Brit. India, Rhynchota*, **4** : 282.

1963. *Sophonia linealis :* Metcalf, *General Catalogue of Homp.* **VII** : 27.

Material examined : 2exs : Dehra Dun, Dist. Dehra Dun; 8.vii.1930. B.N. Chopra coll.

Diagnostic characters : Vertex longer than pronotum, vertex with a reddish central spot and reddish longitudinal lines united at basal angle; pronotum with a central piceous lines; scutellum with dark longitudinal line; tegmina indistinct, slender longitudinal vein.

Length : 5 mm.

Distribution : India : Uttarakhand (Dist. - Dehra Dun); Karnataka; West Bengal.

Elsewhere : Java.

Family COLIDIIDAE
Subfamily COLIDINAE
Genus *Coelidia* Germar 1821

1821. *Coelidia* Germar, *Mag Ent.*, **4** : 38-75.

20. *Coelidia indica* (Walker)

1851. *Jassus indica* Walker, *List Homp. Coll. Btm.*, 855.

1988. *Coelidia indica :* Datta, *Rec. zool. Surv. India, Occ. Paper. No.* **90** : 195.

Material examined : 1ex : Kumaoon Hills, Katarmal, Dist. Almora; 29.v.1930; H.S. Pruthi coll.

Diagnostic characters : Vertex brownish yellow, vertex with narrow central carina, pronotum pitchy black, at anterior area with dull granules; scutellum submarginate, more or less spotted; tegmina with rusty brown maculation at costal area whitish subtriangular spot; legs yellowish.

Length : 6 mm.

Distribution : *India* : Uttarakhand (Dist. - Almora); Andaman Island; Karnataka; Manipur; Meghalaya My sore.

Elsewhere : Africa; Myanmar; Philippine Island; Sri Lanka; Sumatra.

Family KRISHNIDAE
Subfamily KRISHNINAE
Genus *Krisna* Kirakaldy 1900

1900. *Krisna* Kirakaldy, *Entomologist* **33** : 243.

Key to the species of the genus *Krisna*

1. Vertex with two small black spots at apex and one black spots at apex of each clavus .... *strigiocolis*

   Vertex without such black spot at apex and at apex of claval area ..... *striata*

21. *Krisna strigicollis* (Spinola)

1850. *Siva strigicollis* Spinola, *Mem. Soc. Ital Modena*, **25**(1) : 128.

1998. *Krisna strigicollis :* Ghosh, M. & L.K. Ghosh, *State Fauna Series 4 : Fauna of Meghalaya Part* **4** : 24.

Diagnostic characters : Vertex binotate at apex; pronotum strongly transversely striate; scutellum with an oblique impression before apical area; tegmina rugulose and punctate, its apical third reticulate; legs strongly spinulose.

Length : 9.5 mm.

Distribution : India : Uttarakhand (Dist. - Dehra Dun); Bihar, Meghalaya; Maharastra; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Africa; Belgium, Borneo; China, Japan, Java, Malaysia, Myanmar, Srilanka.

Remarks : Specimen of this species was recorded from Dehra Dun by Distant (1908).

22. *Krisna striata* Kirkadly

1901. *Krisna striata* Kirkadly, *Entomologist*, **340** : 39.

1966. *Krisna striata :* Metcalf, *General Catalogue of Homp.*, **XV** : 201.

Diagnostic characters : Vertex semi-Circular with reddish apical; pronotum strongly transversely striated; scutellum also striated and strongly arcuate impression at apical area; tegmina strongly wrinkled and punctate , its apical area reticious ; legs black.

Length : 11 mm.

Distribution : India : Uttarakhand (Dist. - DehraDun); Andhra Pradesh; Mizoram.

Elsewhere : Phillippines; Sri Lanka.

Family IASSIDAE
Subfamily DRABESCINAE
Genus *Drabescus* Stal 1870

1885. *Drabescus* Stal, *Ofv. Vet. Ak. Forh.* : 738.

23. *Drabescus angulatus* Signoret

1880. *Drabescus angulates* Signoret, *Ann. Soc. end. Fr.* : 210.

1996. *Drabescus angulatus* : Metcalf, *General Catalogue of Homp*, **15** : 173.

Diagnostic characters : Vertex short angularly rounded in front, the extreme egde forming a light yellow ridge bounded on the by a black line; pronotum with brown spots furnished with light yellowish round dots and finely transversly striated in all length; scutellum with irregular long and round yellowish dots; tegmina rugose, veins brown alternated with white dots, clavus with two transverse veinlets.

Length : 8 mm.

Distribution : India : Uttarakhand (Dist. - Dehra Dun); North India

Subfamily IASSINAE
Genus *Betrachlomorphus* Lewis.

1836. *Batrachomorphus* Lewis, *Tr. E. S. I.* : 57.

Key to the species of genus *Batrachomorphus*

1. Scutellum with an arcuate, subangulate, impressed transverse line at apical area .... *chlorophana*

   Scutellum without an arcuate, subangulate, impressed transverse line at apical area, depressed at middle ..... *indica*

24. ***Betrachomorphus indicus*** (Lethierry)

1892. *Macropsis indica* Lethierry, *Bull. Zool. Soc. France*, : 209.

1966. *Betrachomorphus indica :* Metcalf, *General Catalogue of Homp.* XV : 54.

Material examined : 4exs : Kausani, Dist. Bageshwar; 3.v.1929; H.S. Pruthi. coll.

Diagnostic characters : Vertex blunt; pronotum finely striate; Scutellum impressed at base; tegmina brownish yellow,coarsely punctate, at claval region with spots.

Length : 4 mm.

Distribution : India : Uttarakhand (Dist. - Bageshwar); Chennai; South Andaman; West Bengal.

Elsewhere : Formosa; Java; Malabar; Srilanka.

25. ***Betrachomorphus chlorophana*** (Melichar)

1903. *Bythoscopus chlorophana* Melichar, *Hom. Faun. Ceylon*, : 153.

1966. *Betrachomorphus chlorophana :* Metcalf, *General Catalogue Of Homp.*, XV : 53.

Material examined : 8exs : Garhwal Hills, Chamba, Dist. Tehri Garhwal; 16.ix.2000; G.C. Sen & Party coll.; 10exs : Binsur, Dist. Almora; 26.x.2001; A. Bal & Party coll.

Diagnostic characters : Vertex smooth, eyes and ocelli red; pronotum finely distinctly striate; scutellum obscurely depressed at base; tegmina brownish, with a minute black spots at apex of claval area.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dists.- Tehri Garhwal, Almora), Andhra Pradesh; Karnataka; West Bengal.

Elsewhere : Srilanka; Myanmar.

Family HECALIDAE
Subfamily Hecalinae
Genus ***Hecalus*** Stal 1864

1864. *Hecalus* Stal, *Ann. Soc. ent. Fr.*, 4(4) : 65.

Key to the Species of the genus *Hecalus*

1. Vertex as long as or longer than pronotum; pronotum longitudinally sulcated ..... *paykulli*

   Vertex not longer, shorter than pronotum; pronotum not sulcated 2

2. Apical area of tegmina brownish, with white spots present ..... *albomaculates*

   Apical area of tegmina not brownish, without white spots 3

3. Longitudinal orange red fasciae on head, pronotum and scutellum ..... *porrectus*

   Not longitudinal fasciae, concentric parabolic fasciae on head pronotum and scutellum .... *arcuatus*

26. ***Hecalus paykulli*** (Stal)

1854. *Petalocephala paykulli* Stal, *Ofv. Vet - Ak. Forh.* : 252.

1864. *Hecalus paykulli :* Stal, *Ann. Soc. Ent. Fr.* : 65.

1963. *Hecalus paykulli* : Metcalf, *General Catalogue of Homp.* Part IX : 20.

Material examined : 2exs : Binsur, Dist. Almora; 21.ix.2001; A. Bal & Party coll.

Diagnostic characters : Vertex clouded with brown, two excavation on the vertex on each side; pronotum a little more than twice as broad as long, finely transversely striated; scutellum with several less marked impressions anteriorly tegmina opaque, with a black dot at the tip of claval angle.

Length : 5.5 mm.

Distribution : India : Uttarakhand (Dist.- Almora).

Elsewhere : Sylhet; East Africa.

27. ***Hecalus albomaculatus*** (Distant)

1908. *Thomsoniella albomaculatus* Distant, *Fauna. Birt. India, Rhynchota*, 4 : 280.

1973. *Hecalus albomaculatus :* Morrison, *Pacific insects* 15 : 379-448.

Material examined : 24 exs : Garhwal Hills, Jolly grant, Dist. Dehra Dun; 16.ix.2000; G.C. Sen & Party coll.; 5exs : Garhwal, Chamba, Dist. Tehri Garhwal; 16.ix.2000; G.C. Sen & Party coll.; 3 exs : Mussorie, Dist. Dehra Dun; 26.ix.2001. A. Bal & Party coll.

Diagnostic characters : Vertex at apical area blacking red; pronotum finely transversely striate; scutellum with an angulate line before apical area; tegmina greenish brown, its apical area with white spots.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dist. - Dehra Dun, Tehri Garhwal); Andhra Pradesh; Manipur; Meghalaya; Orissa; Sikkim; Tamil Nadu; Tripura; West Bengal.

Elsewhere : Belgian Congo; Luzon; Philippine Island; Sri Lanka; Sumbawa.

28. *Hecalus porrectus* (Walker)

1858. *Acocephalus porrectus* Walker, *List. Hom. Br. Mus. Suppl.*, : 362.

1973. *Hecalus porrectus*: Morrison, *Pac. Ins.*, 15(3-4) : 421.

1990. *Hecalus porrectus :* Rao, *Rec. zool. Surv. India No.* 127 : 50.

Material examined : 12 exs : 9 exs : Dehra Dun, Dist. Dehra Dun; 3.xi.2002; M. Prasad & Party coll., 3exs : Binsur, Dist. Almora; 26.ix.2001; A. Bal & Party coll.

Diagnostic characters : Vertex with four longitudinal orange fasciae; pronotum with six longitudinal orange fasciae and scutellum also with four orange red fasice; tegmina greenish, at apex of clavus area with two small black spots.

Length : 5 mm.

Distribution : India : Uttarakhand (Dists. - Dehra Dun, Almora); Andhra Pradesh, Manipur; Meghalaya; Mizoram; Orissa; Punjab; Tripura; Sikkim; West Bengal.

Elsewhere : Myanmar; Formosa; Maldives; Java; Philippines; Queensland.

29. *Heculus arcuatus* (de Motschulsky)

1859. *Acocephalus arcuata* de Motschulsky, *Etud. Ent.*, 8 : 15.

1990. *Hecalus arcuata :* Rao, *Rec. zool. Surv. India, Occ. Paper No.* 127 : 52.

Material examined : 4exs : 2exs : Chamba, Dist. Tehri Garhwal; 16.ix.2000; G.C. Sen & Party coll; 2exs : Kumaoon Hills, Binsur; Dist. Almora; 26.ix. A.K. Bal & Party coll.

Diagnostic characters : Vertex with an bow like orange red fasciae commencing near eyes; pronotum with two concentric parabolic fasciae, the posterior one much small, scutellum with three longitudinal orange red fasciae, tegmina also with longitudinal fasciae present.

Length : 5 mm.

Distribution : India : Uttarakhand (Dist. - Tehri Garhwal, Almora); Karnataka; Meghalaya; Tamil Nadu.

Elsewhere : Maldive Island; Sri Lanka; Southern Asia.

Family PENTHIMIDAE
Sub Family PENTHIMINAE

Key to the genera of the sub family PENTHIMINAE

1. Vertex in length equal to about half the breadth between eyes, short, transverse, anterior convexly rounded and depressed .... ***Penthimia***

   Vertex in length equal to about not half two third the breadth between eyes, sub elongate, anteriorly obliquely rounded and reflexes .... ***Neodartus***

Genus *Penthimia* Germar 1821

1821. *Penthimia* Germar, *Mag. Ent.*, IV : 46.

Key to the species of the genus *Penthimia*

1. Tegmina black, finely reddish speckled, on its apical area a cluster of small white spots.... ..... *maculosa*

   Tegmina brownish yellow, not black, thickly piceous reticulate, on its apical area without white sports, some scattered reddish spots. ..... *compacta*

30. *Penthimia maculosa* Distant

1908. *Penthimia maculosa* Distant, *Fauna Brit. India, Rhynchota* 4 : 244.

2003. *Penthimia maculosa :* Ghosh M. & L.K. Ghosh, *State Fauna Series 9, Fauna of Sikkim, Part* - 2 : 444.

Material examined : 1ex : Koshi, Dist. Almora; 18.ix.2003; B. Mitra & Party coll.

Diagnostic characters : vertex with transverse ridge and striation face also with transversely striation at base; pronotum punctate and transversly wrinkled, at its middle a few small reddish spots present; scutellum punctate and transversly wrinkled; tegmina black and finely reddish speckled and apical area with a cluster of white spots; legs black.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dist. - Almora); Assam; Maharastra; Sikkim; West Bengal.

Elsewhere : Tenasserian.

31. *Penthimia compacta* Walker

1851. *Penthimia compacta* Walker, *List. Hom.*, 3: 842.

1988. *Penthimia compacta*: Datta., *Rec. zool. Surv. India, Occ. Paper No.* **90** : 35.

Material examined : 1ex : Kumaoon, Dist. Almora; 18.ix.2004; M Ghosh & party coll.

Diagnostic characters : Vertex black; pronotum sparsely punctate anteriorly and posteriorly smooth; scutellum finely punctate and obliquely deflexed; tegmina densely reddish reticutate marking and its claval area more or less unicolorous with some scattered reddish spots; legs testaceous.

Length : 6 mm.

Distribution : India : Uttarakhand (Dist. - Almora); Maharastra; North India; Punjab; West Bengal.

Genus *Neodartus* Melichar

1903. *Neodartus* Melichar, *Hom. Fauna., Ceylon* : 162.

32. *Neodartus acocephaloides* Melichar

1903. *Neodartus acocephaloides* Melcher, *Hom. Fauna Ceylon* : 162.

2000. *Neodartus acocephaloides* : Ghosh *et al., State Fauna Series 7 : Fauna of Tripura Part.* **2** : 326.

Material examined : 4exs : Chamba, Dist. Tehri Garhwal; 16.ix.2000; G.C. Sen & Party coll.; 10exs : Jolly grant, Dist. Dehra Dun; 16.ix.2000; G.C. Sen & Party coll.

Diagnostic characters : Vertex of its apical margin prominently reflexus; pronotum finely transversely regulose; scutellum finely transversely striate and a transverse impression at apical area; tegmina with fine hairs, thickly dark brown spotted, at middle an irregular transverse series of five grayish white spots; legs black, strongly spinulose.

Length : 4 mm.

Distribution : India : Uttarakhand (Dists. - Dehra Dun, Tehri Garhwal); Chennai; Punjab; Tripura; West Bengal.

Elsewhere : Croag; Luzon; Philippines.

Family DELTOCEPHALIDAE
Subfamily DELTODEPHALINAE
Key to the genera of subfamily Deltocephalinae

1. Vertex as long as broad, or actually augularly produced 2

   Vertex shorter than long; not pointed or actually angularly produced 6

2. Tegmina long covering the abdomen, rounded off behind with distinct vein 3

   Tegmina shorter, narrow, not covering the abdomen, behind indistinct vein ..... ***Scaphoidea***

3. Face symentrically hexagonal, in claval a distinct tranverse vein running from the outer claval vein to claval suture ..... ***Deltocephalus***

   Face not hexagonal, very long and narrow, the clavus does contain the transverse vein..... 4

4. Pronotum more than twice as long as broad, anterior margin distinct concave between eyes ..... ***Paternus***

   Pronotum about as long as broad, anterior margin distinctly convex, not concave..... 5

5. Tegmina two and half times as long as broad covering three fourth of abdomen, four apical cells ..... ***Viridomarus***

   Tegmina longer than broad, covering full abdomen, three apical cells ..... ***Coroticus***

6. Clypeus rectrangular, at base narrow; tegmina usually punctate ..... ***Goniagnathus***

Clypeus not rectangular, quadrangular broades at base; tegmina not punctate 7

7. Tegmina at apices broadly rounded off; membranal appendix distinctly broaded .... ***Nephotettix***

Tegmina at apices not broadly, slightly rounded rounded off; membranal appendix not broad, extremely narrow ..... ***Exitianus***

Genus ***Scaphoideus*** Uhler 1888

1888. *Scaphoideus* Uhler, Trans. *Maryl. Ac. Sci.*, : 33.

33. ***Scaphoideus zhangi*** Viraktamath & Mohon

2004. *Scaphoideus zhangi* Viraktamath & Mohan, *Zootara* : 45.

Material examined : 1ex : Chamba, Dist. Tehri Garhwal; 16.ix.2000, G.C. Sen & Party.

Diagnostic characters : Vertex with a submarginal band and a series of three transverse stripes on face and a transverse castaneous band across eyes; pronotum with an anterior and submarginal castanous bands; scutellum with two fuscous spots an lateral margin; tegmina with prominent dark brown venation, fuscous spot at apices of clavus.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dist.- Tehri Garhwal); Meghalaya; West Bengal.

Genus ***Dcltocephalus*** Burmeister

1840. *Dcltocephalus* Burmeistetr, *Gen. Ins. i*, t. XIV : 3.

34. ***Deltocephalus infirams*** Melichar

1903. *Deltocephalus infiramus* Melichar, *Hom., Faun. Ceylon*, : 203.

1988. *Deltocephalus infiramus* Datta, *Rec. zool. Surv. India, Occ pap.*, 90 : 117.

Diagnostic characters : Vertex with two united spots at apex , two larger transverse spots on discal spots to base a centeral piceous line; pronotum with four dark broad longitudinal fascial; scutellum with a central discal transverse impressed line and dark spot near each basal angel; tegmina with dark vein and two spots an basal area and discal brown cellular interspaces.

Length : 3.5 mm.

Distribution : India : Uttarakhand (Dist.- Almora); West Bengal; Himachal Pradesh.

Genus ***Paternus*** Distant 1918

1918. *Paternus* Distant, *Fauna. Brit. India, Rhynchota*, 7 : 71.

35. ***Paternus khewrensis*** Pruthi

1936. *Paternus khewrensis* Pruthi, *Mem. Ind. Mus.*, II : 111.

1966. *Paternus khewrensis* : Metcalf, *General Catalogue of Homp.*, 10 : 2359.

Material examined : 1ex : Srinagar, Dist. Pauri Garhwal; 25.XI.2002; M. Prasad coll.

Diagnostic characters : Vertex about twice as long as breadth between the eyes, its apically acute; pronotum flat, medially longitudinally carinate, finely irregularly striate; scutellum transversely impressed in the middle; tegmina yellowish; legs long.

Length : 3.5 mm.

Distribution : India : Uttarakhand (Dist. - Pauri Garhwal); Bihar, North India.

Genus ***Viridomarus*** Distant

1918. *Viridomarus* Distant, *Fauna. Brit. India, Rhynchota*, 7 : 69.

36. ***Viridomarus capitatus*** Distant

1918. *Viridomarus capitatus* Distant, *Fauna. Brit. India, Rhynchota* 7 : 70.

1967. *Viridomarus capitatus* : Metcalf, *General Catalogue of Homptra. Part* X : 2349.

Material examined : 4exs : Srinagar, Dist. Pauri Garhwal; 29.x.2002; M. Prasad & Party coll.

Diagnostic characters : Apex of vertex black broadly subacute, pronotum coustaneous transversely impressed before middle, scutellum short transversely impressed; tegmina light greenish; legs shortly spinulose.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dist. - Pauri Garhwal); Chennai, West Bengal.

Genus ***Coroticus*** Distant

1918. *Coroticus* Distant, *Fauna Brit. India, Rhynchota* 7 : 45.

37. ***Coroticus tessellates*** Distant

1918. *Coroticus tessellates* Distant, *Fauna Brit. India. Rhynchota*, 7 : 45.

1968. *Coroticus tessellates :* Metcalf, *General Catalogue of Homptera.*, X : 2351.

Diagnostic characters : Vertex pale brownish; pronotum dark brownish; scutellum anteriorly blackish and posteriorly grayish white; tegmina with numerous brownish marking and at middle area of costal space four dark spots.

Length : 5 mm.

Distribution : India : Uttarakhand.

Remarks : This species was recorded as *Coroticus tessellates* by Distant (1918) from Uttarakhand.

Genus *Goniagnathus* Fieber 1866

1866. *Goniagnathus* Fieber, *Verh. z. b. Ges. Wien*, XVI, p. 506.

38. *Goniagnathus punctifer* Walker

1858. *Bythocopus punctifer* Walker, *Inscta Saundersiana* : 108.

1908. *Goniagnathus punctifer* : Distant, *Fauna Brit. India. Rhynchota*, 4 : 311.

1998. Goniagnathus *punctifer* : Ghosh & Ghosh, *State Fauna Series 4 : Fauna of Meghalaya Part* 4 : 19.

Material examined : 8exs : 4exs : Mussoorie, Dist. Dehra Dun; 16.ii.2000; G.C. Sen & Party coll; 4exs : Binsur, Dist. Almora; 26.x.2000; A. Bal & Party coll.

Diagnostic characters : Vertex with dark black spots and black transverse stripe; pronotum finely striate; anterior margin scutellum smooth; tegmina with fuscous spots.

Length : 7 mm.

Distribution : India : Uttarakhand (Dist.- Almora, Dehra Dun), Andhra Pradesh; Bihar; Maharastra, Manipur, Meghalaya, Mizoram, Sikkim.

Elsewhere : Myanmar, Maldive, Sri Lanka.

Genus *Nephotettix* Matsumara

1902. *Nephotettix* Matsumura, *Term Fuzetek*, 25 : 356.

Key to the species of genus *Nephotettix*

1. Vertex with a transvers submarginal black band ;anterior margin of pronotum marked by a transverse black band ..... *nigropicta*
2. Vertex usually without sub -marginal black - band; pronotum without marked by such black band ..... *virescens*

39. *Nephotettix nigropicta* (Stal)

1859. *Pediopsis apicalis* Motschulsky, *Etud. Ent.*, :.110.

1906. *Nephotettix nigropicta :* Kirkaldy, *Rep. Exp. Sta. Haw. Plant Assoc.*

2000. *Nephotettix nigropicta :* Ghosh *et al., State Fauna Series 7: Fauna of Tripura, Part.* 2 : 328.

Material examined : 25exs : 10exs : Dist. Dehra Dun; 21.ix.2000; G.C. Sen & party.; 7exs : Mussoorie, Dist. Dehra Dun; 16.ix.2000; G.C. Sen & party; 4exs : Binsur; Dist. Almora; 26. x.2001; A. Bal & party coll.; 4exs : Goaldham, Dist. Bagheswar; 2.x.2004; M. Ghosh & Party coll.

Diagnostic characters : Vertex with a black line at anterior margin; anterior margin of pronotum black; anterior margin of scutellum black and two small black spots an each side; tegmina green; margin of clavus, a black spot before middle extending to claval suture, apical third of tegmina black.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dists.- Bagheswar, Dehra Dun, Almora) Bihar; Manipur, Meghalaya, Mizoram, Orissa, Punjab, Sikkim, Tripura, West Bengal.

Elsewhere : East Africa, SriLanka.

40. *Nephotettix virescens* Fabracius

1803. *Cicada bipunctatus* Fabracius, *Syst. Rhyng.*, : 78.

1971. *Nephotettix virescens :* Ghauri, *Bull .Ent. Res.*, 60 : 481-512

2000. *Nephotettix virescens :* Ghosh *et al., State Fauna Series 7 : Fauna of Tripura* 2 : 329.

Material examined : 15exs : 5exs : Koshi, Dist. Almora; 18.ix.2003; B. Mitra & Party coll.; 10exs : Binsur, Dist. Almora; 2.ix.200; A. Bal & Party coll.

Diagnostic characters : Body shinning and smooth, a fine black line to anterior margin of vertex; in male, face with lateral transvers dark black line, in female without dark black line; tegmina in male with a discal black spot before middle, in female without discal black spot.

Length : 4 mm.

Distribution : India : Uttarakhand (Dists. - Almora, Bagheswar), Bihar, Manipur, Mizoram, Meghalaya, Orissa, Sikkim, Tripura, West Bengal.

Elsewhere : Ethiopian region, Indonesia, Japan, Korea, Malayasia, Palestine, Philippines, Singapore, Taiwan, Thailand.

Genus *Exitianus* Ball

1929. *Exitianus* Ball. Trans. *Amar. Ent. Soc.*, **55** : 5.

Key to the species of the Genus *Exitianus*

1. Vertex with an arcuated transverse black fascia between the eyes 2

   Vertex without an arcuated transverse black fascia between the eyes ..... *nanus*

2. Scutellum with a small black spot near each basal angle ..... *coronatus*

   Scutellum without a such small black spot near each basal angal ..... *indicus*

41. *Exitianus nanus* Distant

1908. *Athysanus nanus* Distant, *Fauna Brit. India, Rhynchota* **4** : 345.

1938. *Exitianus nanus* : Oman, *Kan. Univ. Sci. Bull.*, **24** : 383.

2004. *Exitianus nanus* : Ghosh & Ghosh, *State Fauna Series 10, Fauna of Manipur*, **2** : 273.

Material examined : 16 exs : 6exs : Binsur, Dist. Almora; 20.ix.2001; A. Bal & party coll; 5exs : Srinagar, Dist. Pauri Garwal; 14.ix.2000; G.C. Sen & Party coll.; 5exs : Jolly Grant, Dist. Dehra Dun; 18.ix.2000; G.C. Sen & Party coll.

Diagnostic characters : Vertex with a slender bow-like brownish red line between eyes; pronotum with two small pitchy black spots an anterior margin behind the eyes scutellum with a rounded black spot on each basal margin; tegmina hyaline, vein brown.

Length : 5 mm.

Distribution : India : Uttarakhand (Dists. - Almora, Pauri Garwal, Dehra Dun); Andhra Pradesh; Bihar; Himachal Pradesh; Manipur; Meghalaya; Orissa; Sikkim; Tamil Nadu; Tripura; West Bengal.

42. *Exitianus coronatus* (Distant)

1908. *Phrynomorphus coronatus* Distant, *Fauna Brit. India, Rhynchota*, **7** : 52.

1968. *Exitianus coronatus* : Metcalf, General *Catalogue of Homptera*. **X** : 324.

Diagnostic characters : Vertex with two small spots and a black transverse fascia between anterior margin of eyes; pronotum pale olivaceous; scutellum with a small black spot near each basal angle; tegmina olivaceous, its castal margin brownish.

Length : 4.5 mm.

Distribution : India : Uttarakhand, N.W. India.

Remarks : This species was not available in the present collection. It was recorded from Kumaoon by Distant (1918).

43. *Exitianus indicus* (Distant)

1908. *Athysanus indicus* Distant, *Fauna Brit. India, Rhynchota*, **4** : 344.

1938. *Exitianus indicus* : Oman, Kan. *Univ. Sci. Bull* **24** : 383.

2003. *Exitianus indicus* : Ghosh & Ghosh, *State Fauna Series 9, Fauna of Sikkim, Part* **2** : 450.

Material examined : 12 exs : 4exs : Mussaurie, Dist. Dehra Dun; 30.vi -3.vii.1930; B.N. Chopra coll; 5exs : Bhimtal, Dist. Nainital; 3exs : Ranikhet, Dist. Almora; 25.xi.2002; M. Prasad & Party coll.

Diagnostic characters : Vertex with a transverse black fasciae and a distinct longitudinal line a base; pronotum with more or less distinct piceous spots at base; scutellum with a transverse impression at apical area; tegmina grayish vein brownish; abdomen brown.

Length : 4.5 mm.

Distribution : India : Uttarakhand (Dists. - Dehra Dun, Nainital, Almora); Cheney; Manipur, Meghalaya; Mizoram; Orissa; Punjab; Sikkim; Tripura; Uttar Pradesh; West Bengal.

Elsewhere : China; Formosa.

SUMMARY

The paper presents an account of 43 species belonging to 28 genera distributed over 12

subfamilies and 12familiey of Cicadelloidea from Uttarakhand of these, 16 species Constitute new locality record from the state. Running key to various taxa, wherever applicable, is provided to easy identification Besides, reference to original literature, general diagnosis, geographical distribution of each species are incorporated. The paper is mainly based on the collections made by various survey parties of Zoological survey of India, as well as the named and earlier recorded species of the super family Cicadelloidea. A district wise distribution chart of the species has also been included in the present paper.

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REFERENCES

BALL, E.D. 1929. A supplemental revision of the genus Athysanus in North America (Homoptera : Cicadellidae). *Amer. Ent. Trans.*, **55** : 1-8.

BINDRA, O.S. And SINGH, JOGINDER. 1970. Biology and bionomic of Oronsius albcintus Distant. The Jassid vector of sesamum phyllody uirus. *Indian J. agric. Sci.*, **40**(4) : 340-365.

BURMEISTE, H.C.C. 1840. Rhynchota. No. 5. *Genera Insectorum insectorum inconibus illustravit et descripsit.* V. 1., pl. 7.

DATTA, B. 1989. On oriental Cicadellidae (Homoptera : Insecta). *Rec. zool. Surv. India, Occ. No.* **90** : 1-256.

DISTANT, W.L. 1908. *Fauna Brit. India, Rhynchota,* **iv** : 154-414.

DISTANT, W.L. 1916. *Fauna Brit. India, Rhynchota,* **vi** : 217-240.

DISTANT, W.L. 1918. *Fauna Brit. India, Rhynchota,* **vii** : 1-109.

FABRICIUS, J.C. 1803. Ryngota. Systema Rhyngotarum secundu ordines, genera, species adiectis synonymis, lodis, observationibus, descriptionbus, 314 p.

FIEBER, F.X. 186G6. Neue Gattungen und Arten in Homopteran (Cicadina Bur.). *Zool. Bot. Gesell.Wien. Verhandl.*, **16** : 497-516.

GERMAR, E.F.1821. Bermerkungen iiber einige Gattungen der Cicadarien. *Mag. Ent.*, **4** : 1-106.

GHAURI, M.S.K. 1963a. New fig leaf hopper (Homoptera : Cicadellidae) from India with redescription of allied species under new genera. *Ann. Mag. Nat. Hist.*, **6** : 465-75.

GHAURI, M.S.K. 1963. New mango leaf hopper from the oriental and Ausro oriental regions (Homoptera : Cicadelloidea) *Proc. R. Ent. Soc. London,* (B)**36** : (11-12) : 159-166.

GHAURI, M.S.K. 1974. New genera and species of Cicadelloidea (Homoptera : Auchenorrhyncha) from economic Plant in India, *Bull. Ent. Res.*, **63** : 551-559.

GHOSH, L.K. & GHOSH, M. 1994. Insects : Hemiptera : Cicadellidae Fauna of West Bengal, Part-5 (Insecta : Hemiptera). *Zool. Surv. of India, Calcutta* : 29-68.

KIRKALDY, G.W. 1900. On the nomenclature of the genera of the Rhynchota, Heteroptera, and Auchenorrhynchous Homoptera. *Entomologist* **33** : 25-28.

LETHIERRY, L.F. 1892. List d Hemipteres recoltes a Mahe (Inde) Par M. Em. Deschamps. *Soc. Zool.* de *France Bul.*, 207-210.

LEWIS, R.H. 1834. Description of some new genera of British Homoptera. *Roy. Ent. Soc; London, Tran.*, **1** : 47-52.

MATSUMURA, S. 1902. Monographie der Jassinen *Japan. Term. Fuzetek*, **25** : 353-404, 28 illus.

MELICHAR, L. 1926. Monographie der Cicadellinen III. *Mus. Nat. Hungarici Ann.*, **23** : 273-394.

METCALF, Z.P. 1963. *General Catalogue of the Homoptera* : 1-919.

METCALF, Z.P. 1965. *General Catalague of Homoptera Section* **I & II** : 1-1487.

PRUTHI, H.S. 1930. Studies on Indian Jassidae (Homoptera) Part I. Introductory and description of some new genera and species. *Mem. Indian Mus.*, **2**(I) : 1-68.

PRURHI, H.S. 1936. Studies on Indian Jassidae (Homoptera) Part II. Description of some new genera and species, with first records of some known species from India *Mem. Indian Mus. M*, **II**(1) : 101-131.

SIGNORET, V. 1879. Essai sur les Jassides stal, feeb et plus particulierement sur less Acocephalides puton re partie. *Soc. Ent de france Ann*, **9**(5) : 47-92, Pts 1-2.

SPINOLA, M. 1850. Tavola sinottica dei genera spettanti alla classe degli insetti artroidignate, flemiptera Linn. Latr-Rhyngota, Fab-Rhynchota, Burm *Soc. Ital. Modena Mem.*, **25**(1) : 1-60.

STAL, C. 1870, Hemiptera insularum philippinary Bidrag till philippinska oarnes Hemiptera-Fauna. *Svenska vetensk Akad ofversigt of Forhandl.*, **27** : 607-776, Pts.7-9 list of genera and species with description of new genera and species.

UHLER, P.R. 1896. Summary of the Hemiptera of Japan presented to the united states National Museum by professor Mitzukuri. *U.S. Natl. Mus. Proc.*, **19** : 255-297 (276-297) Description of new genera & species.

VIRAKTAMATH, C.A. & MOHAN, G.S. 2004., A revision of the deltocephaline leafhopper genus scaphoideus (Hemiptera : Cicadellidae) from the Indian Subcontinent. *Zootaxa*, **578** : 1-48.

Chart Showing Distribution of the Species of Cicadelldae Known From Diferent Districts of Uttarakhand

Name of species	Almorah	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragrah	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udhan singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. *Bolanusoides ornatus*	+	+			-	-	-		-	-	-	-	-
2. *Bolanosoides modesta*		+		-			-		-		-	-	-
3. *Bolanusoides heros*	+	-			-	-		-	-	-	-	-	-
4. *vangama steneossaura*	+	+	-		-	-	-		-		-	-	-
6. *Evacanthus repexus*	-	-	+		-		-				-	-	
7. *Marcopsis garuda*			+	-	-	-		-	-	-	-	-	-
8. *Durgades mirabilis*	+	-	-		-		-		-	-	-	-	-
9. *Agallia robusta*		-	+	-	-	-	-		-		-	-	-
10. *Saibanga bella*	-	-	+	-	-	-	-	-	-	-	-	-	-
11. *Bothrogonia leopardina*	-	-	+	-	-	-	-	-	-	-	-	-	-
12. *Bothrogonia ferru*		-	-	-	-	-	-	-	-	+	-	-	-
13. *Bothrogonia indistincta*	+	-	-	-	-	-	-	-	-	-	-	-	-
14. *atkinsoinella opponens*	+	-	-	-	-	-	-	-	-	-	-	-	-
15. *Kolla insignis*	+	-		-	-	-	-	-	-	-	-	-	-
16. *Cofana spectra*	-	+	-	-	-	-	-	-	-	-	-	-	-
17. *Cofana mimica*													
18. *Cofana animaculata*	+	+	-	-	-	-	-	-	-	-	-	-	-
19. *Sophonia linealis*	-	+	-	-	-	-	-	-	-	-	-	-	-
20. *Coelidia indica*	-	-	+	-	-	-	-	-	-	-	-	-	-
21. *Krisna strigicollis*	-	-	-	-	+	-	-	-	-	-	-	-	-
22. *Krisna straita*	+	-	-	-	-	-	-	-	-	-	-	-	-

Name of species	Almorah	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragrah	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udhan singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
23. *Drabescus angulatus*	+	-	-	-	-	-	-	-	-	-	-	-	-
24. *Betrachomorphus chlorophana*	+	-	-	-	-	-	-	-	-	-	-	-	-
25. *Betrachomorphus indicus*	-	-	-	-	-	-	-	-	-	+	-	-	-
26. *Hecalus pykulli*	+	-	-	-	-	-	-	-	-	-	-	-	-
27. *Hecalus albomaculatus*	-	-	+	-	+	-	-	-	-		-	-	-
28. *Hecalus porrects*	+	-	+	-	-	-	-	-	-	-	-	-	-
29. *Hecalus arcuatus*	+	-	-	-	+	-	-	-	-	-	-	-	-
30. *Penthimia maculoasa*	+	-	-		-	-	-	-	-	-	-	-	-
31. *Penthimia compacta*	+		-			-			-	-	-		-
32. *Neodartus acocephaloides*	-		+	-	+	-	-	-	-		-		
33. *Scaphoideus zhangi*	-	-	-	-	+	-	-		-		-	-	
34. *Deltocephalus infirmus*	+		-		-				-		-		-
35. *Paternus khewrensis*	-		-		-	+	-		-		-	-	-
36. *Viridomarsus capitalus*	-		-	-	-	+	-		-	-	-		-
38. *Goniagnathus punctifer*	+		+	-	-			-	-	-	-	-	
39. *Nephotettix nigropicta*	+		+	-		-	-		-	+	-	-	
40. *Nephotettix virescens*	+						-	-	-	+			-
41. *Exitianus nanus*	+		+		-	+		-			-		-
43. *Exitianus indicus*	+	+	+	-		-	-		-				

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Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 195-208.

INSECTA : HEMIPTERA : HOMOPTERA : CICADOIDEA

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INTRODUCTION

The Cicads are the homopteran insects belong to the family Cicadidae. They are well known for their shrill monotonous sound in the forest which is confined to the males only and is clearly of sexual nature. The group exhibits a remarkable variety in form, colouration and habits. About 1162 species belonging to 131 genera are so far known from the world (Metcalf 1963) of which about 206 species are known to occur in oriental region. A perusal of literature reveals that nearly 150 species are so far known from Indian subcontinent (Distant 1889, 1890, 1891, 1892, Kato 1932, Mathur 1953, Paiva 1917). Compilation of available data reveals that only 20 species under 14 genera are known from the state of Uttarakhand (Distant 1889, 1892,1916, Mathur 1953)

The present work is an attempt to provide a comprehensive account of 31 species under 17 genera of two families from Uttarakhand. Of this 6 species are reported for the first time from the state. The account deals with keys to various taxa, diagnostic character, distribution and literature references. The work is based on the recent collection made by different survey parties and also on the old collections housed in the National Zoological Collections in Z.S.I.

SYSTEMATIC ACCOUNT

Super Family CICADOIDEA
Family CICADIDAE
Subfamily TIBICENINAE
Genus ***Cryptotympana*** Stal

1. *Cryptotympana corva* Walker
2. *Cryptotympana intermedia* Signoret
3. *Cryptotympana acuta* Signoret

Genus ***Dundubia*** Amyot & Servile

4. *Dundubia helena* Distant

Genus ***Haphsa*** Distant

5. *Haphsa nicomache* Walker

Genus ***Gudaba*** Distant

6. *Gudaba maculata* Distant

Genus ***Rustia*** Stal

7. *Rustia dentivitta* Walker

Genus ***Oncotympana*** Stal

8. *Oncotympana obnubila* Distant
9. *Oncotympana melanoptera* Distant

Genus ***Pycna*** Amyot & Servile

10. *Pycna repanda* Linneus

Genus ***Platypleura*** Amyot & Serville

11. *Platypleura bufo* Walker
12. *Platypleura octoguttata* Fabricius
13. *Platypleura westwoodi* Stal
14. *Platypleura basialba* Walker
15. *Platypleura mackinnoni* Distant
16. *Platypleura polita* Walker

Genus ***Terpnosia*** Distant

17. *Terpnosia ransonetti* Distant
18. *Terpnosia clio* Walker
19. *Terpnosia ganesa* Distant
20. *Terpnosia maculipes* Walker

Genus ***Euterpnosia*** Matsumura

21. *Euterpnosia crowfooti* Distant

Subfamily CICADINAE
Genus ***Pomponia*** Stal

22. *Pomponia fusca* Olivier
23. *Pomponia surya* Distant
24. *Pomponia thalia* Walker

Subfamily GAEANINAE
Genus ***Meimuna*** Distant

25. *Meimuna cassondra* Distant

Genus ***Platylomia*** Stal

26. *Platylomia saturate* Walker

Genus ***Khimbya*** Distant

27. *Khimbya evanescens* Walker

Genus ***Gaeana*** Amyot & Serville

28. *Gaeana sulphurea* Hope

Family TIBICINIDAE
Subfamily TIBICININAE
Genus ***Lemuriana*** Distant

29. *Lemuriana apicalis* Germar

Genus ***Lycurgus*** China

30. *Lycurgus pomponia* (Distant)
31. *Lycurgus subvitta* (Walker).

Key to families and subfamilies of the Superfamily Cicadoidea

1. Tympanal covering present ..... CICADIDAE
– Tympanal covering absent ..... TIBICINIDAE
(Only one Subfamily Tibiciniae from India)

Key to Subfamilies of the Family CICADIDAE

1. Tympanal covering are completely exposed ..... TIBICENINAE
– Tympanal covering not completely exposed. 3
3. Tympana entirely concealing tympanal orifices ..... CICADINAE
– Tympana more or less incompletely exposed ..... GAEANINAE

Key to genera of the Subfamily TIBICENINAE

1. Opercula long, at least reaching centra, and sometimes apex of abdomen 2
– Opercula short, broad and transverse, not reaching to the abdomen 4
2. Metasternum elevated at middle and furnished with a posterior process directed backward ..... ***Cryptotympana***
– Metasternum not elevated, not provided with a posterior process 3
3. Front of head large and convex, about twice as broad at its base as its length of the anterior margin of the lobes of vertex ..... ***Dundubia***
- Front of head not large, short and not twice as broad as base of vertex ..... ***Haphsa***
4. Abdomen in male tuberculate beneath on second and third abdominal segment ..... ***Gudaba***
– Abdomen in male without tuberculate 5
5. Wings with five apical cells ..... ***Rustica***
– Wings with six apical cells 6
6. The length of head distinctly shorter than breadth between eyes ..... ***Octotympana***
- The length of head not distinctly shorter, more than half or equal breadth between eyes 7
7. Costal membrance of tegmina prominently arched at base and dilated ..... ***Pycna***
– Costal membrance of tegmina not prominently dilated not arched at base 8
8. Pronotum distinctly shorter than mesonotum, its lateral margin sinuate 9
– Pronotum not shorter, little longer than mesonotum, its lateral margin not sinuate, ampliated ..... ***Platypleura***
9. Tegmina more or less maculate, opercula short, transverse, usually extending beyond base of abdomen.
– Tegmina completely unspotted, rudimentary opercula ..... ***Euterponsia***

Family CICADIDAE
Subfamily TIBICENINAE
Genus ***Cryptotympana*** Stal 1861

1861. *Cryptotympana* Stal, *Ann. Soc. Ent. Fr.*, : 613.

Key to the species of the genus *Cryptotympana*

1. Tegmina with transverse veins at base of second and third apical areas infuscated 2
– Tegmina with transverse veins at base of second and third apical areas not infuscated ..... *Corvus*

2. Opercula in male about half as long as abodimen, their outer margin reflexed and their apical margin straight..... *intermedia*

– Opercula not half, more than half the length of abdomen, their outer margin concavely sinuate and their apical margin acutely angulate..... *acuta*

1. *Cryptotympana corva* (Walker)

1850. *Fidicina corvus* Walker, *List. Hom.*, I : 86.

1884. *Cryptotypana corva* : Atkinson., *Asiatic Soc. Bengal Jour.*, 53 : 210-233.

1889. *Cryptotympana corva* : Distant, *Monograph of Oriental Cicadidae*, : I : 1-48.

1963. *Cryptotympana corva* : Metcalf, *General Catalogue of Homoptera*, 8 : 346.

Material examined : 1 ex : Kumaon, Bhimtal, Dist. Nainital; IX.1906; L.L. Farmar.

Diagnostic characters : Two obconical spots on head; pronotum pilose; mesonotum with the outline of two obconical spots; thickly grayish pilose, tegmina with basal blackish colour and apical area infuscated; opercula about half as long as abdomen. Legs blackish, thickly pilose.

Length : 46 mm.

Distribution : India : Uttarakhand (Dist. Nainital; Assam; Tamil Nadu; West Bengal; Sikkim; Uttar Pradesh.

Elsewhere : Tonkin.

2. *Cryptotympana intermedia* (Signoret)

1849. *Cicada intermedia* Signoret, *Rev. Mag. Zool.*, : 402.

1906. *Cryptotympana intermedia* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 82.

1963. *Cryptotympana intermedia* : Met calf, *General Catalogue of Homoptera*, 8 : 357.

Diagnostic characters : Head truncate between the eyes; mesonotum with two obscure central obconical brownish spots; body cover thickly greyishly pilose; tegmina extreme basal area blackish; opercula about half as long as abdomen; legs with streaks.

Length : 43.5 mm.

Distribution : India : Uttarakahand (Dist. Dehra Dun); Bihar; Karnataka; Mizoram; West Bengal; Sikkim; Tamil Nadu.

Elsewhere : China; Japan; Java; Sri Lanka.

Remarks : The species was not available in the present collection. It was recorded by Signoret (1849) from Dehra Dun presently Uttarakhand.

3. *Cryptotympana acuta* signoret

1848. *Cicada acuta* Signoret, *Rev. Mag. Zool.*, 409.

1906. *Cryptotympana acuta* : Distant., *Fauna Brit. India, Rhynchota*, 3 : 83.

1963. *Cryptotympana acuta* : Metcalf, *General Catalogue of Homoptera*; 8 : 335.

Material examined : 2 exs. : Kumaon, Bhimtal, Dist. Nainital; 19.X.1906; N. Annandale coll.

Diagnostic characters : Head broad, transversely truncate; mesonotum with two obconical spots at central; a longer fascia as each side; tegmina hyaline, venation brownish, abdomen with a large greyishwhite fascia on each lateral area.

Length : 40 mm.

Distribution : India : Utarakhand (Dist. Nainital); Assam; West Bengal.

Elsewhere : Bhutan, China, Java, Hong Kong, Philippine Island; Malay States;

Genus *Dundubia* Amy. & Serv. 1843

1843. *Dundubia* Amy & Serv., *Hem.*, : 470.

4. *Dundubia helena* Distant

1912. *Dundubia helena* Distant, *A.M.N.H.*, (8)ix : 641.

1963. *Dundubia helena* : Metcalf, *General Catalogue of Homoptera*, 8 : 529.

Diagnostic characters : Head to front two apical spots present; lateral margin of pronotum distinct; tegmina hyaline, its venation brownish; opercula extended to sixth abdomin segments and their apices convexly ampliated.

Length : 35 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), North India.

Elsewhere : United Provinces.

Remarks : Specimens of this species were not available in the present collection. It was recorded from Dehra Dun by Distant (1912).

Genus ***Haphsa*** Distant 1905

1905. *Haphsa* Distant, *A.M.N.H.*,(7)15 : 64.

5. ***Haphsa nicomache*** (Walker)

1850. *Dundubia nicomache* Walker, *List. Hom.* 1 : 67.

1906. *Haphsa nicomache* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 99.

1963. *Haphsa nicomache* : Metcalf, *General Catalogue of Homoptera*, 8 : 573.

Diagnostic characters : Vertex with two large transverse spots on lateral margin; pronotum with two central black lines united posteriorly and mesonotum with three central lines united posteriorly, tegmina hyaline, its venation fuscous; abdomen black.

Length : 26 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Assam; Karnataka; Northern India; Northern Bengal; Sikkim; Uttar Pradesh.

Remarks : The species was recorded from Dehra Dun by Walker (1850).

Genus ***Gudaba*** Distant. 1906

1906. *Gudaba* Distant, *Fauna Brit. India, Rhynchota*, 3 : 138.

6. ***Gudaba maculata*** Distant

1912. *Gudaba maculata* Distant, *A.M.N.H.*, (8)x : 439.

1963. *Gudaba maculata* : Metcalf, *General Catalogue of Homoptera*, 8 : 499.

Diagnostic characters : Head with two longitudinal black fasciae on apex to front, pronotum with two central longitudinal black fascia and a spot behind each eye; mesonotum with two a central black longitudinal lines; tegmina hyaline, venation brownish, tegmina with a sublateral series of marginal fuscous spots; abdomen, with a basal black spots.

Length : India : Uttarakhand (Dist., Dehra Dun); Northern India; Sikkim.

Remarks : Since Distant (1912) recorded this species from Dehra Dun, it has been included in the present faunal studies.

Genus ***Rustia*** Stal 1866

1866. *Rustia* Stal, *Hem. Afr.*, iv : 8.

7. ***Rustia dentivitta*** (Walker)

1862. *Cicada dentivitta* Walker, *Journ. Ent.*, 1 : 304.

1906. *Rustia dentivitta* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 125.

1963. *Rustia dentivitta* : Metcalf, *General Catalogue of Homoptera*, 8 : 485.

Diagnostic characters : Vertex with a fascia on each side of front, pronotum with a longitudinal black fascia and an oblique black fasia; mesonotum with two united obconical black spots; tegmina hyaline, and with single apical spots.

Length : 13 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Assam; Karnataka; North Bengal; Uttar Pradesh.

Elsewhere : Cambodia; Indochina; Myanmar.

Remarks : Since specimens of this species was recorded from Dehra Dum by Walker (1862)., it has been included in the present work.

Genus ***Oncotympana*** Stal 1870

1870. *Oncotympana* Stal, *Ofv. Vet.-Ak. Forh.*, : 710.

Key to the species of the genus *Oncotympana*

1. Head (including eyes) narrower than base of mesonotum; rostrum considerably passing the posterior coxae ..... ***obnubila***
- Head (including eyes) not narrow, about as wide as base of mesonotum; rostrum considerably passing third abdominal segments ..... ***melanoplera***

8. ***Oncotympana obnubila*** Distant

1888. *Pomponia obnubila* Distant, *A.M.N.H.*, (6)1 : 296.

1906. *Oncotympana obnubila*: Distant, *Fauna Brit. India, Rhynchota*, 3 : 117.

1963. *Oncotympana obnubila* : Metcalf, *General Catalogue of Homoptera*, 8 : 516.

Diagnostic characters : Vertex with a transverse black fascia between eyes; pronotum with a broad black central fascia; tegmina hyaline, its venation fuscous; covered with finely greyishly pilose.

Length : 30 mm.

Distribution : India : Uttarakhand (Dist. Tehri Garwal); Punjab; Uttar Pradesh.

Remarks : Distant (1906) recorded this species from Tehri Garwal Dist. of Uttarkhand.

9. ***Oncotympana melanoptera*** (Distant)

1904. *Pomponia melanoptera* Distant, *Tr. E. S.*, : 672

1906. *Oncotympana melanoptera* Distant, *Fauna Brit. India, Rhynchota*, **3** : 119.

1963. *Oncotympana melanoptera* : Metcalf, *General Catalogue of Homoptera*, **8** : 515.

Diagnostic characters : Vertex with a black triangular spot at anterior margin; pronotum with two longitudinal waved black fascial, mesonotum with two sets of central obconical spots, tegmina hyaline, its basal venation oliveous, pitchy black; abdomen with few obscure black spots above.

Length : 20.5 mm

Distribution : India : Uttarakhand (Dist. Dehra Dun); Karnataka; Uttarpradesh.

Remarks : This species was recorded by Distant (1906) from Dehra Dun.

Genus ***Pycna*** Amyot and Serville. 1843

1843. *Pycna* Amyot & Serville, Hem. : 463.

10. ***Pycna repanda*** (Linneus)

1767. *Cicada repanda* Linne, *Syst. Nat.* **1,2** : 707.

1906. *Pycna repanda* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 71.

1963. *Pycna repanda* : Metcalf, *General Catalogue of Homoptera*, **8** : 222.

Material examined : 18 exs : 5 exs. : Uttarkhasi, F.R.H., Dist. Uttarkhasi; 11.x.2001; S.K. Mandal coll.; 2 exs: Ukhimath, Dist. Rudraprayag; 8.x.04; P. Mukherjee coll.; 3 exs. : Ranikhet, Dist. Almora; 29.ix.2001; A. Bal & Party coll.; 4 exs : Ramgarh Dist. Nainital; 8.x.2004; M. Ghosh & Party Coll.; 4 exs. : Binshar Dist. Almora; 27.ix.58; B.S. Lamba & Party coll.

Diagnostic characters : Vertex with a transverse black fascia and some black spots between eyes; pronotum with a central longitudinal black fascia widened posteriorly; mesonotum with four obconical spots, of four these fasciae; head and body covered with thickly yellowishly pilose; tegmina basal half opaque, and two spots on costal membrane, two in radial cells and one beneath its apex and a large irregular fascia; abdomen cover yellowish pilose; legs with dark spots.

Length : 22 mm.

Distribution : India : Uttarkhand (Dist. almora, Rudraprayag, Nainital), Assam; North India; Meghalaya, Sikkim.

Genus ***Platypleura*** Amyot & Serville

1843. *Platypleura* Amyot & Serville, *Hem.*, : 465.

Key to the species of the genus *Platypleura*

1. Breadth between pronotal angles greater than space between apex of head and base of cruciform elevation ..... *bufo*
– Breadth between pronotal angles not greater than equal to space between apex of head and base of cruciform elevation 2
2. Tegmina and wings hyaline but base areas of both more or less opaque 3
– Tegmina and wings not hyaline, with the base of first and the whole of second areas opaque 4
3. Rostrum reaching base of abdomen .... *octogullata*
– Rostrum reaching not base of abdomen, just passing posterior coxae ..... *westwoodi*
4. Pronotal margins medially angularly produced 5
– Pronotal margin ampliated, not medially angularly produce ..... *basialba*
5. Tegminal extreme basal area and basal third piceous spots and streaked ..... *mackinnoni*
– Tegminal not basal area, extreme apical area fuscous brown spots ..... *polita*

11. ***Platypleura bufo*** (Walker)

1850. *Oxypleura bufo* Walker, *List Hom.*, **1** : 27.

1906. *Platypleura bufo* : Distant, *Fauna Brit. India, Rhynchuta*, 3 : 59.

1963. *Platypleura bufo* : Metcalf, *General Catalogue of Homoptera*, **8** : 88.

Material examined : 1 ex. : Kumaon, Naukuchiyatal; Dist. Nainital; 5.x.2004; M. Ghosh & Party Coll.

Diagnostic characters : Vertex with two broken black fasciae; pronotum with two central black lines; mesonotum with two small obconical purplish brown spots; tegmina hyaline, its venation brownish.

Length : 29 mm.

Distribution : India : Uttarakhand (Dist. Nainital); Eastern India.

12. *Platypleura octoguttata* (Fabricius)

1798. *Tettigonia octoguttata* Fabricius, *Ent. Syst. Suppl.*, **22-23** : 515.

1906. *Platypleura octoguttata*: Distant, *Fauna Brit. India, Rhynchota*, **3** : 67.

1963. *Platypleura octoguttata* : Metcalf, *General Catalogue of Homoptera*, **8** : 81.

Material examined : 3 exs. : 1 ex. : Naukuchiya tal, Dist. Nainital; 5.x.04; M. Ghosh & Party coll.; 1 ex. : Kotbhramari, Dist. Bageshwar; 29.ix.2004; M. Ghosh & party coll.; 1 ex. : Mussooree, Dist. Dehra Dun; Distant coll.

Diagnostic charcters : Vertex with a transverse black fascia a black spot behind eyes; pronotum with small two black spots at central area; mesonotum with four large obconical black spots; tegmina basal area opaque, with brownish spots, a broad transverse fascia; abdomen covered with grayish pilose.

Length : 25 mm.

Distribution : India : Uttarakhand (Dist. Nainital, Bageshwar, Dehra Dun.); Karnataka,; Maharastra; North Bengal; Orissa; Rajasthan; Tamil Nadu, Uttar Pradesh.

Elsewhere : Sri Lanka.

13. *Platypleura westwoodi* Stal

1863. *Platypleura westwoodi* Stal, *Tr. E.S.*, (3)**1** : 571.

1906. *Platypleura westwoodi* : Distant, *Fauna Brit. India Rhynchota*, **3** : 64.

1963. *Platypleura westwoodi* : Metcalf, *General Catalogue of Homoptera*, **8** : 61.

Material examined : 1 ex. : Kausani, Dist. Almora; 2.x.2001; Animesh Bal & Party coll.

Diagnostic characters : Body covered with grayish pilose, vertex with a narrow black fascia between eyes; pronotum with two small black spots at centra; mesonotum with four obconical black spots, tegmina semihyaline, basal area three fuscous spots present, a broad curved brown fascia crossing beyond cell and a large triangular patch at outer margin fuscous spots present; abdomen cover with grayish pilose.

Length : 25 mm.

Distribution : India : Uttarakhand (Dist. Almora).

Elsewhere : Sri Lanka.

14. *Platypleura basialba* (Walker)

1850. *Oxypleura basialba* Walker, *List. Hom.*, **I** : 26

1906. *Platypleura basialba* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 62.

1963. *Platypleura basialba* : Metcalf, *General Catalogue of Homoptera*, 8 : 71.

Diagnostic characters : Vertex with a narrow fascia at anterior margin between eyes; pronotum with two black line at central area; mesonotum with four obconical black spots; tegmina hyaline, a brown fascia present; abdomen covered with strongly grayish pilose.

Length : 21 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); North Bengal; Uttar Pradesh; West Bengal.

Remarks : No specimen was available for the Present study. Walker (1850) was recorded this species from Dehra Dun of Uttarakhand.

15. *Platypleura machinnoni* Distant

1904. *Platypleura mackinnoni* Distant, *Tr. E.S.*, : 667.

1906. *Platypleura mackinnoni* Distant, *Fauna Brit. India, Rhynchota*, **3** : 60.

1963. *Platypleura mackinnoni* : Metcalf, *General Catalogue of Homoptera*, **8** : 93.

Diagnostic characters : Vertex with a broad fascia between the eyes; pronotum with a reddish central longitudinal fasia at basal area; mesonotum with brownish fused spot at basal area; tegmina pale talc like and venation brownish.

Length : 25 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), Bihar; Karnataka; North Bengal; Uttar Pradesh.

Remarks : This species was recorded by Distant (1906) from Dehra Dun of Uttarakhand.

16. *Platypleura polita* (Walker)

1850. *Oxypleura polita* Walker, *List. Hom.*, I : 29.

1906. *Platypleura polita* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 61.

1963. *Platypleura polita* : Metcalf, *General Catalogue of Homoptera*, 8 : 94.

Material examined : 1 ex. : Kumaon, Dist. Nainital; 4-6.v.1913; R. Hodgart coll.

Diagnostic characters : Vertex with a broken black fascia between eyes; pronotum with two central black spots; mesonotum with four obconical black spots; tegmina hyline, venation, costal membrane and apical area, other spots reddish brown;

Length : 12.5 mm.

Distribution : India : Uttarakhand (Dist. Nainital); Kerala; Maharastra; Tamil Nadu.

Genus *Terpnosia* Distant 1892.

1892. *Terpnosia* Distant, *A.M.N.H.*, (6)ix : 325.

Key to the species of the genus *Terpnosia*

1. Opercula in male extending beyond base of abdomen, their apices rounded 2
- Opercula in male not extending beyond base of abdomen, their apices not rounded .... *ransonetti*
2. Tegmina completely unspotted 3
- Tegmina spotted at base, but not at marginal area ..... *elio*
3. Abdomen with dark longitudinal and broader fasciae and small black central spots present ..... *ganesa*
- Abdomen without such fascia and spots .... *maculipes*

17. *Terpnosia ransonetti* (Distant)

1888. *Pompania ransonetti* Distant, *A.M.N.H.*, (6)I : 372.

1906. *Terpnosia ransonetti* : Distant, *Fauna Brit. India., Rhynchota*, 3 : 128.

1963. *Terpnosia ransonetti* : Metcalf, *General Catalogue of Homoptera*, 8 : 442.

Diagnostic characters : Vertex with two converging black lines to fronts and a small spot at posterior margin; pronotum with two black central longitudinal lines united anteriorly and posteriorly; mesonotum with a central longitudinal fasia widened at base; tegmina hyaline, its venation brownish, tegmina with small spots at basal area, and a margine series of reddish brown spots at apices.

Length : 22 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Karnataka; Uttar Pradesh.

Elsewhere : Indochina; Sri Lanka; Colombo.

Remarks : No specimen was available for the present study, but it was recorded by Distant (1906) from Dehra Dun.

18. *Terpnosia clio* (Walker)

1850. *Dundubia clio* Walker, *List Hom.*, I : 73.

1906. *Terpnosia clio* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 129.

1963. *Terpnosia clio* : Metcalf, *General Catalogue of Homoptera*, 8 : 433.

Diagnostic characters : Vertex with a black spot at its anterior angles, and a central apical spot to front; pronotum with two central black faciae united anteriorly and posteriorly; mesonotum with a central longitudinal spear shaped fascia; tegmina hyaline, venation dark brown with a black spots;.

Length : 19 mm.

Distribution : India : Uttarakhand (Dehra Dun); Karnataka; Sikkim, Uttarpradesh. Elsewhere: China; Indochina; Tenasserim.

Remarks : Walker (1850) recorded this species from Dehra Dun of Uttarakhand. Therefore, it has been incorporated in the present study.

19. *Terpnosia ganesa* Distant

1904. *Terpnosia ganesa* Distant, *Tr. E.S.*, : 675.

1906. *Terpnosia ganesa* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 131.

1963. *Terpnosia ganesa* : Metcalf, *General Catalogue of Homopetra*, **8** : 434.

Diagnostic characters : Vertex with an black oblique line at its lateral area; pronotum with central black longitudinal fascia and a black spot on each side; mesonotum with an obconical spots; tegmina hyaline and spotted at apical area;

Length : 26 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Karnataka; Uttarpradesh.

Remarks : No material was available in present study from Uttarakhand. Distant (1904) was recorded from Dehra Dun of Uttarakhand.

20. *Terpnosia maculipes* (Walker)

1850. *Dundubia maculipes* Walker, *List Hom.*, **I** : 70.

1906. *Terpnosia maculipes* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 131.

1963. *Terpnosia maculipes* : Metcalf, *General Catalogue of Homoptera*, **8** : 435.

Diagnostic characters : Vertex with a linear spots at anterior margins; pronotum with two linear black fasciae united posteriorly; mesonotum with a central longitudinal black fascia, on each side; tegmina hyaline, venation dark brown, a series of small dark brown spots at margin near apical area; legs brownish yellow, femora with spines and coxal spots present; abdomen covered with pilose.

Length : 28 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Karnataka; West Bengal.

Elsewhere : Myanmar.

Remarks : The species was not available for present study. Diagnostic charcters and distribution have been included hereafter consulting Distant (1906) and Walker (1850). Distant and Walker had recorded it from Dist. Dehra Dun.

Genus *Euterpnosia* Matsumura 1917

1917. *Euterpnosia* Matsumura, *Nat. Hist. soc. Trans.*, **6** : 202.

21. *Euterpnosia* crowfooti (Distant)

1912. *Terpnosia crowfooti* Distant, *A.M.N.H.*, (S)x : 439.

1932. *Euterpnasia crowfooti* Kato, *Monograph of Cicadidae* : 160.

1963. *Euterpnosia crowfooti* : Metcalf, *General Catalogue of Homoptera*, **8** : 452.

Material examined : 3 exs : Bhimtal, Dist. Nainital; 7.ix.2005; S.K. Chatterjee & Party coll.

Diagnostic characters : Vertex with its anterior margin a black line to front; pronotum with two curved longitudinal black lines; mesonotum with a central longitudinal black line; tegmina hyaline, its venation and costal membrane reddish brown; abdomen covered with grayish pilose.

Length : 20 mm.

Distribution : India : Uttarakhand (Dist. Nainital); Sikkim; West Bengal.

Elsewhere : Indochina.

Subfamily CICADINAE
Genus *Pomponia* Stal 1866

1866. *Pomponia* Stal, *Hem. Afr.* IV. 6

Key to the species of the genus *Pomponia*

1. Tegmina maculate and marginally spotted ... . *fusca*
– Tegmina almost immaculate, only bases of second and third apical areas infuscate 2
2. Opercula with outer margin stronghly, oblique, apical margins subtruncate, apices broadly and moderately convex ..... *thalia*
– Opercula with outer margin not oblique, short, longitudinally placed, apices broadly concave ..... *surya*

22. *Pomponia fusca* (Olivier)

1790. *Cicada fusca* Olivier, *Enc. Meth.* V, : 749.

1906. *Pomponia fusca* : Distant, *Fauna of Brit. India, Rhynchota*, **3** : 111.

1963. *Pomponia fusca*: Metcalf, *General Catalogue of Homoptera*, **8**(II) : 845.

Material examined : 1 ex. : Sonari, Dist. Almora; 21.ix.03; B. Mitra & Party coll.

Diagnostic characters : Vertex with an irregular central fascia enclosing ocelli; eyes; pronotum with a broad central longtitudinal black fascia, mesonotum with a central large obconical spots tegmina hyaline, venation infuscated and marginal series of small blackish red spots at apical area; legs spotted; abdomen covered with grayish pilose.

Distribution : India : Uttarakhand (Dist. Almora); Assam; Bangladesh; Tamil Nadu.

Elsewhere : China, Japan; Java; Malacca; Malay Peninsula; Mayanmar; New Guinea; Singapore.

23. *Pomponia surya* Distant

1904. *Pomponia surya* Distant, *Tr. E.S.*, : 671.

1906. *Pomponia surya* Distant, *Fauna Brit. India, Rhynchota* 3 : 115.

1963. *Pomponia surya* : Metcalf, *General Catalogue of Homoptera,* **8** : 853.

Material examined : 2 exs. : Mussooree, Dist. Dehra Dun, 1ex. : Rishikesh, F.R.H. Campus, Dist. Teheri Garwal; 19.5.2001; S.K. Chakraborty & Party coll.

Diagnostic characters : Vertex with an apical black spot to front; pronotum with two central longitudinal pitchy red fasciae widened anteriorly and posteriorly; tegmina hyaline, venation blackish red and apical area infuscated; abdomen covered with greyish pilose.

Length : 24 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Teheri Garwal), Karnataka.

24. *Pomponia thalia* (Walker)

1850. *Dundubia thalia* Walker, *List Hom.*, **I** : 72.

1906. *Pomponia thalia*: Distant, *Fauna Brit. India, Rhychota* **3** : 114.

1963. *Pomponia thalia* : Metcalf, *General Catalogue of Homoptera,* **8**(II) : 853.

Diagnostic characters : Vertex with anterior portion striation; transversely to front; pronotum with two central black fasciae united anteriorly and posteriorly; mesonotum with central longitudinal fasciae on each side, tegmina hyaline, venation dark brown and a black spot.

Length : 24 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Assam; Karnataka; Sikkim; West Bengal.

Elsewhere : Borneo; British India; China; Java; Tibet.

Remarks : This species was not available for present study. Walker (1850) recorded from Dehra Dun that is presently in Uttarakhand.

Subfamily GAEANINAE

Key to the genera of the subfamily Gaeaninae

1. Head about as long as breadth between eyes 2
   – Head distinctly shorter than breadth between eyes ..... ***Meimuna***
2. Opercula elongate, concavely sinuate their apices rounded, extending lateral abdominal area ..... ***Platylomia***
   – Opercula short and transverse, not extending beyond base of abdomen 3
3. Pronotum distinctly shorter than mesonotum; front not prominent ..... ***Khimbya***
   – Pronotum not distinctly shorter than mesonotum front prominent, porrectly produced ..... ***Gaeana***

Genus *Meimuna* Distant 1905

1905. *Meimuna* Distant, A.M.N.H., (7)**xv** : 67.

25. *Meimuna cassandra* Distant

1912. *Meimuna cassandra* Distant, *A.M.N.H.*, (8)**ix** : 642

1916. *Meimuna cassandra* Distant, *Fauna Brit. India Rynchota,* **6** : 6.

1963. *Meimuna cassandra* : Metcalf, *General Catalogue of Homoptera,* (I) : 649.

Material examined : 1 ex. : Dist. Nainital; v.vi.1893; Luck Mus. Coll.

Diagnostic characters : Vertex with yellow spot at anterior margin; pronotum covered with thick pilose, and a broad central black fascia widened anteriorly and posteriorly; mesonotum with two obconical black spots at margin; tegmina hyaline, its venation infuscated; abdomen covered with pilose.

Length : 19 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun) : United provinces.

Remark : Specimen of this species was not present in present study. Distant (1916) was recorded from Dehra Dun.

Genus *Platylomia* Stal 1870

1870. *Platylomia* Stal, *Ofr. Vet. A.K. Forth.*, : 708.

26. ***Platylomia saturata*** (Walker)

1858. *Dundubia saturata* Walker, *List. Hom. Supl.* : 6.

1906. *Platylomia saturata* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 105.

2003. *Platylomia saturate* : M. Ghosh & L.K. Ghosh, *State Fauna Series, 9, Fauna of Sikkim*, **2** : 463.

Material examined : 4 exs. : 1 ex. : Raniket, Dist Almora; 22.ix.03; B. Mitra & Party coll. 3 exs. : Khiracat, Dist. Bageshwar, 29.ix.05; S.K. Chatterjee & Party coll.

Diagnostic characters : Front sometime globely produced; pronotum with two longitudinal black fasciae; mesonotum with two black longitudinal fasciae connected with two black fused spots; tegmina olive green tinge, its venation reddish and a series of marginal spots at apical area; abdomen with lateral area brownish pilose.

Length : 44 mm.

Distribution : India : Uttarakhand (Dist. Almora and Bageshwar), Assam; Nagaland; Sikkim; Uttarpradesh; West Bengal.

Elsewhere : Indonesia; Malaya peninsula; Nepal.

Genus ***Khimbya*** Distant 1905

1905. *Khimbya* Distant, *A.M.N.H.*, (7)**xv** : 307.

27. ***Khimbya evanescens*** (Walker)

1858. *Dundubia evanescens* Walker, *Ins. Saund., Hom.*, : 6

1906. *Khimbya evanescens* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 139.

1963. *Khimbya evanescens* : Metcalf, *General Catalogue of Homptera*, **8 II** : 670.

Diagnostic characters : Vertex with some striation to front; pronotum with central two longitudinal black fasciae united posteriorly, mesonotum with central longitudinal fascia; tegmina hyaline, its venation brownish, tegmina with a series brownish spot at apieces; abdomen covered with grayish pilose.

Length : 20 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Myanmar; North China.

Remarks : Since Distant (1905) was recorded this species from Dehra Dun it has been included in the present study.

Genus ***Gaeana*** Amyot and Serville

1843. *Gaeana* Amyot and Serville; *Hem.*, : 463.

28. ***Gaeana sulphurea*** (Hope)

1839. *Cicada sulphuria* Hope, *Royle's Illustr. Bot. Himal. Introd.*, **x** : 2.

1906. *Gaeana sulphurea* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 147.

2003. *Gaeana sulphurea* : Ghosh, M. & Ghosh, L.K., *State Fauna Series 9, Fauna of Sikkim* **2** : 465.

Diagnostic characters : Lateral margin of vertex reaching beyond the inner margin of eyes; pronotum with two brownish oblique spot on each side; mesonotum with four transverse linear brownish spots; tegmina with a reddish fascia crossing meddle;.

Length : 36 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Sikkim; West Bengal.

Elsewhere : Nepal.

Remarks : Dut to non-availability of the specimen this species could not be examined. Hope (1839) recorded this species from Dehra Dun.

Family TIBICINIDAE
Subfamily TIBICININAE

Key to genera of the Subfamily Tibicininae

1. Head including eyes broader than base of mesonotum; head with the front prominent . ..... ***Lemuriana***

– Head including eyes not broader, narrower than base of mesonotum; head with the front not prominen ..... ***Lycurgus***

Genus ***Lemuriana*** Distant 1905.

1905. *Lemuriana* Distant, *A.M.N.H.*, (7)**xvi** : 32.

29. ***Lemuriana apicalis*** (Germar)

1830. *Cicada apicalis* Germar, *Thon's Arch.* Ii : **2** : 44.

1906. *Lemuriana apicalis* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 167.

1963. *Lemuriana apicalis* : Metcalf, *General Catalogue of Homoptera*, **8**(2) : 230.

Diagnostic charcter : Front with a brownish spot; pronotum with a central black fascia;

mesonotum with three obconical black spots; tegmina hyaline; tegmina with a reddish spot at apical area; abdomen, covered with grayish pilose, and with white tomentose spot at lateral margin.

Length : 17 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); Karnataka; Maharastra; West Bengal.

Elsewhere : Indochina.

Remarks : The specimen was not available for present study. Germar (1830) was recorded from Dehra Dun.

Genus ***Lycurgus*** China 1925

1925. *Lycurgus* China, *Ann. And Mag. Nat. Hist.*, (9)16 : 449-485.

Key to the species of the genus *Lycurgus*

1. Tegmina and wings considerably immaculate; tegminal area longer and basal cell distinctly broader ..... *pomponia*

– Tegmina and wings distinctly maculate and fasciate; tegminal area not longer and broader ..... *subvitta*

30. ***Lycurgus pomponius*** (Distant)

1912. *Quintilia pomponia* Distant, *A.M.N.H.* (8)ix : 646.

1932. *Lycurgus pomponia* Kato, *Monograph of Cicadidae*, : 178.

1963. *Lycurgus pomponia* : Metcalf, *General Catalogue of Homoptera*, 8(2) : 172.

Diagnostic charcters : Vertex with some obscure yellow spots at anterior margin of front; pronotum covered with thickly pilose, pronotum with a central black broad fascia widened anteriorly and posteriorly; mesonotum with two obconical spots at margin; tegmina hyaline, with a spot near middle of lower vein; abdomen and covered with pilose.

Length : 19 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun);

Remarks : Due to non availability of the specimen, this species could not be examined. Distant (1912) was recorded this species from Dehra Dun.

31. ***Lycurgus subvitta*** (Walker)

1850. *Cicada subvitta* Walker, *List. Hom.*, I : 222.

1906. *Quintilia subvitta*, Distant, *Fauna Brit. India, Rhynchota*, 3 : 169.

1953. *Lycurgus subvitta* Kato, *Monograph of Cicadidae*, 178.

1963. *Lycurgus subvitta* : Metcalf, *General Catalogue of Homoptera*, 8(2) : 173.

Material examined : 1 ex. : Dist. Nainital; v-vi.1893; Lucknow Mus. Coll.

Diagnostic characters : Vertex with a small black spot at lateral margin and a central spot at base ; pronotum with a central longitudinal fascia at anterior and posterior margin; mesonotum with two central obconical spots; tegmina hyaline with a short fascia crossing apex of radial area and maculately continued to apex; legs with spots and streak.

Length : 16 mm.

Distribution : India : Uttarakhand (Dist. Nainital and Dehra Dun); Karnataka; Sikkim; West Bengal.

Elsewhere : China.

SUMMARY

The paper present an account of 31 species under 17 genera belonging to four subfamilies of two families of the superfamily Cicodelloidea from the State of Uttarakhand. Six species have been recorded for the first time from the State. Suitable Taxonomic keys to various texa, have been provided for easy identification. Besides, taxonomic synonyms, diagnostic characters and geographical distribution of each species have been given. The paper is mainly leased on the collections made by various survey parti3s of Zoological Survey of India, as well as the named and earlier recorded species of the superfamily Cicadoidea. A districtwise distributional chart of the studied species has also been included in the present paper.

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REFERENCE

AMYOT, C.J., AND J.G.A. SERVILLE, 1843. Deuxieme partie Homopteres. Homoptera latr Histoire Naturelle des Insectes. Hemipteres i-Ixxvi; 1-676.

ATKINSON, E.T., 1884. Notes on Indian Rhynchota, No. 1 *Asiatic Soc. Bengal Jour.,* **53** : 210-233.

DISTANT, W.L. 1904. Rhynchotal notes.–XXVI *Ann. And Mag. Nat. Hist.,* (7)**14** : 293-303.

DISTANT, W.L. 1906. *Fauna Brit India Rhychota including Ceylon and Burma.,* **3** : 1-503.

DISTANT, W.L. 1916. Rhynchota. Homoptera : *Fauna brit. India, Rhynchota including Ceylon and Burma,* **6** : 1-248.

FABRICIUS, J.C. 1798. Ryngota. Os Rostro : Vagina articulate. *Supplementum Entomologiae Systematica* : 511-524.

GERMAR, E.F. 1830. Species cicadarium enumeratae et sub genera distributae. *Thon's Ent. Arch.* **2**(2) : 1-8.

KATO, M. 1932. *Monograph of Cicadidae* : 1-450

LINNAEUVS, C. 1767. Hemiptera. Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis. *Editio duodecima, reformate,* **1**(2) : 533-1327.

METCALF, Z.P. 1963. *General catalogue of Homoptera. Fascicle,* **8** : 1-865

SIGNORET, V. 1849. Description de quelques Cigalas Voisines de la cicada atrata, Fab. And 3 species of Cicada with 1 new. *Zool. Rev. Mag.,* **1** : 406-410.

STAL, C. 1861. Miscellanea hemopterologica. *Stettin Ent. Ztg.,* **22** : 129-153.

WALKER, F. 1850. List of the specimens of Homopterous insects in the collection of British Museum, **1** : 1-260.

Chart showing the distribution of the species of cicadoidea known from different Districts of Uttarakhand

Name of the Districts	Almora	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udham singh Nagar
Name of the species	1	2	3	4	5	6	7	8	9	10	11	12	13
1. *Cryptotympana corva Walker*		+	-		-								
2. *Cryptotympana intermedia (Sign.)*	-	-	+										
3. *Cryptotympana acuta (Sign.)*	-	+	-		-		-						
4. *Dudubia Helena Distant*	-	-	+	-	-	-							
5. Haphsa nicomache (Walker)	-	-	+	-		-				-			
6. *Gudaba maculata Distant*	-		+		-	-	-						
7. *Rustia dentivitta (Walker)*	-	-	+										
8. *Oncotympana obnubita Distant*	-					+							
9. *Oncotympana melanoptera (Dist.)*		-	+	-						-			
10. *Pycna reanda(Linn.)*	+	+	-	-	-			+	+				
11. *Platypleura bufo(Walker)*	-	+	-	-									
12. *Platypleura octoguttata (Fabr.)*	-	+	+	-									
13. *Platypleura westwoodi Stal*	+	-											
14. *Platypleura basialba (Wakler)*	-		+										
15. *Platypleura mackinnoni Distant*	-	-	+										
16. *Platypleura polita (Walker)*	-	+	-										
17. *Terpnosia ransonetti (Distant)*	-		+										
18. Terpnosia cliop (walker)													
19. *Terpnosia genesa Distant*	-		+										

Name of the Districts	Almora	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udham singh Nagar
Name of the species	1	2	3	4	5	6	7	8	9	10	11	12	13
20. *Terpnosia maculipes (Walker)*			+										-
21. Euterpnosia crowfooti (Distant)		+	+										
22. *Pomponia fusca (Olivera)*	+										-		-
23. *Pomponia surya Distant*			+								-		
24. Pomponia thalia (Walker)			+										
25. Meimuna cassandra Distant			+						-	-	-		
26. *Platylomia saturata Waker*	+	+											-
27. *Kimbya evanescens (Walker)*	+												
28. *Gaeana sulphurea (Hope)*		+	+						-			-	-
29. *Lemuriana apicalis (Germer)*		+									-	-	
30. *Lycurgus pomponius (Distant)*			+									-	
31. Lycurgus subvitta Distant			+										

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INSECTA : HEMIPTERA : HOMOPTERA : FULGOROIDEA

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INTRODUCTION

The hemipteran insects which are belonging to the superfamily Fulgoroidea usually known as "Lantern flies" They are principally characterized by reticulated anal area of fore wings. The group exhibits a remarkable variety in form, brilliant coluorations and specific habits. These super families of homopteran insects are abundant in tropical regions. A perusal of literature reveals that about 430 species of Fulgoroidea are known from India and about 6600 species from the world. In India, earlier contributions are made by Distant (1906, 1916, 1912), Paiva (1918), Menon and Prasad (1962), Chopra (1976), Dutta and Ghosh (1979). Compilation of available data of the earlier work reveals that only seven species under seven genera are known from Uttarakhand (Distant 1911, 1918, Mathur 1953). The present work is an attempt to provide a comprehensive account of 18 species under 18 genera in nine families from Uttarakhand, of which five species are reported for the first times from the state.

The paper provides keys to various texa, diagnostic characters, distribution and literature reference.

The paper is based on the recent collection made by different survey parties and also on the old collection housed in the National Zoological Collection of Zoological Survey of India, Kolkata.

SYSTEMATIC ACCOUNT

Super Family FULGOROIDEA
Family FULGORIDAE
Genus ***Laternaria*** Linneus

1. *Laternaria clavata* Westwood

Genus ***Saiva*** Distant

2. *Saiva virescens* Westwood

Genus ***Polydictya*** Guer

3. *Polydictya tricolor Westwood*

Genus ***Limois*** Stål

4. *Limois* westwoodi (Hope)

Genus ***Penthicodes*** Blanchard

5. *Penthicodes caja* (Walker)

Family DELPHACIDAE
Genus ***Liburnia*** Stål

**6. *Liburnia pusana* Distant

Genus ***Nilaparvata*** Distant

**7. *Nilaparvata lugens* Stål

Family EURYBRACHYDEA
Genus ***Loxocephala*** Schaum

8. *Loxocephala aeruginosa* Hope

Genus ***Nasiana*** Metcalf

9. *Nasiana tricolor Walker*

Family FLATIDAE
Genus ***Flatida*** White

10. *Flatida marginella* Olivier

Genus ***Seliza*** Stål

11. *Seliza partita* Melichar

Family CIXIIDAE
Genus ***Oliarus*** Stål

**12. *Oliarus caudalus* Walker

Family ISSIDAE
Genus ***jagannata*** Distant

**13. *Jagannata maculata* Distant

Genus ***Flavina*** Stål

14. *Flavina granulata* Stål

Family DERBIDAE
Genus ***Perandenina*** Distant

15. *Perandenina typica* Distant

Genus ***Phenice*** Westwood

16. *Phenice pallata* Distant

Family ACHILIDAE
Genus ***Magadha*** Distant

**17. *Magadha flavisigna* Walker

Family DICTYOPHARIDAE
Genus ***Putula*** Melichar

18. *Putula brachycephala* Distant

Super Family FULGOROIDEA
Key to families of the Superfamily : FULGOROIDEA

1. Anal area of wings reticulated, the carina separating the front from ganae, continued on the side of clypeus ..... FULGORIDAE
– Anal area of wings not reticulate, clypeus without lateral carina 2
2. Posterior tibiae with a mobile spur at apex ..... DELPHACIDAE
– Posterior tibiae without a mobile spur at apex 3
3. Face broad transverse, or equally broad a long angularly ampliated on the each side .... EURYBRACHYDEA
– Face not broad, transverse, not laterally a angularly ampliated 4
4. Clavus granulate, apex subacute, very obtuse and broadly open, with two veins separated through entire length ..... FLATIDAE
– Clavus not granulate, not broadly open, distinct closed, two veins very remote from apex.... 5
5. Face with two ocelli, lateral margin of clypeus always carinate or acute 6
– Face with three ocelli, not two, one is situated on the apex of front; lateral margin not carinate ..... CIXIIDAE
6. Haed narrower than thorax; thorax with carinate 7
– Head not narrower than thorax; thorax without carinate ..... ISSIDAE
7. Hind tibia with one or more spines 8
– Hind tibia without spines ..... DERBIDAE
8. Mesonotum much larger than pronotum, rhomboidal and tricarinate ..... ACHILIDAE
– Mesonotum not large, equal in length and breadth of pronotum, not rhomboidal and bicarinate ..... DICTYOPHARIDAE

**The species with article marks denote the new record from state of Uttarakhand

Family FULGORIDEA
Key to genera of the family FULGORIDAE

1. Head furnished, with a long prominently produced in front of eyes 2
– Head not long and prominently produced in front of eyes 3
2. Tegmina moderately broad, greatest width more than one third their length, their apical margin rounded ..... ***Laternaria***
– Tegmina not broad, narrowed, their greatest breadth less than a third of their length, their apical margin not rounded, subtruncate .... ***Saiva***
3. Anterior femora distictly ampliate above at apices ..... ***Polydictya***
– Anterior femora not ampliate above at apices 4
4. Face strongly ampliated, at base and considerable broader than clypeus..... ***Limos***
– Face not strongly ampliated considerable narrower at base and narrower than clypens ..... ***Penthicods***

Genus ***Laternaria*** Linnaeus 1764

1764. *Laternaria* Linnaeus, *Museum ulricae*, : 152

1. ***Laternaria clavata*** (Westwood)

1841. *Fulgora clavata* Westwood, *Tr. Linn. Soc.*, **Xviii** : 139.

1906. *Fulgora clavata* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 191

1946. *Laternaria clavata* : Metcalf, *General Catalogue of Homoptera*, **4**(9) : 193

Diagnostic characters : Vertex with minutely white spotted; pronotum covered with white pubecens, mesonotum with a black spot on each lateral area; tegmina with dark white pnbescence, its basal half with inconstant black spots and apical half usually with brownish spots; abdomen covered with much white pubescence.

Length : 19 mm.

Distribution: India : Uttarakhand (Dehra Dun); Assam; Meghalaya; Sikkim; West Bengal.

Remarks : No Specimen of this species was present in present study; Linneus recorded this species from Dehra Dun.

Genus ***Saiva*** Distant 1906

1906. *Saiva* Distant, *Fauna Brit. India, Rhynchota,* **3** : 192.

2. ***Saiva virescens*** (Westwood)

1842. *Fulgora virescens* Westwood, *A.M.N.H.,* **IX** : 119.

1906. *Saiva virescens* : *Distant, Fauna Brit. India, Rhynchota,* **3** : 196.

1947. *Saiva virescens* : Metcalf, *General Catalogue of Homoptera,* **4**(9) : 181.

Diagnostic characters : Vertex with minute white spots, and at apex blackish red spots; mesonotum with two blackspots; tegmina with black spots, on margins these spots are closed.

Length : 14 mm.

Distribution : India : Uttarakhand (Dist. Garwhal), Assam.

Remarks : This species was not available for the present study. Westwood (1842) recorded this species from Garwhal Dist.

Genus ***Polydictya*** Guerin-Meneville 1830

1830. *Polydictya* Guerin, Meneville, *Icon, Regne Anim, texte Ins :* 358

3. ***Polydictya tricolor*** (Westwood)

1845. *Lystra tricolor* Westwood, *Arc. Ent.* **ii** *:* 35

1906. *Polydictya tricolor* : Distant, *Fauna Brit India, Rhyachota,* **3** : 217

1947 *Polydictya tricolor* : Metcalf, *General Catalogue of Homoptera,* **4**(9) : 88.

Material examined : 1ex : Rajayi Santary, Dist. Dehra Dun; 13. VII. 1963; J. Das & Party Coll.

Diagnoztic characters : Vertex with two reddish spots at base; pronotum black, with distictly medially carinate on its anterior half; tegmina with two transverse series of black spots at base and at middle; posterior tibae with four spines.

Length : 13 mm.

Distribution : India Uttarakhand (Dist. Dehra Dun); Assam; Chennai; West Bengal.

Elsewhere : Indo-China.

Genus ***Limois*** Stal 1863

1863. *Limois* Stål, *Stett. ent. Zeit.,* **xxiv** : 230

4. ***Limois westwoodi*** (Hope)

1845. *Limois westwood* : Hope, *Tr. Linn. Soc;* **XIX** : 133.

1906. *Limois westwoodi :* Distant, *Fauna Brit. India, Rhyachota,* **3** : 200.

1947. *Limois westwoodi* : Metcalf, *General Catalogue of Homoptera,* **4**(9) : 170.

Material examined : 2exs : Mussoris, Dist. Dehra Dun; 1ex : Glirna, Dist. Pithoragarh; 22. ix. 2004; B. Mitra & Party Coll.

Diagnostic characters : Vertex covered with black protuberance; pronotum with two black central broken fasciae; mesonotum with two angulated black spots on each latera area and three black spots on its anterior margin; tegmina with pitchy black small spots.

Length : 12.5 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Pithoragarh), Assam; West Bengal.

Genus ***Penthicodes*** Blanchard. 1845

1845. *Penthicodes* Blanchard, *Hist. des. Ins.,* **2** : 424.

5. ***Penthicodes caja*** (Walker)

1951. *Aphaena caja* Walker, *list Hom.* **ii** : 278

1918 *Penthicodes caja :* Diatant, *Ann. Mag. Nat. Hist.* (9) : 198.

1947. *Penthicodes caja* : Metcalf, *General Catalogue of Homoptera,* **VI**(9) : 126.

Diagnostic characters : Vertex brownish with discal transverse black spots and transversely covered with white pubescence at base; tegmina with reddish irregularly reddish spots and with five large spots; abdomen with dull red spots.

Length : 20 mm.

Distribution : India : Uttarakhand (Dist. Garhwal); Assam; West Bengal.

Elsewhere : Indo–China.

Remarks : This species has recorded from Garhwal Dist. By Walker (1851). Therefore, it has been included in the present study.

II. DELPHACIDAE

Key to the genera of the family DELPHACIDAE.

1. Face more than twice as long as greatest breadth ..... ***Liburnia***

– Face not more than twice as long as greatest breadth ..... ***Nilaparvata***

Genus ***Liburnia*** Stål 1866

1866. *Liburnia* Stål, *Hem. Afr.* **IV** : 179.

6. ***Liburnia pusana*** (Distant)

1912. *Sogata pusana* Distant, *A. M. N. H.* (8)ix : 191.

1967. *Liburnia pusana* : Metcalf, *General Catalogue of Homeptera,* **3** : 368.

Material examined : 103exs : 40exs : Pauri, Dist. Pauri Garhwal; 13.ix.2000; G.C. Sen & Party colls.; 55exs : S.C. Guest house, Dist. Dehra Dun; 9.ix.2000; G.C. Sen & Party colls.; 8exs : P.W.D. & B. Complex, Dist. Haridwar; 7.ix.2000; G.C. Sen & Party coll.

Diagnostic characters : Vertex creamy white, with small dark spots on each side of apex; face black with brown carina; lateral margin of its minutely spotted; posterior tibiae a short spine and a long optical mobile spur.

Length : 3 mm.

Distribution : India : Uttarakhand (Dist. Dehradun, Pauri Garwal, and Haridwar), Tamil Nadu; West Bengal.

Genus ***Nilaparvata*** Distant 1906.

1906. *Nilparvata* Distant, *Fauna Brit. India, Rhynchota* **3** : 473.

7. ***Nilaparvata lugens*** (Stål)

1854. *Delphax lugens* Stål, *Ofv. Sevenska. vet. Akad. Forh.,* **11** : 246.

1906. *Nilaparvata lugens* Distant, *Fauna. Brit. India, Rhynchota,* **3** *: 473.*

1946. *Nilaparvata lugens* : Metcalf, *General Catalogue of Homoptera,* **III** : 296.

Diagnostic characters : Vertex brownish, with anterior interspaces between central and lateral black carination; face with pale yellowish carination; pronotum brownish; mesonotum with also faint brownish carination; tegmina yellowish, its vein smoky brown, an elougate black spots at apex of clavus;

Length : 2.5 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Pauri Garwal & Haridwar). Tripura; West Bengal.

Elsewhere : China; Dutch East Indies; Fiji; Java; Sri Lanka.

Family EURYBRACHYDAE.

Key to genera of family EURYBRACHYDAE

1. Head (including eyes) about as broad as pronotum; posterior tibiae five spines..... ..... ***Loxocephala***

– Head (including eyes) narrower than pronotum; posterior tibiae with four spines .. .. ***Esiana***

Genus ***Loxocephala*** schaum 1850

1850. *Loxocephala* schaum, *Allg. Encycl. Wiss.u. kiinste, art. Fulgorellae, Sec.,* **53** : 71.

8. ***Loxocephala aeruginosa*** (Hope)

1841. *Lystra aeruginosa* Hope, *Tr. Linn. Soc.,* **XVIII** : 443

1906. *Loxocephala aeruginosa* Distant, *Fauna Brit. India, Rhynchota* : 232.

1956. *Loxocephala aeruginosa* : Metcalf, *General Catalogue of Humoptera* **18** : 36.

Diagnostic characters : Vertex greenish in colour; Its basal half ornamented with transverse greenish spots and its apical margin with a sub apical black spots; sternum with small black spots on each side of lateral margin.

Length : 10 mm.

Distribution : India : Uttarakhand (Dist. Garwal); Assam; Meghalaya; Sikkim.

Remarks : Hope (1841) recorded this species from Garwal. Therefore, it has been incorporated in the present study.

Genus ***Nesiana*** Metcalf. 1952

1952. *Nesiana* Metcalf, *Jour. Washim. Acad. Sci.,* **42** : 228.

9. ***Nesiana tricolor*** (Walker)

1851. *Eurybrachys tricolor* Walker, *List Hem.* **ii** : 384.

1906. *Nesis tricolor* : Distant, *Fauna Brit.India, Rhynchota,* **3** : 234.

1956. *Nesiana tricolor* : Metcalf, *General Catalogue of Homoptera,* **IV**(18) : 38.

Material examined : 3exs : 1ex : Mussorree, Dist. Dehra Dun; 2exs : Dist. Nainital; V & VI. 1893; Lucknow Mus. Coll.

Diagnostic characters : Vertex with distinct nodules on each side near eyes; pronotum and mesonotum covered with pilose; tegmina with scattered black spots and short fasciae, its apical area reddish brown and with black spots; abdomen, at its apex covered with long white waxy efflorescence.

Length : 9 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Nainital) & West Bengal.

Family FLATIDAE.

Key to the genera of the family FLATIDAE

1. Tegmina with the costal membrane broader than the radial area ..... ***Flatida***
- Tegmina with costal membrane not broader, narrower than radial area ..... ***Seliza***

Genus ***Flatida*** white 1846

1846. *Flatida* white, *Ann. Mag. Nat. Hist.*, **18** : 26.

10. ***Flatida marginella*** (Olivier)

1791. *Fulgora marginella* Olivier, *Enc. Meth.*, **VI** : 575.

1906. *Phromnia marginella* Distant, *Fauna Brit. India*, Rhynchota, **3** : 398.

1957. *Flatida marginella* : Metcalf, *General Catalogue of Homeptera*, **XIII** : 40.

Material examined : 4exs : 2exs : Jeolikotra, Dist. Nainital; XI.11909; D.Hope colls.; 2exs : Dist. Dehra Dun.

Diagnostic characters : Body covered with white pubescences; pronotum with carina which bifurcating at anterior margin; face strongly bicarinate; Its surface covered with wooly hairs.

Length : 13 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Nainital); Assam; Sikkim; West Bengal.

Elsewhere : Kandy, Sri Lanka; Tenasserim.

Genus ***Seliza*** Stål 1862

1862. *Seliza* Stål, *Berl. ent. Zeitschr.*, **IV** : 312.

11. ***Seliza partita*** Melichar.

1902. *Seliza partita* Melichar, *Ann. Hofmus. Wien*, **XVII** : 138.

1906. *Seliza partita* : Distant, *Fauna Brit India, Rhynchota*, **3** : 442.

1957. *Seliza partita* : Metcalf, *General Catalogue of Homoptera;* **XIII** : 409.

Diagnostic characters : Vertex, its lateral and anterior margin distinctly ridged; face with central fine carina and there is a short sub lateral carina like fold on each side of basal area; pronotum and mesonotum, with lateral carina which roundly transversely connected before anterior margin; tegmina with transverse reticulation extend from latitude of the apex of radial cells to sub apical transverse line.

Length : 7 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun); North Bengal.

Remarks : Melichar (1902) recorded the species from Dehra Dun. Therefore, it has been included in present study.

Family CIXIIDAE

Genus ***Oliarus*** Stål 1862

1862. *Oliarus* Stål, *Berliner Ent. Zeit.* **6** : 306.

12. ***Oliarus caudatus*** Walker.

1858. *Cixius caudatus* Walker, *Insecta Saunder*, : 43.

1906. *Oliarus caudatus* Distant, *Fauna Brit.India, Rhynchota*, **3** : 258.

2000. *Oliarus caudatus* : M. Ghosh & L.K. Ghosh, *State Fauna Series 7* : *Fauna of Tripura*, **2** : 338.

Material examined : 1ex: Sonari, Dist. Almora; 20.IX.2003; B. Mitra & Party coll.

Diagnostic characters : Vertex with brownish yellow ridge; frontal area of face a pitchy black central ridge; pronotum with brownish yellow carination; mesonotum also with five longitudinal carinae; tegmina hyaline, its venation brownish, a brownish stima at base; posterior tibiae with three distinct spines.

Length : 6 mm.

Distribution : India : Uttarakhand (Dist. Almora); Meghalaya; Sikkim; Tripura.

Family ISSIDAE

Key to the genera of the family ISSIDAE

1. Head (including eyes) about as wide as pronotum; vertex angularly produced in front of eyes ..... ***Jagannata***

– Head (including eyes) distinctly narrower than pronotum; vertex sub quadrate, not angularly produced ..... ***Flavina***

Genus ***Jagannata*** Distant 1906

1906. *Jagannata* Distant, *Fauna Brit.India, Rhynchota* **3** : 338.

13. ***Jagannata maculata*** Distant

1906. *Jagannata maculata* Distant, *Fauna Brit.India, Rhynchota*, **3** : 339.

1958. *Jagannata maculata* : Metcalf, *General Catalogue of Homoptera*, **XV** : 484.

Material examined : 1ex : Koshi, Dist. Almora; 18.IX.03.; B. Mitra & Party coll.

Diagnostic characters : Vertex with pitchy black spot on anterior lateral area and a small black spot at middle of lateral margin; face with reddish granulose; pronotum with pitchy black spots at each lateral area and a central red carina; mesonotum with five large dark brown spots, four on anterior portion and one at posterior area, and with distinct carina; tegmina creamy white with dark brown patch and small spots on claval area.

Length : 6 mm.

Distribution : India : Uttarakhand (Dist. Almora).

Genus ***Flavina*** Stål 1861

1861. *Flavina* Stål, *Ofv. Vet. Ak. Forh.* 209.

14. ***Flavina granulata*** Stål 1861

1861. *Flavina granulata* Stål, *Ofv. Vet. Ak. Forh.* : 212.

1906. *Flavina grunulata* : *General Catalogue of Homoptera*, **XV** : 433.

Diagnostic characters : Face with its lateral margin minutely spotted pronotum at its lateral and posterior margin granulated; mesonotum with a central carina and on each side an oblique elongate, foveate tubercular line; tegmina an its basal halves of inner margin of each side longitudinal suture, on its inner and outer margin distinct black speckle or spots.

Length : 7.5 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun).

Remarks : No material was available in present study from Uttarkhand. Stål (1861) recorded this species from Dehra Dun.

Family DERBIDAE

Key to the genera of the family DERBIDAE

1. Wings moderately ample, considerably more than half the length of tegmina ..... ***Perandenina***

– Wings not more ample, considerably less than half the length of tegmina ..... ***Phenice***

Genus ***Perandenina*** Distant 1911

1911. *Perandenina* Distant, *A. M. N. H.* (8) **viii** : 644

15. ***Perandenina typica*** Distant

1911. *Perandenina typica* Distant, *A. M. N. H.* (8)**viii** : 644.

1945. *Perandenina typica* : Metcalf, *General Catalogue of Homoptera.*, **IV** : 94.

Material examined : 1ex : Bhimtal, Dist. Nainital; 27.IX.1906; N. Annandale coll.

Diagnostic characters : Vertex projecting before eyes; apex truncate; face narrow, its lateral margin strongly ridged; pronotum narrow, widened lateral area; obliquely truncate; mesonotun tricarinate; tegmina moderately tomentose; legs not spined.

Length : 3 mm.

Distribution : India : Uttarakhand (Dist. Nainital); Sri Lanka.

Genus ***Phenice*** Westwood 1845

1845. *Phenice* Westwood, *Tr. Linn. Soc.*, **XIX** : 10.

16. ***Phenice pallata*** Distant

1911. *Phenice pallata* Distant, *A.M.N.H.* (8)**VIII** : 639.

1916. *Phenice pallata* : Distant, *Fauna Brit. India, Rhynchota*, **6** : 64.

1945. *Phenice pallata* : Metcalf, *General Catalogue of Homoptera*, **IV** : 34.

Diagnostic characters : Vertex and face with central carina, this central carina to clypens; pronotum with central fascia; mesonotum with carina; tegmina dark brown, costal area white, with large dark brown spots, two white spots at apical margin; veins dark brown; legs blood red colour.

Length : 3 mm.

Distribution : India : Uttarakhand (Dist. Kumaon).

Remarks : No specimen was available for the present study. Distant (1911) recorded this species from Kumaon Dist. Now, it is in Uttarakhand. Therefore, it has been included in the present paper.

Family ACHILIDAE
Genus ***Magadha*** Distant 1906

1906. *Magadha* Distant, *Fauna Brit. India, Rhynchota*, **3** : 290.

17. ***Magadha flavisigna*** (Walker)

1851. *Cixius flavisigna* Walker, *List Hom.*, **ii** : 348.

1906. *Magadha flavisigna* : Distant, *Fauna Brit. India. Rhynchota*, **3** : 291.

1947. *Magadha flavisigna* : Metcalf, *General Catalogue of Homoptera*, **X** : 49.

Material examined : 1ex: Sonari, Dist. Almora; 20.IX.03; B. Mitra & Party coll.

Diagnostic characters : Vertex of its lateral margin strongly ridged; face of its lateral margin acutely laminate ridged; pronotum tricarinate, lateral carinae oblique; mesonotum with a large subquadrate dark brown spot which extend on each side beyond of the lateral carinae; tegmina pale creamy white, with dark brown spotted, its veins mostly with dark brown minutely spotted;

Length : 5.5 mm.

Distribution : India : Uttarakhand (Dist. Almora); North India.

Family DICTYOPHARIDAE
Genus ***Putula*** Melichar 1903

1903. *Putula*, Melichar, *Hom. Faun. Ceylon*, : 26.

18. ***Putula brachycephala*** Distant

1906. *Putula brachycephala* Distant, *A.M.N.H.* (7)**XVII** : 354.

1916. *Putula brachycephala* : Distant, *Fauna Brit India* Rhynchota, **VIII** : 80.

1946. *Putula brachycephala* : Metcalf, *General Catalogue of Homoptera* **VIII** : 80.

Material examined : 5exs : 2ex : Jolly garden, Dist. Dehra Dun; 8.ix.2000; G.C.Sen & Party coll. : 3exs : Koshi, Dist. Almora; 8.ix.2003; B. Mitra coll.

Diagnostic characters : Vertex short, with carinae; pronotum with brownish single carina; mesonotum with much paler brown tricarinae; clypens tricarinate; tegmina hyaline, venation dark brown, tegmina with dark brown stigma and a central longitudinal apical patch; posterior tibiae with five spines.

Length : 7.5 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Almora); Maharashtra; South India.

Elsewhere : Singapore.

SUMMARY

The paper presents an account of 18 species under 18 genera to nine families of the Super family Fulgoroidea from the state of Uttarakhand. Five species have been recorded for the first time from the state. Suitable taxonomic keys to various texa, have been provided for easy identification. Besides, Taxonomic synonyms, diagnostic characters and geographical distribution of each species have been given. The paper is mainly based on the collection made by various survey parties of Zoological Survey of India, as well as the named and earlier recorded species. A district wise distribution chart of the studied species has also been included the present paper.

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REFERENCE

BLANCHARD, E. 1845. Septime ordre les Hemipteres traint de leurs moeurs et de leurs metamorphoses in general et comprenant une nouvelle classification fondee sur leurs rapport naturels. *Hist. de. Ins.,* **2** : 424.

DISTANT, W.L. 1906. *Fauna Brit. India including Ceylon & Burma, Rhynchota, Homoptera,* **3** : 1-501.

DISTANT, W.L. 1918. *Fauna Brit. India including Ceylon & Burma, Rhynchota, Homoptera,* **6** : 1-109.

DISTANT, W.L. 1911. Rhynchotal notes. *Ann. Mag. Nat. Hist.,* **8**(8) : 638.

GUERIN-MENEVILLE, F.E. 1830. Homoptera. *Icon. Regne. Anim., texte Ins.,* : 358.

LINNAEUS, C. 1764. In quo animalia rariora, exotica imprimis insecta et conchila describuntur et determinatur, progromi instar editum. *Museum S : ae R : ae M : tis Ludovicae ulricae Reginae Svecorum, cothorum, Vandalorumque,* **i-viii** : 152-163.

METCALF, Z.P. 1967. *General Catalogue of the Homoptera Fascide* IV *Fulgoroidea,* Part. **1-18** : pp. 3407.

M. GHOSH AND L.K. GHOSH. 1998. *State fauna series* 4 : *Fauna of Meghalaya,* Part 4 : 343-360.

OLIVIER, G.A. 1791. Hemipteres, Section 1. *Encyclopedie methodique histoire naturelle insects,* **6** : 575.

PAYVA, C.A. 1919. Rhynchota from Garo Hill. *Rec. Indian Mus.,* **16** : 373-377.

STAL, C.1854. Nya Hemiptera. *Ofversigt of Svenska Ventesk. Akad. Forhandl.,* **11** : 231-255.

WALKER,-F. 1858. *Insecta saundersiana*: or characters of undescribed insects in collection of Willam Wilson Saunders, Esq., : 43.

WESTWOOD, J.O. 1845. Genera insectorum iconibus illustravit et descripsit Hermannus Burmeistes *Arcana Entomologica* or illustration of new rare and interesting insects, **ii** : 35.

Chart showing the distribution of the species of Fulgoroidea from different Districts of Uttarakhand

Name of the species	Name of the Districts												
	Almora	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udham singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. *Laternaria clavata*			+										
2. *Savia virescens*					+								
3. *Polydictya tricolor*			+										
4. Limois westwoodi			+				+						
5. *Penthicodes caja*	-	-				+							
6. *Liburnia pusana*			+	+		+							
7. *Nilaparvata lugens*	-		+	+		+							
8. *Loxoceplala aeruginosa*		-		+									
9. *Nesiana tricolor*		+	+			-							
10. *Flatida marginella*		+	+										
11. *Seliza partita*	-		+										
12. *Oliarus caudatus*	+	-											
13. *Jagannata maculata*	+	-		-									
14. *Flavina granulata*			+										
15. *Perandenina typica*	-	+											
16. *Phenica pallata*	+												
17. *Magadha flavisigna*	+												
18. *Putula brachycephala*	+		+										

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INSECTA : HEMIPTERA : LYGAEIDAE

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INTRODUCTION

The Hemipteran insects of the family Lygaeidae are mostly phytophagous in nature but some are found to be predaceous. These insects are small to medium sized and oval or elongated oval in sape. They are cosmopolitan in distribution. Most of them are dull or black colour while some are of brightly coloured. They prefer to be inhabited in moss covered surface or rubbish beneath stones or among plants like herbs and shrubs.

From Indian Sub-continent a little more than 250 Species of about 100 genera are recorded so far (Distant 1904, 1910, 1918; Lefroy 1909; Chopra and Rostogi 1980; Mukhopadhyay 1980; Mukhopadhyay and Ghosh 1982; Chakraborty and Ghosh 1994)

The present work deals with the Lygaeidae fauna of the state of Uttarakhand. This is first attempt to have a comprehensive account to evaluate the faunal whealth of the heimpteran insects belonging to the family Lygaeidae from Uttarakhand Distant recorded some 11 Species under 10 Genera of the family from different places of present state of Uttarakhand. The paper has included total 20 species under 14 genera of the family Lygaeidae, of which 9 species under 7 genera are considered to be new records from the state of Uttarakhand. Taxonomic references, diagnostic characters of each species,Keys to different taxa of Lygaeidae of Uttarakhand, Distribution in India and Elsewhere and a list of Districtwise distribution of the studied species from Uttarakhand have been provided in the present paper.

SYSTEMATIC ACCOUNT

Following is the systematic list of the species contained in the present paper .Species with asteric mark denotes new records from the state.

Family LYGAEIDAE
Subfamily RHYPAROCHROMINAE
Genus ***Dieuches*** Dohrn

1. *Dieuches femoralis* Dohrn
2. *Dieuches leucocerus* Walk

Genus ***Rhyparothesus*** Scudder

3. *Rhyparothesus sparsus Distant*

Genus ***Elasmolomus*** Stål

4. *Elasmolomus sordidus* (Fabricius)

Genus ***Metochus*** Scoutt

5. *Metochus uniguttatus* (Thunberg)

Subfamily ORSILLNINAE
Genus ***Nysius*** Dallas

6. *Nysius lacustrinus* Distant
7. *Nysius minor* Distant*
8. *Nysius ceylonicus* (Motschulsky)*

Subfamily LYGAEINAE
Genus ***Spilostethus*** Stål

9. *Spilostethus pandurus* (Militaris)*
10. *Spilostethus hospes* (Fabricius)

Genus ***Graptostethus*** Stål

11. *Graptostethus trisignatus* Distant*
12. *Graptostethus servus* (Fabricius)*
13. *Graptostethus maculates* Dall*

Subfamily HETEROGASTRINAE
Genus ***Chauliops*** Scott

14. *Chauliops nigrescens* Distant

Genus ***Dinomachus*** Distant

15. *Dinomachus rhacinus* Distant*

Subfamily APHANINAE
Genus ***Manatanus*** Distant

16. *Manatanus montanus* Distant

Genus ***Maramaldus*** Distant

17. *Maramaldus admistus* Distant

Genus ***Eremocoris*** Feib

18. *Eremocoris naini* Distant

Genus ***Lethaeus*** Stål

19. *Lethaeus assamensis* Distant*

Subfamily COLOBATHRISTINAE
Genus ***Artemidorus*** Distant

20. *Artemidorus pressus* Distant*

Key to Subfamiles of the family Lygaeidae

1. Suture between IV and V sternite not extending to lateral margin and curving forward laterally; generally three dorsal scent gland openings ..... RHYPAROCHROMINAE

   All abdominal sutures extending to lateral margins; generally two dorsal scent gland openings 2

2. Segments II to VII with abdominal spiracles located dorsally ..... ORSILLINAE

   All abdominal spiracles locatd ventrally 3

3. Apical margin of the corium sinuate at inner angle ..... LYGAEINAE

   Apical margin of the corium straight 4

4. Membrane with basal cells ..... HETEROGASTRINAE

   Membrane without basal cells 5

5. Third ventral incisure not reaching the lateral margins, near which it is recurved : Rostrum clearly passing the intermediate in coxae .... APHANINAE

   Third ventral incisure reaching the lateral margins, near which it is recurved; Rostrum scearsly the intermediate in coxae ..... COLOBATHRISTINAE

Family LYGAEIDAE
Subfamily RHYPAROCHROMINAE

Key to genera of the subfamily Rhyparochrominae

1. Scutellum always longer than broad ..... ***Dieuches***

   Scutellum equal or subequal 2

2. Anterior part of pronotal lobe and base of scutellum without fuscous colouration ..... ***Rhyparothesus***

   Anterior pronotal lobe and basal half of the scutellum dark brown to black 3

3. Pronotum without carination and strongly punctuate ..... ***Elasmolomus***

   Pronotum narrowly carinate or sub-carianate and strongly sinuate ..... ***Metochus***

Genus ***Dieuches*** Dohrn

1860. *Dieuches* Dohrn, *Stett. Ent. Zeit.*, **21** : 159.

Key to Species of the genera Dieuches

1. Lateral margin of the pronotum uniformly narrowed anteriorly; posterion pronotal margin more than two and a half times of coller .... *femoralis* Dohrn

- Lateral pronotal margins run almost parallel and sharply bend to give a rounded Anterior edge; Pronotal base two and a half (or little less) times wider than collar ..... *leucoceras* (Walker)

1. ***Dieuches femoralis*** Dohrn

1860. *Dieuches femoralis* Dohrn, *Stett. Ent. Zeit*, **21** : 405.

1988. *Dieuches femoralis* : Mukhopadhyay, *Rec. zool. Surv. India. Occ. Paper No.* **107** : 55.

1994. *Dieuches femoralis* : Chakraborty et al. *State Fauna Series* 3 : *Fauna Of West Bengal, Part* **5** : 420.

Materia examined : 2exs, Byasi, Dist-Tehri Garhwal, 24.IX.2002, A. Bal & Party Coll; 1ex, Majra, Dist-Dehra Dun, 26.IX.2002, A. Bal & Party Coll; 2exs, Almora, Dist-Almora, 6.X.2002, D.R. Maulik & Party Coll; 1ex, Clement town, Dist-Dehra Dun, 23.IX.2000, G.C. Sen & Party Coll; 3exs, Conkhal, Dist-Haridwar, 21.X.2001, S.K. Mandal & Party Coll; 3exs, Soil Conservation Guest House, Dist-Dehra Dun, 18.IX.2000, G.C. Sen & Party Coll; 1ex, Helong, Dist-Chamoli, 7.VII.2004, S.K. Chakraborty & Party Coll; 1ex, Jollygrant, Dist-Dehra Dun, 18.IX.2000, G.C. Sen & Party Coll.

Diagnostic characters : Head narrower the basal joint apices of second and third joints and fourth joint of antennae piceous;macular space between the transvers fascia and apical margin of corium subtriangular.

Distribution : India : Uttarakhand (Dists-Almora, Dehra Dun, Chamoli, Tehri Garhwal); Assam, Kashmir, Nagaland, West Bengal, Sikkim.

Elsewhere : Myanmar, Sri Lanka.

2. *Dieuches leucocerus* Walk

1872. *Dieuches leucocerus* Walk. *Cat. Het.* **5** : 101.

1902. *Dieuches leucocerus* : Distant, Fauna Brit. India, Rhynchota, **2** : 83-84.

1988. *Dieuches leucocerus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ Paper* No. **107** : 56.

Material examined : 1ex, Barla (Didihat), Dist-Pithoragarh, 24.IX.2004, B. Mitra & Party Coll; 1ex, Mazra, Dist-Dehra Dun, 24.IX.2000, G.C. Sen & Party Coll; 1ex, Kirtinagar, Dist-Pauri Garhwal–Dist, 21.IX.2002, A. Bal & Party Coll; 2exs, Mazra, Dehra Dun, 24.IX.2000, G.C. Sen & Party Coll.

Diagnostic characters : Head black; Pronotum as long as broad, piceous or dark castaneous two small linear luteous spots on anterior margin, Lateral margins somewhat strongly laminate, Scutellum black, with two small medial spots and the apex ochraceous in some specimens the two medial spots are obsolete; Corium pale ochraceous, brownly punctuate, lateral margin impunctate, a broad irregular transverse fascia near inner angle, apical angle and apical margin (narrowly) black; apices of the tree basal joints of antennae, the fourth joint, basaland apical joints of rostrum, intermediate and posterior femora black or castaneous.

Distribution : India : Uttarakhand (Dists-Dehra Dun, Pithoragarh, Pauri Garhwal) Kashmir; Maharashtra.

Elsewhere : Bushire, Srilanka.

Genus *Elasmolomus* Stål

1872. *Elasmolomus* Stål, *Ofv. Vet. Akad. Forh.*, **89** : 58.

3. *Elasmolomus sordidus* (Fabricius)

1787. *Cimex sordidus* Fabricius, *Mant. Ins.*, **2** : 302.

1988. *Elasmolomus sordidus* (Fabricius) Mukhopadhyay, *Rec. zool. Surv. India, Occ Paper No.* **107** : 50.

1994. *Elasmolomus sordidus* : Chakraborty *et al. State Fauna Series* 3 : *Fauna Of West Bengal, Part-* **5** : 436.

Material examined : 5exs, Byasi, Dist-Tehri Garhwal, 24.IX.2002, A. Bal & Party Coll; 1ex, Soil Conservation Guest House, Dist-Dehra Dun, 18.IX.2000, G.C. Sen & Party Coll; 2exs, Rishikesh West (at light), Dist-Tehri Garhwal, 31.VIII.2002, S.K. Mandal & Party Coll; 1ex, Gular, Dist-Tehri Garhwal, 24.IX.2002, A. Bal & Party Coll.

Diagnosis charcters : Colour of anterior lobe of pronotum and base of scutellum varies ranging from bright castaneous to sordid brown. Body size varies in the same sex.

Distribution : India : Uttarakhand (Dists-Dehra Dun, Tehri Garhwal); Bihar; Maharashtra; Meghalaya; Nagaland; West Bengal.

Elsewhere : Myanmar; China.

Genus *Metochus* Scott

1874. *Metochus* Scott *Ann. Mag. Nat. Hist.*, (4)**14** : 433-434.

4. *Metochus uniguttatus* (Thunberg)

1822. *Pendulinus uniguttatus* Thunberg, *Hem. Rost. Cap.*, **4** : 6.

1874. *Metochus uniguttatus* : Scott. *Ann. Mag. Nat. His.* (4)**14** : 433-434.

1988. *Metochus uniguttatus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ Paper No.* **107** : 56.

1994. *Metochus uniguttatus* : Chakraborty *et al. State Fauna Series 3 : Fauna of West Bengal* Part-**5** : 421.

Material examined : 4exs, Byasi, Dist-Tehri Garhwal, 24.IX.2002, A. Bal & Party Coll; 1ex, Kunjapuri, Narendanagar, Dist-Tehri Garhwal, 10.IX.2000, G.C. Sen & Party Coll; 1ex, Conkhal, Dist-Haridwar, 21.X.2001, S.K. Mandal & Party Coll; 7exs, Rishikesh, Dist-Tehri Garhwal, 31.VIII.2002, S.K. Mandal & Party Coll; 2exs, Rudhraprayag, Dist-Pauri Garhwal, 17.IX.2002, A. Bal & Party Coll; 1ex, Gular, Dist-Tehri Garhwal, 23.IX.2002, A. Bal & Party Coll.

Diagnostic characters : Head much broader than the apex of pronotum, and lateral margins of pronotum narrowly carinate or sub-carinate and strongly sinuate.

Distribution : India: Uttarakhand (Dists-Haridwar, Pauri Garhwal, Tehri Garhwal); Andaman Islands; Maharashtra; Meghalaya; West Bengal.

Elsewhere : China; Myanmar; Malaya Archipelago; Sri Lanka.

Genus *Rhyparothesus* Scudder

1962. *Rhyparothesus* Scudder, *Can. Ent.*, **95** : 983.

5. ***Rhyparothesus sparsus*** (Distant)

1904. *Aphanus sparsus Distant, Fauna Brit. India, Rhynchota*, **2** : 81.

1909. *Aphanus dudgeoni* Distant, *Ann. Mag. Nat. Hist.*, (8)**3** : 336.

1964. *Rhyparothesus sparsus* Slater. *Catalogue of the Lygaeidae of the World*, 2 : 1289.

1988. *Rhyparothesus sparsus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ. Paper* No. **107** : 54.

Material examined : 1ex, Nepalifarm, Dist-Dehra Dun, 8.IX.2000, G.C. Sen & Party Coll.

Diagnostic characters : The colouration of the species is variable and ranges pale ochraceous to dark ochraceous.

Distribution : India : Uttarankhand (Dist-Dehra Dun), Maharashtra, West Bengal.

Subfamily ORSILLNINAE
Genus ***Nysius*** Dallas

1852. *Nysius* Dallas, *List. Hem. B. M.* **2** : 551-552.

Key to Species of the genera *Nysius*

1. Corium hyaline with yellowish tint, two black lines on its apical margin membrane hyalin ..... *lacustrinus* Distant
   - Corium Sub hyaline, very pale ochraceous, the veins a little spotted, and the apical margin with three distinct, oblong, fuscous spots; membrane pale hyaline 2
2. All antennal segments black with 2nd segment distinctly longer than 3rd segment ..... *minor*
   - 2nd and 3rd segments of the antennae subequal and brownish ochraceous .... *ceylonicus*

6. ***Nysius lacustrinus*** Distant

1909. *Nysius lacustrinus* Distant., *Ann. Mag. Nat. Hist.*, **3** : 321.

1910. *Nysius lacustrinus* Distant. *Fauna Brit. India Rhynchota*, **5** : 13.

Material examined : 1ex, Bhimtal, Dist-Nainital, 22-27.IX.1906, N.A.

Diagnostic characters : Head ochraceous, the margins of the central lobe black and a black cicatrisant punctuate fascia on each side before eyes extending from above antennae to base; scutellum piceous brown,a pale central line on apex; Body beneath and legs ochraceous; Legs pale ochraceous,femora spotted with castaneous, apices of tarsi black; rostrum black,slightly passing the posterior coxae; membrane hyaline, considerably passing the abdominal apex; sternum coarsely punctuate.

Distribution : India : Uttarakhand (Dist-Nainital).

7. ***Nysius minor*** Distant*

1909. Nysius minor Distant, *Ann. Mag. Nat. His.* (8)**3** : 221.

1988. Nysius minor : Mukhopadhyay, *Rec. zool. Surv. India. Occ. Paper No.* **107** : 20.

1994. Nysius minor : Chakraborty *et al. State Fauna Series 3 : Fauna of West Bengal : Part-***5** : 424.

Material examined : 1ex, Bhimtal, Dist-Nainital, 22.IX.1906, n.a.

Diagnostic characters : Antennae with the second and third joints ochraceous or brownish ochraceous, first and fourth joints more or less piceous, second and third joints of antennae subequal in length and all the joints piceous in coloration.

Distribution : India : Uttarakhand (Dist-Nainital); Bihar, West Bengal.

8. ***Nysius ceylonicus*** (Motschulsky)*

1863. *Hetergaster ceylonicus* Motschulsky, *Bull. Soc. Nat. Moscu.*, **36** : 78.

1904. *Nysius ceylonicus* : Distant, *Fauna Brit, India Rhynchota*, **2** : 18.

1988. *Nysius ceylonicus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ Paper No.* **107** : 20.

1994. *Nysius ceylonicus* : Chakraborty *et al. State Fauna Series* 3 : *Fauna of West Bengal, Part* **5** : 424.

Material examined : 8exs, Dehra Dun, Dist-Dehra Dun, 20.V.1956, K.K. Tiwari & Party Coll; 8exs, Dehra Dun, Dist-Dehra Dun, 19.V.1956, K.K. Tiwari Party & Coll; 1ex, Moita, Dist- Dehra Dun, 5.V.1956, K.K. Tiwari & Party Coll; 8exs, Bhimtal, Dist-Nainital, 22-27.IX.1906, N.A.

Diagnostic characters : Head, antennae, anterior area of pronotum and scutellum piceous;

posterior area of pronotum ochraceous, coarsely brownly punctuate; corium very pale ochraceous, subhyaline, the veins a little spotted, and the apical margin with three distinct, oblong, fuscous, bases and apices of tibiae and apices of tarsi fuscous.

Distribution : India :Uttarakhand (Dists-Dehra Dun, Nainital), Sikkim, West Bengal, Jharkhand.

Elsewhere : Sri lanka.

Subfamily LYGAEINAE

Key to genera of the subfamily Lygaeinae

1. Metathoracic scent gland inconspicuous; Femora of legs in male usully spinose; Brightly coloured insects usully with a combination of red and black ..... ***Spiostethus*** Stal
- Metathoracic scent gland opening otherwise; Femora in male mutic; Colouration Dull; Osteolar periteme distinct; Basal area of pronotum at least with two black maculate spots ..... ***Graptostethus*** Stal

Genus ***Spilostethus*** Stål

1868. *Spilostthus* Stal, *Kongl. Svensk. Vet. Akad. Handl*, **7** : 72.

Key to species of the genera *Spilostethus*

1. Membranal suture with central white spot and two cresent white markings; labium reaches or passes second coxae ..... *pandurus*
- Membranal suture without such white spot; labium passes third coxae ..... *hospes*

9. ***Spilostethus pandurus militaris*** (Fabricius)

1763. *Cimex pandurus* Scopoli., *Ent. Carn. Exhib. Ins. Carnid*, IV. **368** : 126-127.

1912. *Spilostethus pandurus* Oshamin *Kat. Hem.*, **1** : 27.

1988. *Spilostethus pandurus militaris* : Mukhopadhyay, *Rec. zool. Surv. India. Occ. Paper No.* **107** : 15.

1994. *Spilostethus pandurus*: Chakraborty et al. *State Fauna Series* 3: *Fauna of West Bengal* Part-**5** : 419.

Material examined : 2exs, Sharda Riverside, Dist-Champawat, 13.IX.2004, B. Mitra & Party Coll; 1ex, Pauri, Dist-Pauri Garhwal, 16.IX.2002, A. Bal & Party Coll; 1ex, Tanakpur, Dist-Champawat, 12.IX.2004, B. Mitra & Party Coll; 3exs, Kirtinagar (Srinagar), Dist-Pauri Garhwal, 21.IX.2002, A. Bal & Party Coll; 1ex, Nainital, Dist-Nainital, R.E. Lloyed; 1ex, Onchagaon, Dist-Nainital, 1-6.VI.1907, Mus Coll, 2ex, Magand, Dist-Nainital, 6.XII.1893, Mus Coll; 1ex, Nagla, Dist-Nainital, 6-12.XII.1907, Mus Coll; 1ex, Nainital, Dist-Nainital 22-30.III. 1907, Mus Coll.

Diagnostic characters : Pale sanguineous; apex of head and a spot at inner margins of eyes, antennae, rostrum, pronotum, scutellum, a small spot near apex of clavus, a transverse fascia to corium, pro-sternum, margins of meso and metasterna, abdominal segmental margins spots, and the legs black; Femora distinctly spine of beneath; rostrum reaching the intermediate coxae.

Distribution : India : Uttarakhand (Dists-Champawat, Pauri Garhwal, Nainital); Karnataka, Maharastra, Punjab, Uttar Pradesh, Rajasthan, West Bengal.

Elsewhere : Australia; Myanmar; South Africa.

10. ***Spilostethus hospes*** (Fabricius)

1794. *Lygaeus hospes* Fabricius, *Ent. Syst.*, **4** : 150.

1914. *Spilostethus hospes* Bergroth, *Ent. Mitteil*, **2** : 356.

1989. *Spilostethus hospes* : Ghosh *et al. Fauna of Orissa, State Fauna Series* I. : 202.

1994. *Spilostethus hospes* Chakraborty *et al. State Fauna Series* 3 : *Fauna of West Bengal* : Part **5** : 419.

Material examined : 1ex, Chamba, Dist-Tehri Garhwal, 16.IX.2000, G.C. Sen Party & Coll; 1ex, Beriwara forest, Dist-Dehra Dun, 5.XI.2002, M. Prasad & Party Coll.

Diagnostic characters : Pale sanguineous; apex of head and a spot at inner margins of eys, antennae, rostrum, two broad central discal fasciae to pronotum anteriorly and connected with an anterior marginal, scutellum, a lerge central spot to corium, membrane, disks pilose; rostrum passing the posterior coxae; femora unarmed.

Distribution : India : Uttarakhand (Dists-Dehra Dun, Tehri Garhwal); Maharashtra, Tamilnadu, West Bengal.

Elsewhere : Australia; China; Myanmar; Pakistan; Srilanka.

Genus ***Graptostethus*** Stål

1968. Gratostethus Stal. *Kngl. Seensk, Vet, Aked. Hand.*, **11** : 73-74.

Key to species of *Graptostethus*

1. Corium and clavus without any black marking ..... *trisignatus*
- Corium and clavus with black marking 3
2. A large oblique subclaval spot and a smaller marginal spot to corium .....*Servas*

   A small spot beyond middle of clavus, a large central rounded spot to corium .... *maculatus*

11. *Graptostethus trisignatus* Distant*

1879. *Graptostethus trisignatus* Distant, *Fauna Brit.India, Rhynchota*, **5** : 130.

1988. *Graptostethus trisignatus* : Mukhopadhyay. *Rec. zool. Surv. India, Occ Paper No.* **107** : 17.

1994. *Graptostethus trisignatus* : Chakraborty et al.*State Fauna Series 3 : Fauna of West Bengal, Part-***5** : 418.

Material examined : 1ex, Amanghor, Dist-Nainital, 12.XI.1907, Mus Coll.

Diagnostic characters : Head, rostrum, antennae, eyesred; a narrow transverse patch at the base, two large subglobular spots at base of pronotum, scutellum, membrane, apical segment of abdomem,legs, and a spot on the lateral areas of each sternal segment black; apical margin of membrane grayish white; second joint of antennae much longer than third.

Distribution : India :Uttarakhand (Dist-Nainital); Meghalaya, Nagaland, West Bengal.

Eleswhere : Myanmar.

12. *Graptostethus servus* (Fabricius)*

1787. *Cymex servus* Fabricius, *Mant. Ins.*, **2** : 300.

1902. *Graptostethus servus* Distant, *Fauna Brit. India, Rhynchota*, **2** : 8-9.

1988. *Graptostethus servus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ. Paper No.* **107** : 18.

1994. Graptostethus servus, Chakraborty *et al. State Fauna Series* 3 : *Fauna of West Bengal, Part-***5** : 417.

Material examined : 1ex, Nagla, Nainital-Dist, 6-12.IV.1907, Mus Coll; 1ex, Bhura, Nainital-Dist, 14-17.IV.1907, Mus Coll; 1ex, Gangurpur (Patiya), Nainital-Dist, 12-13.IV.1907, Mus Coll.

Diagnostic characters : Head pale obscure sanguineous, pilose; apex and sometimes the whole central area, a small spot at inner margin of eyes a transverse anterior fascia and two angulated subbasal fasciae to pronotum, scutellum,a large oblique subclaval spot and a small marginal spot to corium. abdomen, legs, antennae and rostrum black; basal spot and apical margin to membrane grayish. rostrum about reaching the posterior coxae.

Distribution : India : Uttarakhand (Dist-Nainital); Kerala, Maharashtra, Meghalaya, West Bengal.

Elsewhere : Australia; China; Myanmar; Sri Lanka; South Africa.

13. *Graptostethus maculates* Dall

1852. *Graptostethus maculates* Dall. *List. Hem.*, **2** : 545.

1901. *Graptostethus maculates* Distant *Ann. Mag. Nat. Hist.* **2** : 537.

1902. *Graptostethus maculates* Distant. *Fauna Brit. India, Rhynchota*, **2** : 11.

Material examined : 1ex, Amangarh, Dist-Nainital, 13.IV.1908. Mus Coll (R.H).

Diagnostic characters : Reddish ochraceous; a large spot between eyes, two very large rounded spots on basal area of pronotum, scutellum, a small spot beyond middle of clavus, a large central rounded spot to corium, legs, rostrum, and antennae piceous; second joint of antennae a little longer than the third.

Distribution : India : Uttarakhand (Dist-Nainital).

Subfamily HETEROGASTRINAE

Key to genera of subfamily Heterogastrinae

1. Corium shorter than membrane .... ***chauliops***

   Corium longer than membrane .... ***dinomachus***

Genus *Chauliops* Scott

1909. *Chauliops* Distant, *Fauna Brit. India Rhynchota*, **3** : 427.

14. *Chauliops nigrescens* Distant

1909. *Chauliops nigrescens* Distant, *Ann. Mag. Nat. Hist.* **3** : 328.

1910. *Chauliops nigrescens* Distant, *Fauna Brit. India, Rhynchota*, **5** : 35.

Material examined : 1exs, Bhimtal, Dist-Nainital, 8.III.1907, Mus. Coll.

Diagnostic characters : Head pale castaneous brown, with an obscure darker longitudinal fascia on each side between the bases of antennae and the ocelli; antennae pale ochraceous, the first and fourth joints brownish ochraceous; membrane sordidly grayish, with piceous suffusions; connexivum pale luteous, spotted with black; body beneath and legs dull black; Corium shorter than membrane, which vert slightly extends beyond abdominal apex; abdomem beneath coarsely granulose.

Distribution : India : Uttarakhand (Dist-Nainital).

Genus ***Dinomachus*** Distant

1901. *Dinomachus* Distant. *Fauna Brit. India Rhynchota*, **8** : 473.

15. ***Dinomachus rhacinus,*** Distant*

1906. *Dinomachus rhacinus* Distant. *Ann. Soc. Ent. Belg.* **1** : 410.

1988. *Dinomachus rhacinus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ.* Paper No. **107** : **31.**

Material examined : N.W. India; Roorkee; Haridware-Distant (In Book).

Diagnostic characters : Pronotum with the extreme lateral margins piceous, a broken macular black basal fascia, and with a central pale line to posterior lobe; scutellum piceous, with a central pale line on apical area; corium with two small spots on disk, a transverse spot before apex and the apical angle black; membrane bronzy; connexivum spotted with piceous; body beneath piceous, disk of abdomen and legs ochraceous; rostrum reaching the intermediate coxae, basal joint searcely passing base of head; scutellum as long as broad, largely irregularly excavate at each lateral angla, and obliquely depressed on each side at apical area, thickly finely punctuate; corium more sparsely and finely punctuate, the punctures arranged longitudinally.

Distribution : India: Uttarakhand (Dist-Haridwar); West Bengal.

Elsewhere : Sri lanka.

Remarks : No specimen was available for study Distant (1902, 1910) recorded the species from Roorke, Dist. Haridware.

Subfamily APHANINAE

Key to genera the subfamily Aphaninae

1. Hemelytra scarcely extending beyond middle of abdomem ..... ***Manatanus***

   Hemelytra not reaching apex of abdomen ... 2

2. Head long, broad and convex ..... ***Maramaldus***

   Head long, more acute 3

3. Antennae with the first joint distinctly passing apex of head ..... ***Eremocoris***

   Antennae first joints more than half its length passing the apex of the 4

4. Antennae more than half the length of, first joint of antennae nearly as long as the head ..... ***Lethaeus***

Genus ***Manatanus*** Distant

1909. *Manatanus* Distant. *Fauna Brit. India, Rhynchota*, **3** : 494.

16. ***Manatanus Montanus*** Distant

1909. *Manatanus montanus*, Distant. *Ann. Mag. Nat. Hist.* **3** : 495.

1910. *Manatanus montanus* Distant, *Fauna Brit. India, Rhynchota*, **5** : 87.

Diagnostic characters : Head, Pronotum, and scutellum black; lateral margins of the anterior lobe of pronotum white; antennae black; abdomen above and body beneath black; rostrum and legs ochraceous, basal joint of rostrum, anterior femora, more than apical halves of intermediate and posterior femora, and the tibiae more or less black or piceous; membrane narrow, whitish, sometimes divided by black into two large whitish spots.

Distribution : India : Uttarakhand (Dist-Nainital), Simla.

Remarks : No specimen was available for study Distant (1910) recorded the species from Kumaon, Dist- Nainital.

Genus ***Maramaldus*** Distant

1909. *Maramaldus* Distant. *Fauna Brit. India, Rhynchota*, **3** : 333.

17. ***Maramaldus admistus*** Distant

1909. *Maramaldus admistus* Distant. *Ann. Mag. Nat. Hist.*, **3** : 333.

1910. *Maramaldus admistus* Distant. *Fauna Brit. India, Rhynchota*, **5** : 55.

Diagnostic characters : Head, pronotum, scutellum and body beneath shining black; anterior collar and posterior lobe more opaque and strongly punctuate; antennae stramineous, finely pilose, apical joint piceous; rostrum ochraceous, the basal joint piceous; legs stramineous, anterior and intermediate femora with their apical areas piceous; connexivum spotted with stramineous; corium castaneous brown, spotted with white; membrane piceous, with a white spot at apex.

Distribution : India : Uttarakhand (Dist-Kumaon).

Remarks : No specimen was available for study characters are incorporated after Distant (1910).

Genus ***Eremocoris*** Fieb

1861. *Eremocoris* Fieb. *Eur. Hem.* Pp. 49 & 187.

18. ***Eremocoris naini*** Distant*

1909. *Eremocoris naini*, Distant. *Ann. Mag. Nat. Hist.* **3** : 494.

1910. *Eremocoris naini* Distant. *Fauna Brit. India, Rhynchota*, **5** : 85.

Diagnostic characters : Head, Pronotum, and Scutelum dull black; clavus and corium dull ocharaceous, punctured and shaded with piceous the costal margin narrowly ochraceous, a rather distinct piceous spot near middle of costal area, and a similar, rather more obscure spots on disk near apex of clavus; membrane pale piceous, the posterior margin and veins grayish white, forming a looped linear spot near apical margin of corium; body beneath and femora black; tibiae, tarsi, and rostrum brownish ochraceous; head very thickly punctuate; corium somewhat coarsely punctuate, the pale narrow costal margin impunctate except at the region of the piceous central spot; membrane scarcely passing the abdominal apex; rostrum reaching or slightly passing the posterior coxae.

Distribution : India : Uttarakhand (Dist-Nainital).

Remarks : Since no specimen was available for study the characters have been incorporated after Distant (1910).

Genus ***Lethaeus*** Dall

1852. *Lethaeus*. Dall. *List. Hem.* **2**, pp. 532 & 557.

19. ***Lethaeus assamensis*** Distant*

1901. *Lethaeus assamensis* Distant. *Ann. Mag. Nat. Hist.* **8** : 507.

1902. *Lethaeus assamensis* Distant. *Fauna Brit. India, Rhynchota*, **2** : 88.

Material examined : 1ex, Duili, Dist-Tehri Garhwal, 7.X.2001, S. K. Mandal & Party Coll.

Diagnostic characters : Head black; a spot near each anterior angle of the pronotum, two small spots in clavus, and two small central spots to corium ochraceous; antennae fuscous, apical half of third joint ochraceous, fourth joint mutilated in specimen described; membrane pale brownish; body beneath and legs very dark castaneous; rostrum and tarsi brownish-ochraceous. Corium more sparingly punctuate, its half from base brownish-ochraceous and levigate.

Distribution : India : Uttarakhand (Dist-Tehri Garhwal); Assam; Nagaland.

Subfamily COLOBATHRISTINAE

Genus ***Artemidorus*** Distant

1902. *Artemidorus Distant, Fauna Brit. India, Rhynchota*, **11** : 33.

20. ***Artemidorus pressus*** Distant*

1902. *Artemidorus pressus* Distant, *Fauna Brit. India, Rhynchota*, **11** : 34.

1988. *Artemidorus pressus* : Mukhopadhyay, *Rec. zool. Surv. India, Occ.* Paper No **107** : 30.

Material examined : 1ex, Nainital, Dist-Nainital, 12.IV.1908. R.H.

Diagnostic characters : Pale ochraceous; head,anterior lobe of pronotum, laterial margins of posterior lobe, base of scutellum, body beneath and almost apical halves posterior femora black; apex of scutellum luteous, levigate, the central carination

castaneous; apex of abdomen castaneous. Boby, antennae and legs finely pilose, posterior tibiae setosh; head, pronotum and sternum thickly punctuate.

Distribution : India : Uttarakhand (Dist-Nainital); West Bengal.

Elsewhere : Myanmar, Sri lanka.

SUMMARY

The present paper has recorded the account of 20 species of Lygaeidae belonging to 14 genera from the state of Uttrakhand, out of which 9 species, with asteric marks in the text are being reported for the first time from the state. For each species the original and the subsequent references, distributional records in India and elsewhere. Keys of various taxa have been provided. This is the first comprehensive account of Lygaeidae from the state of Uttrakhand.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, Zoological Survey Of India for Providing the Laboratory facilities. Thanks are also due to Dr. A. K. Hazra, Scientist- E for numerous courtesies. Co-operation from the colleagues of the Hemiptera Section are also thankfully acknowledged.

REFERENCES

Chakraborty, S.P. and Ghosh, L.K. State Fauna Series 3 : Fauna Of West Bengal Part-**5** : 421.

Distant, W.L. 1904. Fauna of British India, Including Ceylon and Burma, **2** : 1-93.

Distant, W.L. 1910. Fauna of British India, including Ceylon and Burma, **5** : 1-92.

Distant, W.L. 1918. Fauna of British India, including Ceylon and Burma, **7** : 179-202.

Ghosh, L.K. Biswas, B. Chakaraborty, S.P. And Sen, G.C. 1989. Insecta : Hemiptera, Fauna Of Orissa. State Fauna Series, **1** : 181-224.

Mukhopadhyay, A. 1988, Taxonomic Study of Lygaeidae (Heteroptera : Insecta) from West Bengal (India). *Rec. zool. Surv. India, Occ. Paper* No. **107** : 1-72.

Rawat, R.R. and Modi, B.N. 1909. New host records of predacious bug *Geocoris tricolor* Fabr. (Lygaeidae : Heteroptera) from India, *Indian j. Ent.*, **31**(1) : 74.

Rangarajan, A.V., Vijoyaraghavan, S., Vasanthraraj David, B and Gopalan, M. 1964. A note on the predaceous Lygaeidae, *Geocoris tricolor* Fabr, *Madras Agric, J.*, **51** : 253.

Slater, J.A. 1964a. Hemiptera (Heteroptera) Lygaeidae, *South African Animal Life*, **10** : 127.

Slater, J.A. 1964b. A Catalogue of the Lygaeidae of the World, University of Connecticut storrs. Conn., **1** : 1-778; **2** : 779-1668.

Ushinger, R.l. 1936. The genus Geocoris in the Hawaiian islands (Lygaeidae, Hemiptera) : *Hawaiian Ent. Sr. Proc.*, **9**(2) : 213-215.

The Chart Showing Districtwise distribution of different species of Lygaeidae known from Uttrakhand

Name of species	Districts												
	Almora	Nainital	Dehradun	Haridwer	Tehri Garhwal	Pauri Garhwal	Uttarkashi	Rudraprayag	Pithoragarh	Bageshwar	Chamoli	Champawat	Udham Singh Nagar
1. *Dieuches femoralis*	+		+		+						+		
2. *Dieuches leucocerus*			+			+			+				
3. *Elasmolomus sordidus*			+		+								
4. *Metochus uniguttatus*				+	+	+							
5. *Rhyparothesus sparsus*			+										
6. *Nysius ceylonicus*		+	+										
7. *Nysius minor*		+											
8. *Nysius lacustrinus*		+											
9. *Spilostethus pandurus militaris*		+							-				
10. *Spilostethus hospes*		+				-			-				
11. *Graptostethus trisignatus*		+											
12. *Graptostethus servus*		+	-			+			-				
13. *Graptostethus maculates*			+		+								
14. *Chauliops nigrescens*		+											
15. *Dinomachus rhacinus*		-		+				-	-				-
16. *Manatanus montanus*	-	+		-									-
17. *Maramaldus admistus*		+		-									-
18. *Eremocoris naini*	-	+		-		-		-				-	-
19. *Lethaeus assamensis*	-	-		-	+			-	-	-			-
20. *Artemidorus pressus*	-	+		-			-	-	-			-	

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 229-244.

INSECTA : HEMIPTERA : PENTATOMOIDEA

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INTRODUCTION

The pentatomids commonly known as 'Shield bugs' are heteropterous insects, mostly phytophagous in nature although the species belonging to the sub-families Asopinae & Amyotinae are wholly or partially predaceous and a few species are minor pests. These insects are also known as 'Stink bugs' as most of them emit a nauseous odor.

These insects are characterized by large scutellum either covering the whole abdomen or occupying a large portion of the base of the abdomen between the hemelytra. They are moderate to large insects often brightly coluored and known to occur in tropical & temperate zone, mostly abundant in tropical region.

A little over 590 species (Distant 1902, 1908, 1918 Ahamad & Afzal 1989, Ahamad & Maizuddin 1990, Durai 1987 Dutta, Ghosh & Dhar 1985) are known to occur in India, against about 5000 species from the world. Distant W.L. (1906, 1912) had recorded 6 species under 6 genera from the hill region of Uttar Pradesh presently known as Uttarakhand state. The present work is an attempt to provide a comprehensive account of the Super Family Pentatomoidea from the state of Uttarakhand.

This paper deals with 40 species under 33 genera belonging to 9 families of the Super Family Pentatomoidea. Of these, 35 spcies under 28 genera are reported for the first time from the state of Uttarakhand.

The materials deals with are collected by different survey parties as well as specimens housed in the National Zoological Collection, Beside, the specimens recorded by earlier workers are also been incorporated.

SYSTEMATIC ACCOUNT

Super Family PENTATOMOIDEA
Family PENTATOMIDAE
Division Halyaria
Genus ***Erthesina*** Spin., 1837

1. *Erthesina fullo* (Thumb.)
2. *Erthesina guttata* (Fabr.)

Genus ***Halys*** Fabr., 1803

*3. *Halys dentatus* (Fabr.)

Genus ***Dalpada*** Amy. & Serv. 1843

4. *Dalpada affinis* Dall.
5. *Dalpada clavata* (Fabr.)

Division Sciocoraria
Genus ***Sciocoris*** Fallen, 1829

6. *Sciocoris indicus* Dall.

Division Carpocoria
Genus ***Tolumnia*** Stal, 1876

7. *Tolumnia latipes* (Dall.)

Genus ***Palomena*** Mals & Ray, 1866

8. *Palomena reuteri* Dist.
9. *Palomena spinosa* Dist.

Genus ***Dolycoris*** Stal, 1876

10. *Dolycoris baccarum* (Linn.)
11. *Dolycoris indicus* Stal

Division Antestiaria
Genus ***Apines*** Dall., 1851

*12. *Apines concinna* Dall.

Division Eusarcocoriaria
Genus ***Eysarcocoris*** Stal, 1864

13. *Eysarcocoris ventralis* (Westw.)

Genus ***Carbula*** Stal, 1864

14. *Carbula indica* (Westw.)

Division Eurydemaria
Genus ***Agonoscelis*** Spin, 1837

15. *Agonoscelis nubilia* (Fabr.)

Genus ***Bagrada*** Stal, 1862

*16. *Bagrada picta* (Fabr.)

Division Tropicoraria
Genus ***Priassus*** Stal, 1867

17. *Priassus exemptus* (Walk.)

Genus ***Dognetus*** Dist.

18. *Dognatus serratus* (Dist.)

Division Nezaria
Genus ***Nezara*** Amy. & Serv., 1843

19. *Nezara viridula* (Linn.)

Family ASOPINIDAE
Genus ***Asopus*** Burm., 1834

*20. *Asopus janus* (Fabr.)

Genus ***Zicrona*** Amy & Serv., 1843

21. *Zicrona caerulea* (Linn.)

Genus ***Canthecona*** Amy. & Serv., 1843

22. *Canthecona binotata* Dist.
23. *Canthecona furcellata* (Wolff.)

Genus ***Cazira*** Amy. & Serv., 1843

24. *Cazira verrucosa* (Westw.)
25. *Cazria friwaldsky* Horv.

Family TESSERATOMIDAE
Genus ***Eurostus*** Dall., 1851

26. *Eurostus grossipes* Dall.

Family PLATASPIDAE
Genus ***Coptosoma*** Dallas, 1851

27. *Coptosoma siamicum* Walk.

Genus ***Tarichea*** Stal, 1865

28. *Tarichea nitens* (Dall.)

Family DINIDORIDAE
Genus ***Aspongopus*** Laporte, 1832

29. *Aspongopus janus* (Fabr.)

Genus ***Clycopelta*** Amy. & Serv., 1843

30. *Clycopelta siccifolia* (Westw.)

Family PHYLLOCEPHALIDAE
Genus ***Randolotus*** Dist., 1902

*31. *Randolotus elongatus* Dist.

Genus ***Megarhynchus*** Lap., 1832

32. *Megarhynchus rostratus* (Fabr.)

Family UROSTYLIDAE
Genus ***Urolabida*** Westw

33. *Urolabida histrionica* (Westw.)

Genus ***Urostylis*** Westw

34. *Urostylis pallida* Dall.

Genus ***Urochela*** Dall.

35. *Urochela bimaculata* Dall.

Family ACANTHOSOMATIDAE
Genus ***Anaxandra*** Stal, 1876

36. *Anaxandra nigrolineata* Stal

Genus ***Sastragala*** Amy. & Serv., 1843

37. *Sastragala murrecana* Dist.

Family SCUTELLERIDAE
Genus ***Cantao*** Amy. & Serv., 1843

38. *Cantao ocellus* (Thunb.)

Genus ***Chrysocoris*** Hahn, 1834

39. *Chrysocoris fascilis* (White)

Genus ***Lampocoris*** Stal, 1864

40. *Lampocoris lateralis* (Guer)
41. *Lampocoris roylii* (Westw.)

Genus ***Scutellera*** Lam, 1801

42. *Scutellera nobilis* (Fabr.)

Genus ***Poecilocoris*** Dall., 1848

43. *Poecilocoris interruptus* (Westw.)

Family CYDINIDAE
Genus ***Brachypelta*** Amy. & Serv., 1834

*44. *Brachypelta aterrima* (Forst.)

*Species recorded by W.L. Distant in his Fauna of British India including Ceylon and Burma, Rhynchota Vol-1.

Super Family PENTATOMOIDEA
Key to the families of the Super family Pentatomoidea

1. Hemelytra longer than the body; folded in at the base of membrane; head clypeated ..... PLATASPIDAE
– Hemelytra straight; not folded in at the base of the membrane 2
2. Scutellum covering the whole of the hemelytra excepting extreme base of outer margin ..... SCUTELLERIDAE
– Scutellum of moderate size, corium always exposed 3
3. Spiracle of basal ventral segment not hidden by metasternum ..... TESSARAOTOMIDAE

– Spiracle of basal ventral segment hidden by posterior margin of metasternum 4

4. Scutellum never extending beyond middle of abdomen its apex broad and membrane large ..... DINIDORIDAE

- Scutellum extending to about or beyond middle of abdomen rarely shorter, if shorter the apex narrowed and very slightly produced behind the frena; membrane moderate or small 5

5. Tarsi with two joints .... ACANTHOSOMATIDAE

– Tarsi with three joints 6

6. Rostrum passing the anterior coxae 7

– Rostrum short; not passing anterior coxae 8

7. Rostrum slender, basal joint not incrassated, nor inserted at labrum .... PENTATOMIDAE

– Rostrum robust; basal joint incrassated, inserted at labrum ..... ASOPINIDAE

8. Basal joint of antennae not reaching apex of head ..... PHYLLOCEPHALIDAE

– Basal joint of antennae much longer than head ..... UROSTYLIDAE

Family PENTATOMIDAE
Division HALAYARIA

Key to genera of the Division Halyaria

1. Anterior and posterior tibiae dilated .... ***Erthesina***

- Anterior tibiae sometimes dilated posterior tibiae simple 2

2. Head elongated, tapering infront, and longer than pronotum ..... ***Halys***

– Head rounded or truncated at apex; lateral margin of head toothed near apex .... ***Dalpada***

Genus ***Erthesina*** Spin., 1837

1837. *Erthesina* Spin., *Ess.*, : 291.

Key to Sspecies of the genus *Erthesina*

1. Black, rostrum reaching the third abdominal segment; scutellum black, coarsely punctate with scattered ochraceous callosities .... *fullo*

– Olivaceous green, rostrum reaching the fourth abdominal segment; scutellum with three small basal spots and the apex ochraceous ..... *guttata*

1. ***Erthesina fullo*** (Thunberg)

1783. *Cimex fullo* Thunb., *Nov. Ins. Spec.*, **2** : 42.

1904. *Erthesina fullo* : Distant, *Fauna Brit. India*, **1** : 177.

1998. *Erthesina fullo* : Chakraborty, S.P. & Ghosh, L.K., *State Fauna Series 4 : Fauna of Meghalaya Part-4* : 403.

Material examined : 1 ex., Nainital, Dist. Nainital., 15.iv.08, Mus coll; 1ex., Dist. Nainital., 20.iv.09 Mus coll; 1ex., Mussouri. Dist. Dehra Dun,? Mus. Coll.

Diagnositic character : Head punctate with a central longitudinal line, ocelli and inner margins of eyes ochraceous; pronotum and scutellum thickly punctate with ochraceous callosities, central line to pronotum, lateral and anterior margin ochraceous; four longitudinal fasciae to head beneath, sternal and abdominal incisures, transverse lines at abdominal stigmata, marginal and sub apical spot to abdomen black; corium purplish brown, second joint of rostrum longer than third.

Length : 20-25 mm.

Distribution : Uttarakhand (Dist. : Nainital), Assam, Andaman Island, Andhra Pradsh, Kerala, Sikkim.

Elsewhere : China, Japan, Sri Lanka.

2. ***Erthesina guttata*** (Fabr.)

1787. *Cimex guttata* Fabr., *Ins Mant.*, **2** : 291.

1904. *Erthesina guttata* : Distant, *Fauna Brit. India*, **2** : 117.

Material examined : 1 ex., Nainital, Dist. Nainital., 30.v.98..

Diagnositic character : Head black, strongly punctate, a central longitudinal line at the middle of the head and pronotum, inner margin of eyes and the ocelli, base of apical joints of antennae ochraceous; pronotum and scutellum black thickly punctate, corium purple brown; scutellum and pronotum with scattered small ochraceous callosities, connexivum alternate with ochraceous and piceous.

Length : 20-25 mm.

Distribution : Uttarakhand (Dist. : Nainital).

Elsewhere : Sri Lanka.

Genus ***Halys*** Fabricius, 1830

1830. *Halys* Fabr., *syst. Rhyng.*, : 180.

3. ***Halys dentatus*** (Fabricius)

1775. *Cimex dentatus* Fabr., *Syst. Ent.*, : 702.

1904. *Erthesina dentatus* : Distant, *Fauna Brit. India*, **1** : 119.

Material examined : 3 exs., Haridwar, Dist Haridwar., ?. coll. J.W.M.; 1 ex., Dehra Dun, Dist Dehra Dun.,?.

Diagnositic character : Body dull ochraceous, darkly and thickly punctate, margin and central lobe of head, scutellum with short basal and obscure central discal fasciae, two marginal spots before apex of corium with some obscure discal patchs black; membrane grayish brown; legs ochraceous finely spotted with piceous, more thickly at apices of femora and tibiae, antennae piceous apices of the second and third and base of the fifth joint luteous.

Length : 17-23 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun, Haridwar) Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Tamil Nadu, U.P., West Bengal.

Elsewhere : Sri Lanka.

Genus ***Dalpada*** Amy. & Serv., 1843

1843. *Dalpada* Amy. & Serv., *Hem.*, : 105.

4. ***Dalpada affinis*** Dallas

1851. *Dalpada affinis* Dall., *List. Hm.*, : 185.

1904. *Daplada affinis* : Distant, *Fauna Brit. India*, **1** : 112.

1998. *Daipada affinis : Chakraborty & Ghosh, State Fauna Series, 4 : Fauna of Meghalaya, Part-4* : 172.

Material examined : 1 ex., Mussouri, Dist. Dehra Dun, 20.vi.05, coll. Brunetti.

Diagnositic character : Body pale luteous, punctured with brassy black dots; head longer, lateral margins of pronotum shorter, serrate, more tuberculous and ochraceous at their apices; body beneath ochraceous with the abdominal disc less impunctate.

Length : 17-18 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun) Sikkim.

5. ***Dalpada clavata*** (Fabricius)

1798. *Cimex clavata* Fabr., *Ent. Syst. Suppl.*, : 532.

1904. *Daplada clavata* : Dist., *Fauna Brit. India*, **1** : 113.

Material examined : 10 exs., Nainital, Dist. Nainital., v-vi-1893, coll. Lucknow Mus.

Diagnositic character : Body ochraceous with bronzy or dark green markings, head elongate and longer; lateral pronotal angles obtuse nodulose and inwardly marked with two furrows; abdomen beneath occasionally with double series discal spots.

Length : 14-17 mm.

Distribution : Uttarakhand (Dist. : Nainital) Assam, Maharashtra, Meghalaya.

Elsewhere : Mayanmar and Siam.

Division SCICOCORARIA

Genus ***Sciocoris*** Fallen, 1820

1820. *Sciocoris* Fallen, *Hem., Suec.*, : 20.

6. ***Sciocoris indicus*** Dall

1851. *Sciocoris indicus* Dall., *List. Hm.*, : 132.

1904. *Sciocoris indicus* : Dist., *Fauna Brit. India*, **1** : 1.

Material examined : 1 ex., Mussouri, Dist. Dehra Dun, ?, coll. Brunetti.

Diagnositic character : Body dull ochraceous; thickly and darkly punctate; the central levigate line of the pronotum extending through the scutellum, with pale grayish ochraceous apex; sternum with a narrow pale fascia on each lateral area; connexivum ochraceous, spotted with piceous.

Length : 5.5-6 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun) Kerala, North India.

Division CARPOCORARIA

Key to genera of the Division Carpocoraria

1. Connexivum punctured only with brown or black ..... ***Palomena***

– Connexivum spotted or punctured with black 2

2. Odoriferous orifices on metasternum long accuminates margin of pronotum elevated or callous ..... ***Tolumnia***

– Odoriferous orifices on metasternum short, abruptly abbreviated; frena extending beyond scutellum ..... ***Dolycoris***

Genus ***Palomena*** Muls. & Rey, 1866

1866. *Palomena* Muls & Rey, Pun. France, Pent., : 271 &

Key to species of the genus Palomena

1. Antennae luteous with its apical joint fuscous, third joint longer than second but shorter than fourth; pronotum with laterial angles rounded ..... *reuteri*

– Antennae with the first, second and third joints green, fourth and the whole fifth brown, second joint longer than the third, fourth and fifth subequal; pronotum with lateral angle produced into broad obtusely pointed spines ..... *spinosa*

7. ***Palomena reuteri*** Distant

1879. *Palomena reuteri* Dist., *Tr. E. S.*, 122.

1904. *Palomena reuteir* : Dist., *Fauna Brit. India*, **1** : 156.

Material examined : 4ex., Nainital, Dist. Nainital., v.vi.1893, Lucknow Mus. Coll.; 2exs., Mussouri, Dist. Dehra Dun 22.vi.1958, coll. A.P, Kapoor; 2exs., Mussouri, Dist Dehra Dun., 20-24.vi.05, coll., Brunetti.

Diagnositic character : Body green; head bronzy, thickly punctate with black central lobe slightly shorter than lateral lobes; antennae luteous, apical joints fuscous, third joint longer than second but shorter than fourth; rostrum luteous with its apex black; pronotum thickly punctate with its lateral angle prominent and rounded; scutellum, corium and membrance bronzy, thickly and darkly punctate.

Length : 11-12 mm.

Distribution : Uttarakhand (Dist. : Nainital, Dehra Dun) Jammu & Kashmir, Punjab.

8. ***Palomena spinosa*** Distant

1880. *Palomena spinosa* Dist., *Tr. E. S.*, 149.

1904. *Palomena spinosa* : Dist., *Fauna Brit. India*, **1** : 157.

Material examined : 3exs., Dahakwani, Dist. Tehri Garhwal., 5.viii.58, coll. B.S. Lamba.

Diagnositic character : Body above green, head with the lateral lobes longer than the central; first, second, third, joints of antennae green; fourth and fifth brown; pronotum punctate with the lateral angles produced into pointed spines somewhat ronded slightly black at apices.

Length : 13-14 mm.

Distribution : Uttarakhand (Tehri Garhwal).

Genus ***Tolumnia*** Stal, 1867

1867. *Tolumnia* Stal, *Ofv. Vet.-Ak. Forh.*, : 515.

9. ***Tolumnia latipes*** (Dallas)

1857. *Pentatoma latipes* Dall., *List. Hem.*, : 238.

1904. *Tolumnia latipes* : Dist., *Fauna Brit. India*, **1** : 154.

Material examined : 1ex., Dehra Dun, Dist Dehra Dun.,?,?.

Diagnositic character : Body pale chocolate brown, thickly punctured; central lobe of head, lateral and margin of pronotum, a large spot on each basal angle and the apex of scutellum luteous; body beneath and legs luteous; connexvium alternately black and luteous; three small spots on each lateral area of the sternum; tibiae tarsi and the apex of the rostrum black.

Length : 9-10 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun) Meghalaya, Nagaland, Sikkim.

Elsewhere : Java, Hong Kong, Malayan Peninsula, Siam.

Genus ***Dolycoris*** Stal, 1872

1872. *Dolycoris* Stal, *Ofv. Vet.-Ak. Forh.*, **3** : 38.

Key to species of the genus *Dolycoris*

1. Head, pronotum, scutellum densely punctate, membrane usual & grayish ..... *baccarum*

– Head, pronotum, scutellum less densely punctate, membrane longer ..... *indicus*

10. ***Dolycoris baccarum*** (Linneaus)

1761. *Cimex baccarum* Linn., *Faun. Suec.*, **2** : 249, 928.

1904. *Dolycoris baccarum* : Dist., *Fauna Brit. India,* **1** : 169.

1998. *Dolycoris baccarum* : Chakraborty & Ghosh, *State Fauna Series, 4 : Fauna of Meghalaya, Part-4* : 392.

Material examined : 2exs., Nainital, Dist Nainital., 12-13.vi.07, Mus coll., 1ex., Mussouri, Dist. Dehra Dun, Mus. coll.

Diagnositic character : Body ochraceous with thick puntures, antennae black with basal joint and bases of other joints luteous; lateral margins of pronotum, apex of the lateral lobes of head luteous, connexivum spotted with black at the incisures, small black spots near coxae; lateral area of prosternum and disc of the abdomen with sporadic black punctures; membrane grayish with the veins darker.

Length : 12-14 mm.

Distribution : Uttarakhand (Dist. : Nainital) Jammu & Kashmir and Karnataka.

11. ***Dolycoris indicus*** Stal

1876. *Dolycoris indicus* Stal, *En. Hem.*, : 76.

1904. *Dolycoris indicus* : Distant, *Fauna Brit. India,* **1** : 160.

1998. *Dolycoris indicus* : Chakraborty & Ghosh, *State Fauna Series, 4 : Fauna of Meghalaya,* Part-4 : 398.

Material examined : 4exs., Srinagar, Dist Pauri Gharwal., 26.iv.1958, coll. B.S. Lamba, 1ex., Dehra Dun, Dist. Dehra Dun, coll. K.K. Tewari

Diagnositic character : This species differs from the D. indicus by narrow body, membrane longer; head pronotum scutellum sparingly punctate.

Length : 9.5 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun, Pauri Garhwal), Karnataka, Maharastra, Nagaland.

Division EUSARCORARIA

Key to genera of the Division Eusarcoraria

1. Scutellum a little narrowed on posterior half, almost as long as corium ..... ***Eysarcocoris***

– Scutellum apically narrowed and distinctly shorter than corium ..... ***Carbula***

Genus ***Eysarcocoris*** Stal, 1864

1864. *Eysarcocoris* Stal, Hem. Afr., 1 : 135.

12. ***Eysasrcocoris ventralis*** (Westwood)

1837. *Pentatoma ventralis* Westw., *in Hope cat.,* **1** : 30.

1904. *Eysarcocoris ventralis* : Distant, *Fauna Brit. India,* **1** : 167.

1998. *Eysarcocoris ventralis* : Chakraborty & Ghosh, *State fauna Series, 4 : Fauna of Meghalaya, Part-4* : 402.

Material examined : 1ex., Gular bojh, Dist. Nainital., 17-20.iv.07, Mus. coll.

Diagnositic character : Body brownish ochraceous, darkly and thickly punctate, pronotum thickly punctate with its anterior area luteous and with two large transverse on brassy black spots on head lateral margin of pronotum and a rounded spot near each basal angle of scutellum luteous; central disk of the abdomen brassy black.

Length : 5.5-6.5 mm.

Distribution : Uttarakhand (Dist. : Nainital), Bihar, Karnataka, Maharastra.

Elsewhere : Mayanmar, Malayan Peninsula.

Genus ***Carbula*** Stal

1864. *Carbula* Stal, Hem. Afr., **1** : 140.

13. ***Carbula indica*** (Westwood)

1837. *Pentatoma indica* Westw., *In Hope cat.,* **1** : 42.

1904. *Carbula indica* : Distant, *Fauna Brit. India,* **1** : 171.

1998. *Carbula indica* : Chakraborty & Ghosh, *State Fauna Series, 4 : Fauna of Meghalaya, Part-4* : 401.

Material examined : 1ex., Bhimtal, Dist Nainital., 25.ix.07, coll. Mus.

Diagnositic character : Body brownish ochraceous, thickly punctate, pronotal angles concave beneath, thair apices broadly subacute, abdomen beneath with a broad central black fascia with its margin notched and the rostrum reaching the third abdominal segment.

Length : 7-8 mm.

Distribution : Uttarakhand (Dist. : Nainital), Skkim, West Bengal.

Elsewhere : Nepal.

Division EURYDEMARIA

Key to genera of the Division Eurydemaria

1. Body remotely pilose ..... ***Agonoscelis***

– Body glabrous, not pilose; pronotum with the anterior margin moderately truncate and neither elevated nor callous ..... ***Bagrada***

Genus ***Agonoscelis*** Spin., 1837

1837. *Agonoscelis* Spin., Ess., : 327.

14. ***Agonoscelis nubila*** (Fabricius)

1837. *Cimex nubila* Fabr., *Syst. Ent.*, : 721.

1904. *Agonoscelis nubila* : Dist., *Fauna Brit. India*, **1** : 189.

1998. *Agonoscelis nubila* : Chakraborty & Ghosh, *State Fauna Series, 4 : Fauna of Meghalaya, Part-4* : 399.

Material examined : 1ex., Dehra Dun, Dist Dehra Dun., iii.45.1956, K.K. Tewari.

Diagnositic character : Body covered with thick black punctures barring lateral margins and central fascia to pronotum; corium levigate more or less orange yellow; some scattered luteous rugosities on the anterior lateral area of the scutellum; connexivum orange yellow with black spots at the apices of the incisures, lateral margins of sternum and abdomen orange yellow; a double lateral series of black spots to sternum and abdomen.

Length : 10-11 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun); Jammu & Kashmir, Karnataka, Maharastra, Meghalaya, Nagaland, Punjab, Tamil Nadu, West Bengal.

Elsewhere : China, Japan, Mayanmar, Malay Peninsula, Sri Lanka.

Genus ***Bagrada*** Stal, 1862

1862. *Bagrada* Stal, *Stett. Ent. Zeith.*, **23** : 105.

15. ***Bagrada picta*** (Fabricius)

1775. *Cimex picta* Fabr., *Syst. Ent.*, : 715.

1904. *Bagrada picta* : Distant, *Fauna Brit. India*, **1** : 193.

1998. *Agonoscelis picta* : Chakraborty & Ghosh, *State Fauna Series, 4 : Fauna of Meghalaya, Part-4* : 399.

Material examined : 2exs., Nainital, Dist Nainital., 6-18.iv.07, Mus. Coll.; 1ex., Nainital, Nainital Dist., Mus., coll.; 1ex., Nainital, Nainital Dist, Mus. coll.

Diagnositic character : Body black, anterior and lateral margins of pronotum, a spot near each basal angle and a spot on each margin before apex of scutellum, lateral lobes of head, a marginal fascia to corium terminating in a rounded discal spot, ochraceous, connexivum spotted with black, a streak to head, lateral marginal spots to strnum and abdomen, transverse discal segmental lines and sgmental spots becoming larger posteriorly black, membrane fuliginous, antennae black, legs spotted with black.

Length : 5-7 mm.

Distribution : Uttarakhand (Dist. : Nainital); Manipur, Maharastra, West Bengal.

Elsewhere : Sri Lanka.

Division TROPICORARIA

Key to genera of the Division Tropicoraria

1. Antennae five jointed; anterior margin of pronotal angle straight, apices acute or sub acute ..... ***Priassus***

– Antenae four jointed ..... ***Degonetus***

Genus ***Priassus*** Stal, 1867

1867. *Priassus Stal. Ofv. Vet.-Ak. Forh.*, 1518.

16. ***Priassus examptus*** (Walker)

1868. *Priassus examptus* Walk., *Cat. Het.*, **3** : 539.

1904. *Priassus examptus* : Distant, *Fauna Brit. India*, **1** : 206.

Material examined : 1ex., Mossouri, Dist. Dehra Dun., 20-24. vi.05, coll Brunetti : 1ex., Nainital, Dist. Nainital Coll. Mus.

Diagnositic character : Body luteous; lobes of the head are equal in length; corium thickly and coarsely punctate; pronotal angle less produced,a fw scattered black punctured on posterior area of corium.

Length : 16-19 mm.

Distribution : Uttarakhand (Dist. : Nainital, Dehra Dun); Nagaland.

Genus ***Degonetus*** Distant. 1904

1904. *Degonetus* Distant, *Fauna Brit. India*, **1** : 208.

17. ***Deognatus serratus*** (Distant)

1887. *Abeona serratus* Distant, *Tr. E.S.*, : 350.

1904. *Deognatus serratus* : Distant, *Fauna Brit. India*, **1** : 209.

Material examined : 1ex., Dehra Dun., Dist. Dehra Dun, 24.v.1962, coll. N.R.S.

Diagnositic character : Body ochraceous with thick dark punctures, connexivum reddish ochraceous with black spots near bases and apices of segmental incesures; antennae having first and second joints dark ochraceous, third and fourth lustrous, pronotal lateral angles bispined and broadly produced; scutellum with small black spot in each basal angle; head with a black spot on each side near base of membrane.

Length : 12-14 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun); Maharashtra.

Division NEZARIA

Genus ***Nezara*** Amy. & Serv., 1843

1843. *Nezara* Amy. & Serv., *Hem.*, : 143.

18. ***Nezara viridula*** (Linnaeus)

1758. *Cimex viridula* Linn., *Syst Nat. ed.*, **10** : 444.

1904. *Nezara viridula* : Distant, *Fauna Brit. India*, **1** : 220.

Material examined : 4exs., Dehra Dun., Dist. Dehra Dun., ?, ?.

Diagnositic character : Body dark green to greenish ochraceous, punctate, antennae green; apices of the third and apical area of fourth, fifth joints purplish brown; sometimes head, anterior area and lateral margins of pronotum pale luteous; often with two spots at the base of head, three spots at the anterior area of pronotum, three basal and an apical spot to scutellum and a discal spot on apical area of corium, green.

Length : 12-16 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun); Cosmopolitan.

Family ASOPINIDAE

Key to genera of the family Asopinidae

1. Anterior femora unarmd; second joint of antennae very little longer than third ..... ***Zicorna***

– Anterior femora with a prminant spine 2

2. Lateral pronotal margins crenulated nor dentate ..... ***Canthecona***

– Lateral pronotal margins nither crenulated nor dentate, head short; intermediate and posterior femora spined before apex ..... ***Cazira***

Genus ***Zicorna*** Amy. & Serv., 1843

1843. *Zicorna* Amy., & Serv. *Hem.*, : 86.

23. ***Zicorna caerules*** (Linnaeus)

1775. *Cimex caerules* Linn., *Syst. Nat. ed 10*, **1** : 445.

1904. *Zicrona caerules* : Distant, *Fauna Brit. India*, **1** : 255.

Material examined : 3exs., Mossouri, Dist. Dehra Dun., 20-24.v.05, coll Brunetti.

Diagnositic character : Body dark blue to violaceous; antennae and membrane black; scutellum a little gibbous at base; above finely punctate.

Length : 9-10 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun.); Jammu & Kashmir, Nagaland, West Bengal.

Elsewhere : Mayanmar.

Genus ***Canthecona*** Amy. & Serv., 1843

1843. *Canthecona* Amy., & Serv. *Hem.*, : 81.

19. ***Canthecona binotata*** Distant

1879. *Canthecona binotata* Distant, *A.M.N.H.* (5)**3** : 47.

1904. *Canthecona binotata* : Distant, *Fauna Brit. India*, **1** : 249.

Material examined : 4exs., Dehra Dun., Dist. Dehra Dun, ?. coll. Wood.

Diagnositic character : Body luteous densely punctured with brown; lateral lobes of head punctured with brassy black, rostrum luteous, antennae with first and second joints luteous, third and fourth fuscous with luteous at base; pronotum deflected towards head with a central raised longitudinal line through out scutellum, lateral angle produced into short black spins, corium with a subcostal black spot beyond middle, membrane blackish with apical half whitish; lateral abdominal margins with a series of green spots, and a large sub apical blackish spot.

Length : 15 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun.), Nagaland.

20. *Canthecona furecllata* (Wolff.)

1801. *Cimex furcellata* Wolff., *le.*, **5** : 182.

1904. *Canthecona furcellata* : Distant, *Fauna Brit. India,* **1** : 248.

Material examined : 2exs., Bhimtal, Dist. Nainital., 22-23.ix.06, coll. N.A.

Diagnositic character : Body ochraceous with thick bronzy punctures; head with a central fascia; pronotum with a broken central fascia and some distinct longitudinal fascia on anterior half and lateral angle bronzy black; scutellum bronzy black at base with a large spot at each basal angle, connexivum punctate with subquadrate bronzy black spot; apices of the lateral pronotal angles bifid with the anterior spine longest and the ante rior lateral pronotal margin finely dentate.

Length : 15-16 mm.

Distribution : Uttarakhand (Dist. : Nainital), Bihar, Maharashtra, Tamil Nadu, West Bengal.

Elsewhere : Java, Mayanmar, Sri Lanka.

Genus *Cazira* Amy. & Serv., Hem., 78

1843. *Cazira* Amy., & Serv. *Hem.*, : 78.

21. *Cazira verrucosa* (Westwood)

1835. *Pentatoma verrucosa* Westw., *Zool, Journ.*, **5** : 445.

1904. *Cazira verrucosa* : Distant, *Fauna Brit. India,* **1** : 245.

Material examined : 5exs., Dehra Dun., Dist. Dehra Dun, 4.v.1956. coll. K.K. Tiwari.

Diagnositic character : Body reddish ochraceous punctured with fuscous; pronotum with the lateral angle produced into a short spine, notched on their posterior margins, head, pronotum, scutellum rugosely tuberculate with two large and conspicuous convex tubercles on basal area; corium punctate with costal area rugose, intermediate and posterior femora and tibae annulated with white.

Length : 10-11 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun.), Assam, Meghalaya, Nagaland, Skkim, West Bengal.

Elsewhere : Malabar.

22. *Cazira friwaldskyi* Horv

1899. *Cazira friwaldskyi* Horv., *Termesz. Fizetek;* **12** : 33.

1904. *Cazira friwaldskyi* : Distant, *Fauna Brit. India,* **1** : 246.

Material examined : 1ex., Premnagar, Dist. Dehra Dun., 1.9.1906, coll. K.C. Basu.

Diagnositic character : Body shiningly punctate; head black with a longitudinal line; pronotum black, punctate, with four tubercles and thir apices fusco-cinnmoneous, the anterior lateral margin slightly denticulate, the posterior area with seven tubercles, four anterior and three posterior, a discoidal transverse callosity on each side recurvd, scutellum with a large black discoidal callosity.

Length : 10 mm.

Distribution : Uttarakhand (Dist. : Dehra Dun.), Western Himalayas.

Family TESSARATOMDAE

Genus *Eurostus* Dallas, 1851

1851. *Eurostus Dall., List. Hem.*, **1** : 343.

24. *Eurostus grossipes* Dallas

1904. *Eurostus grossipes* Dall., *List. Hem.* **1** : 343.

1904. *Eurostus grossipes* : Distant, *Fauna Brit. India,* **1** : 268.

Material examined : 1ex., Nainital, Dist. Nainital., ?, coll Mus.

Diagnositic character : Head, pronotum, scutellum, connexivum opaque with an olivaceous spot, pronotum finely wrinkled transversely with its lateral margin brown; the apex of the scutellum ochraceous; at the base of each segment connexivum with an ochraceous spot; body dull ciolaceous beneath; the basal joint of antennae brownish ochraceous, second black, the apex of the fourth joint ferruginous.

Length : 30-36 mm.

Distribution : India : Uttarakhand (Dist. : Nainital), Assam, Meghalaya, Skkim, West Bengal.

Family PLATASPIDAE

Key to genera of the family PLATASPIDAE

1. Lateral margin of pronotum strongly dilated ..... *Tarichea*

– Lateral margin of pronotum not strongly dilated ..... *Coptosoma*

Genus *Tarichea* Stal, 1865

1865. *Tarichea* Stal, *Ann. Soc. Ent. F.*, (4)**5** : 163.

25. *Tarichea nitens* Dallas

1865. *Tarichea nitens* Dall., *List. Hem.* **1** : 74.

1904. *Tarichea nitens* : Distant, *Fauna Brit. India,* **1** : 6.

Material examined : 56exs., Dehra Dun, Dist. Dehra Dun.,?.

Diagnositic character : Body shiningly olivaceous black; rostrum, antennae, body beneath legs brownish ochraceous; a central fascia to abdomen olivaceous black bellow with a basal ochraceous spot, finely punctate.

Length : 9 mm.

Distribution : India : Uttarakhand (Dist, Dehra Dun).

Genus *Coptosoma* Lap, 1832

1832. *Coptosoma* Lap., *Ess. Hem.,* : 73.

26. *Coptosoma siamicum* Walker

1867. *Coptosoma siamicum* Walker, *Cat. Het.,* **1** : 80 & 39.

1904. *Coptosoma siamicum* : Distant, *Fauna Brit. India,* **1** : 30.

Material examined : 1ex., Almora, Almora Dist., 5-19.viii.11, coll. C. Paiva.

Diagnositic character : Body black shining; extreme lateral margin of head black, pronotum with the anterior margin having two small spot, the lateral margin intersected by a black line and a spot at lateral angle ochraceous, scutellum with a spot at apices and a smaller spot near basal angle, ochraceous; body bellow black, head beneath, rostrum, antennae and legs reddish ochraceous.

Length : 2.25-2.50 mm.

Distribution : India : Uttarakhand (Dist. Almora), West Bengal.

Elsewhere : North Australia, Mayanmar, Malay Archepelago, Siam, Sri Lanka.

Family DINIDORIDAE

Key to genera of the family DINIDORIDAE

1. Antennae five jointed ..... ***Aspongopus***
- Antennae four jointed; head small, lateral lobes a little longer than central lobe .... ***Cyclopelta***

Genus *Aspongopus* Laporte, 1832

1832. *Aspongopus* Laporte, *Ess. Hem.,* : 58.

27. *Aspongopus janus* (Fabricius)

1775. *Cimex Janus* Fabr., *Syst. Ent.,* : 714.

1904. *Aspongopus janus* : Distant, *Fauna Brit. India,* **1** : 281.

Material examined : 3exs., Haridwar, Dist. Haridwar.,?, coll. J.W.M.

Diagnositic character : Body ochraceous or sanguinous, head, antennae, membrane, basal half of scutellum, transverse fascia to pronotum black; antennae with third joint a little longer than first, shorter than remaining joints.

Length : 16-20 mm.

Distribution : India : Uttarakhand (Dist., Haridwar), Karnataka, Kerala, Maharashtra, Meghalaya, Tamil Nadu, West Bengal.

Elsewhere : Mayanmar.

Genus *Cyclopelta* Amy. & Serv., 1843

1843. *Cyclopelta siccifolia* Amy. & Serv., *Hem.,* : 172.

28. *Cyclopelta siccifolia* (Westwood)

1775. *Aspongopus siccifolia* Westw. *In Hope Cat.,* **1** : 20.

1904. *Cyclopelta siccifolia* : Distant, *Fauna Brit. India,* **1** : 280.

Material examined : 12exs., Dehra Dun, Dist. Dehra Dun.,?, coll. J. Wood.

Diagnositic character : Body entirely black; membrane brownish ochraceous; connexivum concolours, neither red nor spotted with black; scutellum sometimes with a small sanguineous spot at base.

Length : 11-16 mm.

Distribution : India : Uttarakhand (Dist., Dehra Dun), Andhra Pradesh, Maharashtra, Meghalaya, Sikkim, West Bengal.

Elsewhere : Mayanmar, Sri Lanka.

Family PHYLLOCEPHALIDAE

Genus *Megarhynchus* Lap., 1832

1832. *Megarhynchus* Lap., *Ess. Hem.,* : 65.

29. *Megarhynchus rostratus* (Fabricius)

1803. *Aelia rostratus* Fabr., *Syst. Rhyng.,* : 18.

1904. *Megarhynchus rostratus* : Distant, *Fauna Brit. India,* : 302.

Material examined : 1ex., Boxar, Dist. Nainital., 19.4.08, coll. Mus.

Diagnositic character : Body ochraceous, pronotum, corium and lateral mergin of head purplish red but the extreme lateral margin of pronotum and corium luteous; anterior tibiae, tarsi and antennae purplish red; abdomen a stigmatal series of small black spots.

Length : 18-24 mm.

Distribution : India : Uttarakhand (Dist., Nainital), Assam.

Elsewhere : China, Mayanmar, Malaya peninsula.

Family UROSTYLIDAE

Key to genera of the family UROSTYLIDAE

1. Head without ocelli ..... ***Urolabida***
– Head provided with ocelli 2
2. Basal joint of antennae nearly as long as head and pronotum together; antennae slender .. .. ***Urostylis***
3. Basal joint of antennae not twice the length of head, much shorter than head and pronotum together; antennae stout .... ***Urochela***

Genus ***Urolabida*** Westwood, 1837

1837. *Urolabida* Westw., *in Hope Cat.*, : 40.

30. ***Urolabida histrinica*** (Westwood)

1837. *Urostylis histrionica* Westw., *in Hpe Cat.*, : 46.

1904. *Urolabida histrionica* : Distant, *Fauna Brit. India*, 1 : 305.

Material examined : 4exs., Bhimtal, Dist. Nainital., 19-20.9.06, coll. N.A.; 2exs., Bhimtal, Dist. Nanital., 22-27.ix.06, coll. N.A.; 2exs., Mussouri, Dehra Dun Dist., 1.ix.05, coll Brunetti.

Diagnositic character : Body reddish ochraceous; basal spot and lateral margin of pronotum, central area of head and a curved discal fascia, clavus, inner and outer margin of corium and an elongate spot at the basal half of scutellum virescent; a black spot at the center of apical margin to corium, antennae dull ochraceous.

Length : 10-12 mm.

Distribution : India : Uttarakhand (Dist., Dehra Dun, Nainital).

Genus ***Urostylis*** Westwood, 1837

1837. *Urostylis* Westw., *in Hope Cat.*, 1 : 45.

31. ***Urostylis pallida*** Dallas

1851. *Urostylis pallida* Dall., *List. Hem.*, 1 : 315.

1904. *Urostylis pallida* : Distant, *Fauna Brit. India*, 1 : 307.

Material examined : 2exs., Nainital.,?. 5-6. 1893, coll. Lucknow Mus.

Diagnositic character : Body above light greenish, yellow; lateral margins of pronotum undulating, scutellum strongly punctured with brown, inner and outer portion of the apical margin of corium black but centrally yellow; membrane whitish with a black spot at inner basal angle, rostrum yellow with the tip black.

Length : 13.5-14 mm.

Distribution : India : Uttarakhand (Dist. Nainital), Sikkim.

Genus ***Urochela*** Dallas, 1850

1850. *Urochela bimaculata* Dall., *List. Hem.*, 1 : 313.

1904. *Urochela binotata* : Distant, *Fauna Brit. India*, 1 : 311.

Material examined : 7exs., Nainital, Dist. Nainital., 20.v.59, coll. A.G.K. Menon.

Diagnositic character : Body brownish gray punctured with black, head with two finer streak at apex and with two prominent black streak at head, pronotum with the lateral margins weaved, corium with a large brown spot at the center of the disk.

Length : 13.5 mm.

Distribution : India : Uttarakhand (Dist. Nainital), North India.

Family ACONTHOSOMATIDAE

Key to genera of the family ACONTHOSOMATIDAE

1. Mesosternal ridge not produced backward between intermediate coxae; pronotal angle strongly or spinosly produced; pronotum anteriorly levigate ..... ***Sastragala***
– Mesosternal ridge extending considerably beyond anterior margin of pronotum .... ***Anaxandra***

Genus ***Sastragala*** Amy. & Serv., 1843

1843. *Sastragala* Amy, & Serv., *Hem.*, : 155.

34. ***Sastragala murreeana*** Distant

1900. *Sastragala murreeana* Distant, *A.M.N.H.* (7)**6** : 228.

1904. *Sastragala murreeana* : Distant, *Fauna Brit. India*, **1** : 320.

Material examined : 1ex., Panwali, Trijugan pass, Dist. Tehri Garhwal., 26.v.1956, coll. B.S. Lamba.

Diagnositic character : Body ochraceous coarsely punctate, lateral pronotal spine red, long, directed forward and upward, abdomen with reddish apical spots; apical half of third and the whole fourth and fifth joints piceos, second joint longer than third; scutellum sparingly, pronotum and corium coarsely punctate.

Length : 14-15 mm.

Distribution : India : Uttarakhand (Dist., Tehri Garhwal), Punjab.

Genus ***Anaxandra*** Stal, 1876

1876. *Anaxandra nigrolineata* Stal, *En. Hem.*, **5** : 114.

1904. *Anaxandra nigrolineata* : Distant, *Fauna Brit. India*, **1** : 325.

Material examined : 1ex., Dwali, Dist. Almora., 16.ix.1958, coll. B.S. Lamba.

Diagnositic character : Body ochraceous with olivaceous hue, central longitudinal fascia commencing before apex of head and ending on disk of pronotum, and the lateral margin of scutellum joined before apex, black; pronotum with lateral angles produced into long, slightly ascending and a luteous spine forwardly directed with the apex slightly reflexed and sub acute.

Length : 15-17 mm.

Distribution : India : Uttarakhand (Dist. Almora), Sikkim, West Bengal.

Family SCUTELLERIDAE

Key to genera of the family SCUTELLERIDAE

1. Head elongate, gradually narrowed to apex, its lateral margins scarcely sinuate .... ***Cantao***

– Head shorter and broader, the lateral margin distinctly sinuate 2

2. Abdomen distinctly furrowed longitudinally beyond middle 3

– Abdomen not longitudinally furrowed..... 4

3. Body broad, ovate ..... ***Poecilocoris***

– Body elongate ..... ***Scutellera***

4. Third joint of antennae twice or more than twice the length of second joints, scutellum completely covering abdomen, except at base ..... ***Chrysocoris***

– Third joint of antennae longer than second, but not twice as long ..... ***Lamprocoris***

Genus ***Cantao*** Amy. & Serv., 1843

1843. *Cantao* Amy. & Serv., *Hem.*, : 29.

35. ***Cantao ocellus*** (Thunb.)

1784. *Cimex ocellus* Thunb., *Nov. Ins. Sp.*, **3** : 60.

1904. *Cantao ocellus* : Distant, *Fauna Brit. India*, **1** : 43.

Material examined : 10exs., Horai, Nainital, Dist. Nainital., 7.4.x, Mus. Coll., 13exs., Unchagaon, Nainital, Dist. Nainital, 13.4.x, Mus. coll., 1ex., Bindakhera, Dist. Nainital, 3.iv.10, Mus. coll.

Diagnositic character : Body ochraceous to reddish ochraceous; antennae, base and central fascia to head bluish black; scutellum sometimes with eight sometimes with six black spots; pronotum with two sometimes with eight black spots near anterior margin; lateral angle of pronotum usually produced in a strong curved spine; base of the head, disk of sternum, rostrum bluish black.

Length : 16-28 mm.

Distribution : Uttarakhand (Dist., Nainital), Delhi, Maharashtra, Meghalaya, Sikkim.

Genus ***Chrysocoris*** Hahn, 1834

1834. *Chrycoris* Hahn, *Wanz. Ins.*, **2** : 38.

36. ***Chrysocoris fascelis*** (White)

1842. *Callida fascelis* White, *Tr. E.S.*, **3** : 86.

1904. *Chrysocoris fascelis* : Distant, *Fauna Brit. India*, **1** : 60.

Material examined : 1ex., Bhimtal, Dist. Nainital, 4500 ft, 22-27.ix.06, coll. S.W. Kemp.

Diagnositic character : Head bluish green; eyes, pronotum and body beneath, a spot on both side of apex of central lobe of head, ochraceous, a transverse basal fascia on scutellum and six spots on apices of the femora, tibiae, tarsi, rostrum, antennae, a transverse spot at the base of abdomen, some lateral streaks to sternum, black.

Length : 9.5-10 mm.

Distribution : Uttarakhand (Dist., Nainital), Assam, Meghalaya, Nagaland, Sikkim.

Elsewhere : Mayanmar.

Genus ***Lampocoris*** Stal, 1864

1864. *Lampocoris* Stal, *Hem. Afr.*, **1** : 34.

37. ***Lampocoris Lateralis*** (Guer)

1803. *Scutellera lateralis* Guer, *Voy. Coq. Zool.*, : 159.

1904. *Lampocoris lateralis* : Distant, *Fauna Brit. India*, **1** : 63.

Material examined : 1ex., Nainital, Dist. Nainital., 28.9.67, Mus. coll.

Diagnositic character : Body above indigo blue or metallic green; a spot at inner margin of each eye, a spot near each anterior angle of pronotum, a central linear fascia on each side of which are three linear spots; five spot near base of scutellum, black; lateral abdominal margin ochraceous with the segmental spots, black.

Length : 9-10 mm.

Distribution : Uttarakhand (Dist. Nainital), Nagaland.

Elsewhere : Java, Sumatra, Mayanmar.

38. ***Lampocoris roylii*** (Westwood)

1827. *Callidea roylii* Westw. *In Hope Cat.*, **1** : 16.

1904. *Lampocoris roylii* : Distant, *Fauna Brit. India*, **1** : 63.

Material examined : 1ex., Mussouri, Dist. Dehra Dun., Mus coll.; 5exs., Nainital, Dist. Nainital., ?, coll. N.A.; 1ex. Bhimtal, Dist. Nainital, 19-22.ix.06, coll. N.A.

Diagnositic character : Body metallic green with reddish reflexions; lateral lobe of head and a spot at inner margin of both the eyes, a central fascia to pronotum and a broken fascia on each side of pronotum a spot near both the lateral angles, three basal spots on scutellum, dark indigo blue, anterior margin of abdominal segment, antennae and rostrum blakish.

Length : 9.5-10 mm.

Distribution : Uttarakhand (Dist. Dehra Dun, Nainital), Meghalaya, Nagaland, Sikkim.

Elsewhere : Nepal.

Genus ***Scutellera*** Lam., 1801

1801. *Scutellera* Lam., *Syst.*, : 293.

39. ***Scutellera nobilis*** (Fabr.)

1775. *Cimex nobilis* Fabr., *Syst. Ent.*, : 697.

1904. *Scutellera nobilis* : Distant, *Fauna Brit. India*, **1** : 51.

Material examined : 9exs., Dehra Dun, Dist. Dehra Dun., ?,?.

Diagnositic character : Body metallic bluish green above; transverse fasciaes are absent above; the scutellum has usually the central fascia indistinct but bears six small discal spots arranged in pairs, and a lateral spot on each side near the center.

Length : 17-21 mm.

Distribution : Uttarakhand (Dist. Dehra Dun), Assam, Karnataka, Kerala, Maharashtra, Manipur, Tamil Nadu, West Bengal.

Elsewhere : China, Pakistan.

Genus ***Poecilocoris*** Dallas., 1848

1848. *Poecilocoris* Dallas, Trans. *Ent. Soc.*, **5** : 100.

40. ***Poecilocoris interruptus*** (Westwood)

1837. *Tectocoris intrruptus* Wetw., *in Hope Cat.*, **1** : 14.

1904. *Poecilocoris interruptus* : Distant, *Fauna Brit. India*, **1** : 48.

Material examined : 2exs., Malari, Dist. Tehri Garhwal., 9.vii.58, coll. B.S. Lamba; 16exs., Nainital, Dist. Nainital., vi.1893, coll. Lucknow Mus.

Diagnositic character : Shining brassy black; a central longitudinal line on each lateral area of pronotum; a central transverse fascia interrupted in middle and apical margin of scutellum, bases of the second, third, fourth and fifth abdominal segments are sanguineous.

Length : 14-17 mm.

Distribution : Uttarakhand (Dist. Nainital. Tehri Garhwal), Himachal Pradesh, Nagaland, Sikkim.

SUMMARY

This paper incorporates the account of 40 species in 33 genera belonging to 9 families of the Super family Pentatomoidea. Four species namely *Brachypelta aterrima* (Forst.), *Apines concinna* Dall., *Asopus janus* (Fabr.) and *Randolotus elongatus* Dist., are recorded by Distant in his Fauna of British India including Ceylon and Burma, Rhynchota, Vol-2 which could not be examined due to nonavailability of specimens, are also included in the Systematic Account. The species other than asterix mark are being recorded for the first time from the state of Uttarakhand. Keys to various taxa, general diagnosis, original references of the genera and species, geographical distribution both in India and abroad and references to the original literatures have been provided. Districtwise distribution of each species has also been provided.

ACKNOWLEDGEMENT

The authors are indebted to Director in charge Zoological Survey of India for providing laboratory facilities. Sincere thanks are due to Dr. A.K. Hazra Scientist-E for numerous courtesies. Co-operation from the colleagues of the Hemiptera section are also thankfully acknowledged.

REFERENCES

AHAMAD, I and AFZAL, M. 1989. A revision on Myrocheini (Pentatomoidea : Pentatomonae) fron Indo-Pakistan area. *Oriental Ins.*, **22** : 185-240.

AHMAD, I and MAIZUDDIN, M. 1990. A revision of Acanthosomatidae (Hemiptera : Pentatomidae) from Indo-Pakistan area with a cladistic analysis of the genera. *Oriental Insects.*, **24** : 267-304.

CHAKRABORTY, S.P., GHOSH, L.K. and BASU, R.C. 1993. Insecta : Hemiptera : Pentatomidae. *Fauna of West Bengal, State Fauna Series*, **3** (Part-5) : 463-493.

CHAKRABORTY, S.P. and GHOSH, L.K. 1998, Insecta : Hemiptera : Pentatomoidea : *Fauna of Meghalaya, State Fauna Series,* **4** : (Part-4) : 391-429.

CHAKRABORTY, S.P., 2004, Insecta : Hemiptera : Heteroptera : Pentatomoidea : *Fauna of Manipur : State Fauna Series,* **10** : 169-176.

DATTA, B., GHOSH, L.K. and DHAR, M. 1985. Study on Indian Pentatomoidea (Heteroptera : Insecta). *Rec. zool. Surv. India, Occ. paper No.*, **168** : 1-44.

DISTANT, W.L. 1902. *The Fauna of British India including Ceylon and Burma, Rhynchota : Heteroptera,* **1** : 1-130.

DISTANT, W.L. 1908. *Ibid,* **4** : 420-455.

DISTANT, W.L. 1918, *Ibid,* **7** : 110-151.

DURAI, P.S.S., 1987. A revision of the Dinidoridae of the world (Heteroptera : Pentatomoidea). *Oriental Ins.*, **21** : 163-360.

Chart Showing Distribution of the Species of Pentatomoidea known from Different Districts of Uttarakhand

Name of the Districts	Almorah	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragrah	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udhan singh Nagar
Name of spcies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. *Erthesina fullo* (Thunb.)	–	+	–	–	–	–	–	–	–	–	–	–	–
2. *Erthesina guttata* (Fabr.)	–	+	–	–	–	–	–	–	–	–	–	–	–
3. *Halys dentatus* (Fabr.)	–	–	+	+	–	–	–	–	–	–	–	–	–
4. *Daipada affinis* Dall.	–	–	+	–	–	–	–	–	–	–	–	–	–
5. *Dalpada clavata* (Fabr,)	–	–	–	–	+	–	–	–	–	–	–	–	–
6. *Sciocoris indicus* Dall.	–	–	+	–	–	–	–	–	–	–	–	–	–
7. *Tolumnia latipes* (Dall.)	–	–	+	–	–	–	–	–	–	–	–	–	–
8. *Palomena reuteri* Dist.	–	+	+	–	–	–	–	–	–	–	–	–	–
9. *Palomena spinosa* Dist.	–	–	–	–	+	–	–	–	–	–	–	–	–
10. *Dolycoris buccarum* (Linn.)	–	+	+	–	–	–	–	–	–	–	–	–	–
11. *Dolycoris indicus* Stal	–	+	–	–	+	–	–	–	–	–	–	–	–
12. *Apines concinna* Dall.	–	–	–	+	–	–	–	–	–	–	–	–	–
13. *Eusarcocoris ventralis* (Westw.)	–	+	–	–	–	–	–	–	–	–	–	–	–
14. *Carbula indica* (Westw.)	–	+	–	–	–	–	–	–	–	–	–	–	–
15. *Agonoscelis nubila* (Fabr.)	–	–	+	–	–	–	–	–	–	–	–	–	–
16. *Bagrada picta* (Fabr.)	–	+	–	–	–	–	–	–	–	–	–	–	–
17. *Priassus exemptus* (Walk.)	–	+	–	–	+	–	–	–	–	–	–	–	–
18. *Deognetus serratus* (Dist.)	–	–	+	–	–	–	–	–	–	–	–	–	–
19. *Nezara viridula* (Linn.)	–	–	+	–	–	–	–	–	–	–	–	–	–
20. *Asopus janus* (Fabr.)	–	–	–	+	–	–	–	–	–	–	–	–	–

Name of the Districts	Almorah	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragrah	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udhan singh Nagar
Name of spcies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
21. *Zicorna caerulea* (Linn.)	–	–	–	–	+	–	–	–	–	–	–	–	–
22. *Canthecona binotata* Distant	–	–	+	–	–	–	–	–	–	–	–	–	–
23. *Canthecona furcellata* (Wolff.)	–	+	–	–	–	–	–	–	–	–	–	–	–
24. *Cazira verrucosa* (Westw.)	–	–	+	–	–	–	–	–	–	–	–	–	–
25. *Cazira friwaldskyi* Horv.	–	–	+	–	–	–	–	–	–	–	–	–	–
26. *Eurostus grossipes* Dall.	–	+	–	–	–	–	–	–	–	–	–	–	–
27. *Coptosoma siamicum* Walker	+	–	–	–	–	–	–	–	–	–	–	–	–
28. *Tarichea nitens* (Dall.)	–	–	+	–	–	–	–	–	–	–	–	–	–
29. *Aspongopus fanus* (Fabr.)	–	–	–	+	–	–	–	–	–	–	–	–	–
30. *Cyclopelta siccifolia* (Westw.)	–	–	+	–	–	–	–	–	–	–	–	–	–
31. *Randolotus elongates* Dist.	–	–	–	+	–	–	–	–	–	–	–	–	–
32. *Megarhynchus rostratus* (Fabr.)	–	+	–	–	–	–	–	–	–	–	–	–	–
33. *Urolabida histrionica* (Westw.)	–	+	–	–	+	–	–	–	–	–	–	–	–
34. *Urostylis pallida* Dall.	–	+	–	–	–	–	–	–	–	–	–	–	–
35. *Urochela bimaculata* Dall.	–	+	–	–	–	–	–	–	–	–	–	–	–
36. *Anaxandra nigrolineata* Stal	+	–	–	–	–	–	–	–	–	–	–	–	–
37. *Sastragala murrecana* Dist.	–	–	–	–	+	–	–	–	–	–	–	–	–
38. *Cantao ocellata* (Thunb.)	–	+	–	–	–	–	–	–	–	–	–	–	–
39. *Chrysocoris fascialis* (White)	–	+	–	–	–	–	–	–	–	–	–	–	–
40. *Lampocoris lateralis* (Guer)	–	+	–	–	–	–	–	–	–	–	–	–	–
41. *Lampocoris roylli* (Westw.)	–	+	–	–	–	–	–	–	–	–	–	–	–
42. *Scutellera nobilis* (Fabr.)	–	–	+	–	–	–	–	–	–	–	–	–	–
43. *Poecilocoris iterruptus* (Westw.)	–	+	–	–	+	–	–	–	–	–	–	–	–
44. *Brachypelta aterrima* (Forst.)	–	–	–	+	–	–	–	–	–	–	–	–	–

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HEMIPTERA : PYRRHOCORIDAE

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INTRODUCTION

Pyrrhocoridae is a small family under the order Hemiptera, where a few members are serious pests of cotton. Earlier workers included this group in the family Lygaeidae, but the absence of ocelli in Pyrrhocoridae separates them from Lygaeidae. Pyrrhocorids are much larger and more robust species than Lygaeids. *Dysdercus koenigii* causes havoc in cotton cultivation by infesting and transmitting the fungus *Nematospora* to the cotton bol which actually stains the cotton.

About 360 species under 43 genera have, so far been recorded globally while India has 45 species under 15 genera. Distant (1902)included only one species from Uttarakhand in his fauna of British India, Rhynchota Vol. II &V. Sen et al (1994, 1999)contributed on the pyrrhocorid fauna of West Bengal and Meghalaya with a few new records from the concerned states. No other comprehensive taxonomic work has yet been done on the pyrrhocorid fauna of Uttarakhand.

The present studies have been based upon the named and unnamed collections , housed in the Hemiptera section as well as collected materials received from different survey parties of Zoological Survey of India who ventured the state of Uttarakhand.

The resultant work comprises 17 species under 10 genera of the family Pyrrhocoridae, of which 16 species have been reported for the first time from the state of Uttarakhand. Identified materials under this study will be deposited in the National Zoological Collection.

MATERIALS AND METHOD

Pyrrhocorids can be collected either by sweeping of crops and bushes with insect nets or by light trapping at night. After collection the specimes are killed in a killing jar with liquid benzene or chloroform as killing agent and preserved dry with Naphthalene and Paradichlorobenzene. The specimens are kept in insect envelops with proper data labels mentioning locality , date of collection and name of collecter with ecological notes In the laboratory specimens are relaxed and set- pinned. After identified under binocular microscope the specimens are labeled properly and kept dry in insect drawers for permanent preservation.

SYSTEMATIC ACCOUNT

Following is the systematic list of all the species contained in the present paper. Species with asteric mark denotes new record from the state.

Family PYRRHOCORIDAE
Sub family EURYOPTHALMINAE
Genus ***Macrocerea*** Spinola 1837

1. *Macrocerea grandis* *(Gray)

Genus ***Iphita*** Stål 1870

2. *Iphita limbata* Stal.

Genus ***Physopelta*** Stål 1843

3. *Physolpelta gutta** Burmiester.
4. *Physolpelta schlanbuschi** Fabricius

Sub family PYRRHOCORINAE
Genus ***Dysdercus*** Amyot and Servile 1843

5. *Dysdercus koenigii** (Fabricius)
6. *Dysdercus evanescens** Distant

Genus ***Antilochus*** Stål 1863

7. *Antilochus coqueberti** (Fabricius)
8. *Antilochus tussus* *Stål

Genus ***Euscophus*** Stål 1870

9. *Euscophus indecorus** (Walker)
10. *Euscophus rufipes** Stål.

Genus ***Pyrrhopeplus*** Stål 1870

11. *Pyrrhopeplus pictus** Dist

Genus ***Dindymus*** Stål 1861

12. *Dindymus lanius* *Stål
13. *Dindymus rubigenosus** Fabricius

Genus ***Melamphaus*** Stål 1868

14. *.Melamphaus feber** Fabricius
15. *Melamphaus rubrocinctus** Stål

Genus ***Odontopus*** Laporta 1832

16. *Odontopus nigricornis** Stål
17. *Odontopus varicornis* (Fabricius)

Key to subfamilies of the family Pyrrhocoridae

1. Females always with the sixth ventral segment cleft at base ..... EURYOPTHALMINAE

   Both sexes with sixth ventral segment entire .....PYRRHOCORINAE

Subfamily EURYOPTHALMINE

Key to genera of the subfamily EURYOPTHALEMINAE

1. Antennae normal in both sexes, first joint longer than head but shorter than head and pronotum together 2

   Antennae quite long in male, first joint about twice as long as head and and pronotum together ..... ***Macrocerea***

2. Pronotum with anterior disc convex, which does not reach anterior margin of pronotum, lateral margin strongly reflexed .....***Iphita***

   Pronotum with its anterior convex disc reaching the anterior margin of pronotum, lateral margin not strongly reflexed..... ..... ***Physopelta***

Subfamily EURYOPTHALMINAE

Genus ***Macroceraea*** Spinola 1837

1837. *Macrocerea Spinola, Essai, Ins. Hem* : 17.

1. ***Macrocerea grandis*** (Gray).

1832. *Lygaeus grandis* Gray, *In Griffiths Anim. Kingd.* XV

1902. *Lohita grandis* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 95.

1994. *Macrocerea grandis* : Sen *et al., Stata Fauna Series,* 3 *: Fauna of West Bengal,* Part **5** : 436.

1998. *Macrocerea grandis* : Sen *et al., Stata Fauna Series* 4 *: Fauna of Meghalaya,* Part **4** : 333.

Material examined : 2exs, Dehradun, Dist - Dehradun, 15.IV. 1908, Mus. Coll; 2exs, Chuharwala, Dist - Nainital, 15. IV. 1908, Mus coll; 1ex, Bairabkunda, Dist. - Nainital, 15.IV. 1908, Mus. Coll; 2exs, Lacchiwala forest, Dist - Dehradun, 28. X. 2000, P. Mukhopadhyay &Party; 7exs, Lacchiwala forest, Dist. - Dehradun, 28. X.2000, S. K. Mitra &Party; 3exs, Lacchiwala forest, Dist-Dehradun, 29.X. 2001, S.K. Chakroborty &Party coll.

Diagnostic characters : Body red; pronotum and scutellum reddish in colour; central to clavus area with elongate spots and large rounded spots different in size at inner angle of corium; leg black.

Distribution : India : Uttarakhand (Dist - Dehradun, Nainital); Assam, Andhra Pradesh, West Bengal.

Elsewhere : Philippines.

Genus ***Iphita*** Stål 1870

1870. *Iphita Stal, Enum. Hem.* **1** : 99.

2. ***Iphita limbata*** Distant.

1902. *Iphita* limbata Distant, *Fauna of Brit. India, Rhynchota*, **2** : 96.

1994. *Iphita limbata* Sen *et al.,* State *Fauna Series, 3 : Fauna of West Bengal,* Part **5** : 436.

1998. *Iphita limbata* Sen *et al., State Fauna Series,* 4 : *Fauna of Meghalaya,* Part **4** : 333.

Material examined : 8exs, Nagla, Dist-Nainital, 6.IV.1907 to 12.IV.1907, Mus. Coll; 2exs, Gangurpur patiya, Dist-Nainital, 12.IV. 1907 to 13. IV. characte 1907, Mus coll; 1ex, Haridwar, Dist-Haridwar, 24. IV. 1908, J.W.M.

Diagnostic character : Body blackish red, lateral margin of pronotum, corium and base of antennae brownish yellow; pronotum at the middle transeversly impressed, legs reddish.

Distribution : India : Uttarakhand (Dist-Nainital, Haridwar), Assam, Andhra Pradesh, Kerala, Maharashtra, West Bengal.

Eisewhere : Philippines

Genus ***Physopelta*** Amyot & Servile

1773. *Cimex albofasciatus* De Geer, *Mem. Hist. Ins.*, **111** : 335.

1843. *Physopelta* Amyot & Servile, Hemip : 271.

Key to species of the genus *Physopelta*

1. Body reddish ochraceous, a discal rounded black spot at the middle of the corium, paramere weakly bifid with inner arm narrower than outer ..... *gutta*

   Body sanguieneous, a dot like black spot at the middle of the corium, paramere deeply bifid, with dissimilar arms .... *schlanbuschi*

3. ***Physopelta gutta*** (Burmeister)

1843. *Lygaeus gutta* Burmeister, *Nova. Acta Acad. Leop. Carot.*, **16** : 425.

1903. *Physopelta gutta* Distant, *Fauna Brit. India, Rhynchota* **2** : 97.

1927. *Physopelta gutta* Taeuber, *Konowia.*, **6** : 174.

1994. *Physopelta gutta* Sen *et al., State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 437.

1998. *Physopelta gutta* Sen *et al., State Fauna Series* 4 : *Fauna of Meghalaya*, Part **4** : 334.

Material examined : 2exs Ammangarh, Dist-Nainital, 13.IV.1908 Mus. coll; 2exs, Bijrani, Dist-Nainital, 19.III.1910, Mus coll; 2exs, Maldhau, Dist-Nainital, 12.IV.1908, Mus. coll; 3exs, Kaladhungi, Dist-Nainital, 4.V.1913 to 6.V.1913, R. Hodgart coll; 4exs, 2exs, Molta, Dist-Dehradun, 3.V.1950, K.K. Tiwari; 2exs, Mussoorie, Dist-Dehradun, 5.viii.1933, H.S. Pruthi; Teri, Dist-Teri, 5.IV.1958. B.S. Lamba & Partycoll; 4exs, Bhimtal, Dist-Nainital, 26.IX.1907. Mus coll; 1ex Gunhill (Musouri), Dist-Dehradun, 27.IX.2002, A. Bal & Party coll; 1ex Khurpatal, Dist-Nainital, 25.IX.2004, D.R. Maulic & Party coll; 1ex Khairna, Dist-Almora, 25.IX.2004, D.R. Maulic & Party coll; 1ex Khurpatal, Dist-Nainital, 23.IX.2004, D.R. Maulic & Party coll; 11ex Mazra, Dist-Dehradun, 24.IX.2000, G.C. Sen & Party coll; 1ex Clement town, Dist-Dehradun, 23.IX.2000 G.C. Sen & Party coll; 4exs P.W.D. Guest House, Dist-Tehri Garhwal, 16.IX.2000, G.C. Sen & Party coll; 3exs Soil Conservation Guest House (at light), Dist-Dehradun, 20.IX.2000, G.C. Sen & Party coll; 1ex Mazra, Dist-Dehradun, 24.IX.2000, G.C. Sen & Party coll; 1ex Chamba, Dist-Tehri Garhwal, 16.IX.2000, G.C. Sen & Party coll; 1ex Guptakashi, Dist-Rudhraprayag, 2.VII.2004, S.K. Chakraborty & Partycoll; 1ex Soil Conservation Guest House (At light), Dist-Dehradun, 19.IX.2000, G.C. Sen & Party coll; 2exs Shill lake, Dist-Nainital, 7.X.2004, Mrs. M. Ghosh & Party coll.

Diagnostic character : Body pale reddish brown in colour; Head with a spot at base; pronotum, scutellum and base of corium reddish in colour and with a discal round black spot; antennae reddish in colour; body pilose.

Distribution : India : Uttarakhand (Dist-Almora, Dehradun,4 Nainital, Rudraprayag, Teri Garhwal) Assam, Andhra Pradesh, West Bengal.

Elsewhere : Australia, Borneo, Myanmar, China, Japan, Java, Philippines, Sumatra, Srilanka.

4. ***Physopelta schlanbuschi*** (Fabricius)

1789. *Cimex schlanbuschi* Fabricius, *Mant. Ins.* 2 : 299.

1903. *Physopelta schlanbuschii* : Distant, *Fauna of Brit. I ndia*, **2** : 99.

1909. *Physopelta schlanbushii* : Lefroy. *Rec. Indian Mus.*, **3** : 325.

Material examined : 3exs, Ammangarh, Dist-Nainital, 13.IV.1908, Mus coll; 2exs, Koti, Dist-Tehri Garhwal, 5.IV.1958, B.S. Lamba; 1ex, Rajaji National Park, Dist-Dehradun, 27.X.2000, P. Mukhopadhyay & party coll; 6exs, Gandhikhet, Dist-Haridwar, 11.IX.2002, A. Bal & Party coll; 2exs Chilla, Dist-Haridwar, 12.IX.2002, A. Bal & Party coll; 1ex Fakot, Dist-Tehri Garhwal, 14.IX.2002, A. Bal & Party coll; 1ex Nepalifarm, Dist-Haridwar, 10.IX.2002, A. Bal & Party coll 1ex Satnarayan, Dist-Dehradun, 26.X.2002, M. Prasad & Party coll; 1ex Gandhikhet, Dist-Haridwar, 11.IX.2002, A. Bal & Party coll; 1ex Dhodkhand Forest, Dist-Dehradun, 5.XI.2002, M. Prasad & Party coll.

Diagnostic character : Body blood red in colour, at posterior lobe of pronotum with two large transverse spots and at posterior a rounded area punctate; spot on scutellum to corium sternal with a lateral series of transverse linear spots; antennae pilose.

Distribution : India : Uttarakhand (Dist-Dehradun, Nainital, Haridwar) Assam, West Bengal.

Elsewhere : Myanmar, China, Hongkong.

Subfamily PYRRHOCORINAE

Key to genera of the subfamily Pyrrhocorinae

1. Apical angle of corium more or less rounded, not elongately acute 2

   Apical angle of corium elongately acute ... ***Dysdercus***

2. Head transversely constricted or impressed beneath near base ..... ***Antilochus***

   Head not transversely constricted or impressed beneath 3

3. Anterior area of pronotum not or incompletely circumbscribed by continuous impression or punctures; head with eyes not broader than anterior margin of pronotum; eyes not pedunculate ..... ***Euscospus***

   Anterior area of pronotum completely circumbscribed by continuous impression or punctures 4

4. Incisures of third and fourth ventral segments moderately laterally curved 5

   - Incisures of ventral segments straight, not distinctly curved ..... ***Pyrrhopeplus***

5. Lateral marginof the pronotum acute, seldom reflexed ..... ***Dindymus***

   Lateral margin of pronotum strongly reflexed 6

6. Eyes not touching anterior margin of pronotum ..... ***Melamphaus***

   Eyes immersed to head ..... ***Odontopus***

Genus ***Dysdercus*** Amyot & Serville 1843.

1843. *Dysdercus* Amyot & Serville, Heimp, 272.

Key to species of the genus *Dysdercus*

1. Membrane black; head, pronotum, sanguineous; extreme base of the first joint of antennae sanguineous; paramere deeply biffid at apex; outer arm about twice the length of the inner arm ..... *koenigii*

2. Membrane pale brownish; head pronotum reddish ochraceous; antennae black; paramere obliquely emerginate at apex .... *evanescens*

5. *Dysdercus koenigii* (*Fabricius*)

1775. *Cimex koenigii* Fabricius, *Syst. Ent.* 720.

1902. *Dysdercus cingulatus* : Distant, *Fauna, Brit. India, Rhynchota* **2** : 119

1914. *Dysdercus koenigii* : Bergroth, *Ent. Mitt.* **3** : 355.

1994. *Dysdercus koenigii* : Sen *et al., State Fauna of Series* 3 : *Fauna of West Bengal*, Part **5** : 439.

1998. *Dysdercus koenigii* : Sen *et al., State Fauna of Series* 4 : *Fauna of Meghalaya*, Part **4** : 337.

Materials examined : 2exs, Almora, Dist-Almora, 12.XI.1950, C. Paiva coll; 1ex, Dehradun, Dist-Dehradun, 15.VII.1905 to 19. VII.1905; 2exs, Dehradun, Dist-Dehradun, 22.V.1908, Mus. coll; 1ex, Kansraoforest, Dist-Dehradun, 25.V.1971, K.P. Singh coll; 1ex, Kansrao forest, Dist-Dehradun, 27.V.1971, K.P. Singh coll; 1ex Bahadrabaih, Dist-Haridwar, 15.IV.2003, B.G. Kundu & Party coll; 3exs Tamnikhal, Dist-Tehri Garhwal, 13.IV.2003, B.G. Kundu & Party coll; 4exs Chilla, Dist-Haridwar, 12.IX.2002 & Party coll; 5exs Kaddukhal (Srinagar), Dist-Pauri Garhwal, 18.IX2002, A. Bal & Party coll; 6exs Ganchar, Dist-Chamoli, 21 VIII.2002, S.K. Mandal & Party coll.

Diagnostic characters : Body yellow with a slight tinge of brown anterior pronotal callosity and lateral margin of pronotum reddish; scutellar membrane and legs black in colour; abdominal segments and spot of coxae creamy white. other characters as in key.

Distribution : India : Uttarakhand (Dist-Almora, Dehradun Tehri Garwhal, Pauri Garhwal, Chamoli) Assam; Andhra Pradesh; Andaman & Nicobar Islands: Karnataka; West Bengal.

Elsewhere : Srilanka.

6. *Dysdercus evanescens* Distant

1902. *Dysdercus evanescens* Distant, *Am. Mag. Nat. Hist.*, **9** : 43

1903. *Dysdercus evanescens* Distant : *Fauna Brit. India Rhynchota*, **2** : 120.

1909. *Dysdercus evanescens* : Lefroy. *Rec. Ind. Mus.*, **3** : 326.

Marerial examined : 46exs, Bhimtal, Dist-Nainital, 27.IX.1906, N.A., 1ex Soil Conservation Guest House (at light) Dist-Dehradun, 21.IX.2000. G.C. Sen & Party coll; 1ex Telpur, Dist-Dehradun, 20.IX.2000, G.C. Sen & Party coll.

Diagnostic characters : Pale to reddish orchaceous; head, lateral margins of pronotum, scutellum, legs, antennae reddish Ochraceous; a small round blackish spot on the disc of the corium; prosternum with a spot behind each eye, connected by a narrow transverse line; anterior areas of abdominal segments reddish ochraceous sometime stripped with creamy white; membrane pale brownish; pronotum and corium thickly punctate.

Distribution : India : Uttarakhand (Dist-Nainital, Dehra Dun) Assam; Borghat; Sikkim; West Bengal.

Elsewhere : Myanmar.

Genus ***Antilochus*** Stål 1863

1863. *Antilochus* Stål, *Berl. Ent. Zeitschr.*, **7** : 393.

Key to species of the genus *Antilochus*

1. Membrane pale brownish ochraceous with a black rounded spot near its base; pronotum with two transverse series of punctures and a transverse series of punctures near base of scutellum; paramere with axe shaped apex ..... *russus*

- Membrane black, without spot; pronotum with anterior discal area margined with black punctures; paremere simple, with clavate inner margin ..... *coqueberti*

7. ***Antilochus russes*** Stål

1863. *Antilochus russes* Stål, *Ent. Zeitschr. Berlin* **7** : 394.

1903. *Antilochus russes* : Distant, *Fauna. Brit. India Rhynchota*, **2** : 101.

1994. Antilochus russes : Sen *et al.*, State Fauna *Series*, 3 : *Fauna of West Bengal*, Part-**5** : 440.

1998. *Antilochus russes* : Sen *et al.*, *State Fauna Series*, 4 : *Fauna of Meghalaya*, Part-**4** : 335.

Materials examined : 1ex, chamba, Dist-Tehri Garhwal, 28.9.2001, Dr. A. Bal & Party coll.

Diagnostic characters : Blood reddish, membrane brownish ochraceous with a black rounded spot near its base; a transverse series of punctures present near base of scutellum; two transverse of punctures to pronotum.

Distribution : India : Uttarakhand (Dist-Tehri Garhwal), Assam, Andhra Pradesh, Sikkim.

Elsewhere : Bhutan, Tenasserim.

8. ***Antilochus coqueberti*** (Fabricius)

1784. *Cimex angur* Fabricius, *Nova Ins. Spec.*, **3** : 58.

1902. *Antilochus coqueberti* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 101.

1926. *Antilochus coqueberti* : Esaki, *Am. Mus. Nat. Iiung.*, **24** : 158.

1994. *Antilochus coqueberti* : Sen *et al.*, *State Fauna Series*, 3 : *Fauna of West Bengal*, Part **5** : 440-441.

1998. *Antilochus coqueberti : Sen et al., State Fauna series 4 : Fauna* of Meghalaya, Part-**4** : 335.

Materials examined : 46exs, Naukuchiatal, Dist -Nainital, 19.V.1948, Parsh nath coll; 3exs, Boxar, Dist-Nainital, 19.V.1908, Mus coll., 3exs, Bindikhera, Dist-Nainital, 3.V.1910; Mus coll; 1ex Jollygrant, Dist-Dehradun, 18.IX.2000, G.C. Sen & Party coll.

Diagnostic characters : Body blood reddish; membrane black with its apical margin pale brownish, ochraceous; pronotum obscurely punctate but its anterior discal areas is margined with black punctures.

Distribution : India : Uttarakhand (Dist-Nainital, Dehra Dun), Andaman Islands; Assam; Jammu & Kashmir; Meghalaya; Nagaland; West Bengal.

Elsewhere : Myanmar, Sri lanka.

Genus ***Euscopus*** Stål

1870. *Euscopus* Stål, *En. Hem.*, **1** : 102 & 106.

Key to species of the genus *Euscopus*

Anterior femora with two distinct spines beneath near apex ..... *indecorus*

Anterior femora without distinct spines beneath near apex ..... *rufipes*

9. ***Euscopus indecorus*** (Walker)

1872. *Pyrrhocoris indecorus* Walker, *Cat. Heter.*, **5** : 172.

1902. *Euscopus indecorus* Distant, *Ann. Mag. Nat. Hist.*, **9** : 37.

1909. *Euscopus indecorus* : Lefroy, *Rec. Indian Mus.*, **3** : 326.

1998. *Euscopus indecorus* : Sen *et al.*, *State Fauna of Series* 4 : *Fauna of Meghalaya.*, Part **4** : 337.

Material examined : 1ex, Nagla, Dist-Nainital, 6.IV.1907, Mus coll. 1ex Chamba, Dist-Tehri Garhwal, 16.IX.2000, G.C. Sen & Party coll.

Diagnostic character : Body reddish black; lateral and posterior margin of pronotum brownish yellow; a small spot present at apical margin of corium; membrane dark reddish paler at its apical margin; a round black spot present at lateral margin of abdomen; coarse of series punctures ptresent transversely at pronotum; two distinct spines present at apex of femora.

Distribution : India : Uttarakhand (Dist-Nainital, Tehri Garhwal) Assam; Meghalaya.

Elsewhere : Bhamo, Sri Lanka, Teinzo.

10. ***Euscopus rufipes*** Stål

1870. *Euscopus rufipes* Stål, *En. Hem.*, **1** : 106.

1902. *Euscopus rufipes* : Distant, *Fauna Brit India. Rhynchota*, **2** : 106.

1925. *Euscopus rufipes* : China, *Ann. Mag. Nat. Hist.*, (9)**14** : 463.

1994. *Euscopus rufipes* : Sen *et al.*, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 442.

1998. *Euscopus rufipes* : Sen *et al.*, *State Fauna Series*, 4 : *Fauna of Meghalaya.*, Part **4** : 337-338.

Materials examined : 3exs, Bhimtal, (Dist-Nainital), 20.V.1911, S. Kemp; 1ex Fakot, Dist-Tehri Garhwal, 14.IX.2002, A. Bal & Party coll; 1ex, Gun Hill (Mussoorie), Dist-Dehra Dun, 27.IX.2002, A. Bal & party coll.

Diagnostic characters : Body black; legs, apex of the scutellum, lateral margin of the prosternum sanguineous; a large rounded discal spot on the clavus; apical margins and inner angle of the membrane pale fuliginous; body beneath grayish sericeous; a rounded spot near basal lateral margins of the third, fourth and fifth segments.

Distribution : India : Uttarakhand (Dist-Nainital, Dehra Dun, Tehri Garhwal), Assam; Meghalaya; Nagaland; West Bengal.

Elsewhere : Myanmar, Bangladesh, Java.

Genus ***Pyrrhopeplus*** Stål 1870

1870. *Pyrrhopeplus* Stål. *Enum. Hem.*, **I** : 103 & 115.

11. ***Pyrrhopeplus pictus*** Distant

1902. *Pyrrhopeplus pictus*, Dist. *Am Mus Nat Hist.* (7) ix, P. 41.

Material examined : 2exs, Tehri, Dist-Tehri Garhwal., 5.IV.1958, B.S. Lamba; 1ex, Bhimtal, Dist-Nainital, 26.IX.1907, Mus coll; 1ex, Majra, Dist-Dehradun, 26.IX.2002, A. Bal Party coll; 1ex Dongitala (Dharchula), Dist-Pithoragarh, 27.IX.2002, B. Mitra & Party coll.

Diagnostic character : Body pale ochraceous; a rounded black spot on corium near anterior angle; pronotum and scutellum darkly punctate; anterior and lateral margins ofm corium; sternum, coxae and femora testaceous or dark ochraceous.

Distribution : India : Uttarakhand (Dist-Nainital, Tehri Garhwal, Pithoragarh); Assam, Sikkim, Shilong, Naga Hill.

Elsewhere : Myanmar, Tibet China.

Genus ***Dindymus*** Stål

1861. *Dindymus* Stål, *Ofv. Vet. An. Forh* : 196.

1862. *Dindymus bicolar*, (Herre-Sch), *Wanz.*, **6** : 27.

Key to species of the genus *Dindymus*

Hemelytra broadly subovate; pronotum at anterior area defined by coarse black punctures ..... *lanius*

Hemelytra elongated; pronotum at anterior area without puncture ..... *rubigenosus*

12. ***Dindymus lanius*** Stål

1883. *Dindymus lanius* Stål, *Berl. Ent. Zeitschr.*, **7** : 401.

1903. *Dindymus lanius* : Distant *Fauna, Brit. India, Rhynchota*, **2** : 110.

1994. *Dindymus lanius* : Sen *et al.*, *State Fauna Series*, 3 : *Fauna of West Bengal*, Part **5** : 443.

1998. *Dindymus lanius* : Sen *et al.*, *State Fauna Series*, 4 : *Fauna of Meghalaya.*, Part **4** : 336.

Materials examined : 1ex, Dehradun, (Dist-Dehradun), 9.X.2000., A. Bal & Party.

Diagnostic characters : Sanguineous; legs, base of the abdomen, third, fourth joint and apex of the second joint of antennae and sternum black; membrane with a large discal spot; corium finely and thickly punctate; lateral margin of prosternum; anterior are a of pronotum coarsely punctate where as posterior area sparingly punctate.

Distribution : India : Uttarakhand (Dist-Dehradun) Assam; Meghalaya.

Elsewhere : Myanmar.

13. ***Dindymus rubiginosus*** Fabricius

1787. *Cimex rubiginosus* Fabricius, *Mant. Ins.*, **2** : 301.

1903. *Dindymus rubiginosus* : Distant, *Fauna Brit.* India *Rhynchota*, **2** : 111.

1962. *Dindymus rubiginosus* : Esaki, *Ann. Mus. Nat. Hung.*, **24** : 158.

1998. *Dindymus rubiginosus* : Sen *et al., State Fauna Series*, 4 : *Fauna of Meghalaya.*, Part 4 : 336.

Material examined : 1ex, Srinagar, Dist-Pauri Garwal 17.X.2000, A. Bal & Party; 2exs, Chamba, Dist-Tehri Garwal, 23.X.2000, A. Bal & Party.

Diagnostic characters : Body reddish with brownish tinge, membrane with a large black spot; abdomen, legs black; Posterior parts of three sternal segments creamy white; basal margin of pronotum and membrane pale blackish red; basal area of abdomen black.

Distribution : India : Uttarakhand (Dist-Pauri Garwal, Tehri Garwal) Assam; Meghalaya.

Eleswhere : Myanmar, Karnnee, Malewoon, Malabar, Margherita, Palon, Sadiya, Tenasserim, Thagata.

Genus ***Melamphaus*** Stål

1787. *Cimex faber* Fabricius, *Mant. Ins*, : 297.

1868. *Melamphaus* stal, *Hem. Fabr.*, **1** : 83.

Key to species of the genus *Melamphaus*

1. Lateral margin of pronotum acute. Rostrum extending to near middle of abdomen .... *faber*

   Lateral margin of pronotum reflexed. Rostrum not extending to near middle of abdomen ..... *rubrocinctus*

14. ***Melamphaus faber*** (Fabricius)

1903. *Melamphaus faber* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 107.

1905. *Melamphaus faber* : Breddin, *Mitt. Naturhist. Mus. Hamburg.*

1998. *Melamphaus faber* : Sen *et al., State Fauna Series* 4 : *Fauna of Meghalaya*, Part 4 : 338.

Material examined : 1ex, Lacchiwala forest, Dist-Dehra Dun, 29.X.2000, P. Mukhopadhyay & Party.

Diagnostic characters : Head blood reddish in colour; posterior area of pronotum; scutellum and membrane black; two black spots at base of sternal sutures and four black spots present at lateral segment of abdomen; apical margin of corium with brownish spot; antennae black.

Distribution : India : Uttarakhand (Dist-Dehradun) Assam; Andhra pradesh; Meghalaya; West Bengal.

Elsewhere : Borneo, Mallacca, Myanmar, Palawan, Pulocandor, Philippines.

15. ***Melamphaus rubrocinctus*** Stål

1870. *Melamphaus rubrocinctus* Stål, *Enum. Hem.*, **1** : 108.

1903. *Melamphaus rubrocinctus* Distant, *Fauna Brit. India, Rhynchota* **2** : 108.

1998. *Melamphaus rubrocinctus* : Sen *et al., State Fauna Series*, 4 : *Fauna of Meghalaya*, Part 4 : 338.

Material examined : 1ex, Dehra Dun, Dist-Dehra Dun, 5.X.1904, 1ex Charchum Dharchula, Dist-Pithoragarh, 27.IX.2004, B. Mitra & Party coll.

Diagnostic characters : Head brownish red, with small spot at base; pronotum, scutellum, corium, membrane pitchy black; two oblique reddish fasciae present at lateral and posterior margin of pronotum; apical margin of membrane smoky brown.

Distribution : India : Uttarakhand (Dist-Dehra Dun, Pithoragarh), Andhra Pradesh; Assam; Meghalaya; West Bengal.

Elsewhere : Borneo, Mallacca, Myanmar, Philippines.

Genus ***Odontopus*** Laporte 1832

1832 *Odontopus* Laporte, *Ess. Hem.*, : 37.

Key to species of the genus *Odontopus*

1. Body ochraceous, reddish ochraceous or sanguineous; a round spot near the apical of the corium ..... *Nigricornis*

Body above purplish red, no red spot near the apical of corium ..... *varicornis*

16. ***Odontopus nigricornis*** Stål

1861. *Odontopus nigricornis*, Stål, *Stett. Entt. Zeit.*, **22** : 146.

1910. *Odontopus nigricornis* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 96.

1994. *Odontopus nigricornis* : Sen *et al.*, *State Fauna Series*, 3 : *Fauna of West Bengal*, Part **5** : 441.

Material examined : 1ex, Nagla, Dist-Nainital, 8.IV.1907, Mus coll; 1ex, Rajaji National Park, Dist-Dehra Dun, 27.X.2000, P. Mukhopadhyay & Party coll.

Diagnostic character : Blood reddish or yellow with a slight tinge of brown; a round spot near apical angleof corium, anterior femora finely serrate beneath armed with one or two spines; antennae with third joint shortest and second and third subequal in length.

Distribution : India : Uttarakhand (Dist-Dehradun, Nainital) Assam; Andhra Pradesh; Karnataka; Maharastra; West Bengal; Sikkim.

Elsewhere : Myanmar.

17. ***Odontopus varicornis*** (Fabricius)

1787. *Cimex varicornis* Fabricius, *Mant. Ins.*, **2** : 298.

1868. *Odontopus varicornis*. Stål, *Hem Fabr.* 81.

Material examined : 1ex, Bhimtal, Dist-Nainital, 26.IX.1907, Mus coll, 1ex, Rajaji National Park, Dist-Dehra Dun, 27.X.2000, P. Mukhopadhyay & party.

Diagnostic characters : Body purplish red; pronotal margins, lateral margins of corium, connexivum above and beneath, and lateral margins of poststranum luteous; antennae, scutellum, clavus, membrane and margins of abdominal segments black; antennae with base of first joint reddish, first joint a little longer than the second.

Distribution : India : Uttarakhand (Dist-Dehradun, Nainital), Andhra Pradesh.

Elsewhere : Srilanka.

SUMMARY

The present paper incorporated the account of 17 species of Pyrrhocorids belonging to 10genera from the state of Uttarakhand, out of which 16 species, with asteric marks in the text are being recorded for the first time from the state. For each species the original and the subsequent references,distributional records in India and elsewhere, Keys to various taxa have been provide. This is the first comprehensive account of Pyrrhocorid bugs from the state of Uttarakhand.

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REFERENCES

Distant, W.L. 1902. *The Fauna of British India including Ceylon and Burma*, **2** : 94-121.

Distant, W.L. 1903. *The Fauna of British India including Ceylon and Burma*, **2** : 101.

Distant, W.L. 1910. *The Fauna of British India including Ceylon and Burma*, **5** : 92-100.

Esaki, T. 1926. Verzeichnis der Hemiptera : Heteroptera der insect Farmosa, *Ann. Mus. Nat. Hung.*, **24** : 135-189.

Sen, G.C., Biswas, B and Basu, R.C. 1993. Insecta : Hemiptera : Heteroptera : Pyrrhocoridae. *Fauna of West Bengal, State Fauna Series*, **3** (Part-5) : 433-447.

Sen, G.C., Ghosh, M. and Ghosh, L.K. 1998. Insecta : Hemiptera : Heteroptera : Pyrrhocoridae. *Fauna of Meghalaya, State Fauna Series*, **4** (Part-4) : 331-342.

The Chart Showing Districtwise Distribution of Pyrrhocorid Species Known from Uttarakhand

Name of species	DISTRICTS												
	Almorah	Nainital	Dehradun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pittoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udhan singh Nagar
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. *Macrocerea grandis*		+	+										
2. *Iphita limbata*		+		+									
3. *Physopelta gutta*	+	+	+		+				+				
4. *Physopelta schlanbuschi*			+	+	+	+							
5. *Dysdercus koenigii*	+		+	+	+	+					+		
6. *Dysdercus evanescens*		+	+							+			
7. *Antilochus russus*		+	+		+								
8. *Antilochus coqueberti*					+								
9. *Euscophus indecorus*		+			+								
10. *Euscophus rufipes*		+	+		+								
11. *Pyrrhopeplus pictus*		+	+		+		+						
12. *Dindymus lanius*			+										
13. *Dindymus rubigenosus*					+	+							
14. *Melamphaus feber*			+										
15. *Melamphaus rubrocinctus*			+		+		+						
16. *Odontopus nigricornis*		+	+										
17. *Odontopus varicornis*		+	+										

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INSECTA : HEMIPTERA : HETEROPTERA : REDUVIIDAE

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INTRODUCTION

Reduviids are commonly known as 'Assassin bugs' who are considered as one of the largest predatory insects belonging to the order Hemiptera under the Class Insecta. Reduviids, inhabit a variety of habitats such as on the ground, herbs, shrubs, on the bark and fringe of trees, semi arid zones, scrub jungles, forest and agro ecosystems. Some of them under the Subfamily Triatominae are even pathogenic and known to transmit 'Kal-a-zar' in Madagascar.

These insects have an elongated head with a distinct neck behind the eyes. The rostrum is short and fit into a groove on the under side of the thorax. Antennae are usually four segmented. Front legs are modified typically for grasping or holding the preys, which sometimes provided with the tibial pads, thereby enhancing the efficiency to hold the prey.

The family Reduviidae is represented by more than 3000 species belonging to 29 sub families in the world (Richard and Davis 1977). Distant (1902 and 1910) recorded 342 species from 106 genera and 13 sub families from Indian sub regions after words different workers added 69 species under 11 genera in India (Sahayaraj, 2004).

The present work is the first comprehensive account of the Fauna of Reduviidae from the Uttarakhand state the Himalayan region of erstwhile Uttar Pradesh state and a separate state was formed in the year 2000. This paper comprises of 31species under 23genera belonging to 8 subfamilies. Distant had recorded 4 species under 4 genera marked from the Himalayan region of Uttar Pradesh rest of the 27 species under 20 genera are reported for the first time from the state of Uttarakhand.

The materials dealt with are collected by different survey parties as well as specimens housed in the National Zoological Collection.

SYSTEMATIC ACCOUNT

Family REDUVIIDA
Subfamily NABIDINAE
Genus ***Alloerhynchus*** Fieb., 1861

*1. *Alloerhynchus collaris* Distant

Genus ***Nabis*** *Latr*

*2. *Nabis mussooriensis Distant*

Subfamily EMISINAE
Genus ***Bagauda*** Bergr., 1903

3. *Bagauda cavernicola* Paiva

Subfamily HARPACTORINAE
Division CORANUSARARIA
Genus ***Coranus*** Curtis, 1833

4. *Coranus obscurus* (Kirby.)

5. *Coranus spiniscutis* Reuer

Division EUAGORASARIA
Genus ***Epidaus*** Stal, 1857

6. *Epidaus atrispinus* Distant

Genus ***Brassivola*** Distant, 1902

7. *Brassivola hystrix* Distant

Genus ***Endochus*** Stal, 1959

8. *Endochus plagiatus* (Burm.)

Genus ***Euagoras*** Burm., 1835

9. *Euagoras plagiatus* (Burm.)

Division POLIDIDUSARIA
Genus ***Irantha*** Stal, 1861

10. *Irantha armipes* (Stal)

Division HARPACTORARIA
Genus ***Rhinocoris*** Hahn., 1834

11. *Rhinocoris costalis* (Stal)

12. *Rhinocoris marginatus* Fabr.

Genus ***Sphedanolestes*** Stal, 1866

*13. *Sphedanolestes fraterculus* Bergr.

14. *Sphedanolestes funeralis* Stal
15. *Sphedanolestes signatus* Distant

Division SYCANARIA
Genus ***Sycanus*** Amy & Serv., 1834

16. *Sycanus collaris* (Fabr.)

Subfamily STENOPODINAE
Genus ***Oncocephalus*** Klug, 1830

17. *Oncocephalus impudicus* Reuter

Subfamily ECTRICHODINAE
Genus ***Scadra*** Stal, 1859

18. *Scadra fuscicerus* Stal

Genus ***Ectrychotes*** Burm., 1835

19. *Ectrychotes pilicornis* (Fabr.)

Genus ***Physorhynchus*** Amy. & Serv., 1843

20. *Physorhynchus marginatus* Reuter

Subfamily PIRATINAE
Genus ***Androclus*** Stal, 1863

21. *Androclus granulatus* Stal
22. *Androclus pictus* (Herr-Schiiff)

Genus ***Catamiarus*** Amy. & Serv., 1843

23. *Catamiarus brevipennis* (Serv.)

Genus ***Ectomocoris*** Mayr, 1865

24. *Ectomocoris atrox* (Stal)
25. *Ectomocoris cordiger* Stal

Genus ***Pirates*** Serv., 1831

26. *Pirates atromaculatus* (Stal)
27. *Pirates lepturoides* Wolff

Subfamily SALYAVATINAE
Genus ***Lisarda*** Stal, 1859

28. *Lisarda annulosa* Stal

Subfamily ACANTHASPIDINAE
Genus ***Acanthaspis*** Amy. & Serv., 1843

29. *Acanthaspis angularis* Stal
30. *Acanthaspis micrographa* Walker

Genus ***Reduvius*** Lamark, 1801

*31. *Reduvius boysi* Dist

Key to Sub-families of the Family REDUVIIDAE

1. Rostrum four jointed ..... NABIDINAE
– Rostrum three jointed 2
2. Anterior coxae much elongated, reaching or passing apex of head .....EMESINAE
– Anterior coxae not more than twice or thrice longer than broad 3
3. Hemelytra without a quadrangular areolet or cell at interior area of corium near base of membrane; first joint of rostrum rarely very short, generally elongate; space between the eyes transverse ..... HARPACTORINAE
– Hemelytra without a quadrangular areolet or cell at interior area of corium, near base of membrane 4
4. Hemelytra with a discoidal areolet or cell somewhat sexangular and touching base of membrane or largely triangular ....STENOPODINAE
– Hemelytra without a discoidal areolet or cell 5
5. Scutellum with its apex broad and two or three spined ..... ECTRICHODINAE
– Scutellum with its apex triangular or sub triangular 6
6. Pronotum constricted behind middle ....PIRATINAE
– Pronotum constricted before or near middle 7
7. Anterior tarsi two jointed ....SALYAVATINAE
– Anterior tarsi three jointed ....ACANTHASPIDINAE

Subfamily NABIDINAE

Key to genera of the Subfamily Nabidinae

1. Head immersed to eyes, which about to touch anterior margin of pronotum; anterior femora with a dentate ampliation beneath .... ***Alloerhynchus***
2. Head always distinctly exerted, not immersed to eyes, which are well separated from the anterior margin of pronotum, posterior tibiae simple, not immersed ..... ***Nabis***

Genus ***Alloerhynchus*** Fieb., 1861

1861. *Alloerhynchus* Fieb., *Eur. Hem.*, : 43.

*1. *Allorhynchus collaris* Distant

1909. *Allorhynchus collaris* Dist., *Ann. Soc. Ent. Belg.*, **13** : 394.

1910. *Allorhynchus collaris* : Dist., *Fauna Brit. India*, **5** : 218.

Diagnostic character : Head, pronotum, scutellum, body beneath black; rostrum, legs, anterior margin of pronotum, antennae with first and second joints are yellow with slight brown tinge; pronotum with posterior lobe shorter and broader than anterior lobe with its lateral margin obliquely rounded.

Length : Female 6 mm.

Distribution : India : Uttarakhand (Kumaoon)

Remark : This species could not be examined due to non-availability of the specimens. But Distant (1910) has recorded the species in his Fauna Brit. India, Vol-V.

Genus *Nabis* Latr. *1807*

1807. *Nabis* Latr., *Gen.*, **3** : 127.

*2. *Nabis mussooriensis Distant*

1909. *Nabis mussooriensis Distant, Fauna of Brit. India*, **2** : 218.

Diagnostic character : Head black having some yellow with slight brownish lines from inner margin of eye towards base; anterior lobe of pronotum with its anterior lateral margin and a central spot black, scutellum, hemelytra pitchy black, membrane slightly passing the abdominal apex and it's apical margin having some scattered yellow with slight brownish spots, legs brownish to brownish yellow annulated with pitchy black.

Length : Female 9 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun)

Remarks : This species could not be examined due to non-availability of the specimens but Distant (1910) had recorded the species in his Fauna of Brit. India, Vol-V.

Sufamily EMISINAE
Genus *Bagauda* Berg., 1903

1903. *Baguda* Bergr., *Red.d" Ent.*, **22** : 12.

3. *Bagauda cavernicola* Paiva

1919. *Baugada cavernicola* Paiva, *Rec. Ind. Mus.*, **16** : 366.

1966. *Baugada cavernicola* : Wygodzinsky, *Bull. Am. Mus. nat. Hist.*, New york, **133** : 95.

Material examined : 1ex., Guptakashi, Dist. Rudra Prayag, 2.vii.04, coll. S.K. Chakraborty and party.

Diagnostic character : Body chestnut brown membrane smoky brown a large rounded spot on corium, apical halves of anterior femora, prosterna, a spot on the disk of meso and metasterna and posterior tibiae creamy white; and the constricted area extending to the anterior half of the posterior lobe.

Length : 16 mm.

Distribution : India : Uttarakhand (Dist. Rudra Prayag), Meghalaya.

Subfamily HARPACTORINAE
Key to Division of the Subfamily Harpactorinae

1. Antennae short, its first joint not longer than head ..... CORANUSARIA
– Antennae long its first joint longer than head 2
2. Head armed with spine or tubercle behind the base of each antenna; lateral pronotal angles spinous or at least prominent .... EUAGORASARIA
– Head without any spine or tubercle 3
3. Anterior femora granulate, generally nodose or nodulose and always spinous .... POLIDIDUSARIA
– Anterior femora neither granulate nor nodulose and without any spine 4
4. Post ocular and ante ocular area almost sub equal in length; abdominal segments lobately dilated; head almost as long as pronotum; body oblong and sub elongate .... HARPACTORARIA
– Post ocular area more than three times longer than the ante ocular area; abdomen on each side much dilated; head distinctly longer than pronotum ..... SYCANARIA

Division CORANUSARIA
Genus *Coranus* Curtis, 1833

1833. *Coranus* Curtis, *Brit. Ent.*, **10** : 153.

Key to species of the genus *Coranus*

1. Body pitchy black, membrane shining bronzy black; first joint of antennae almost as long as head ..... *obscurus*

– Body blackish brown to brownish yellow; membrane bronzy brownish yellow; first joint of antennae distinctly shorter than head .... *spiniscutis*

4. *Coranus obscurus* (Kirby)

1891. *Harpactor obscurus* Kirby, *J. Linn. Soc. Zool.*, **14** : 120.

1902. *Coranus obscurus* : *Distant, Fauna Brit. India*, **2** : 381.

Material examined : 1ex., Bhimtal, Dist. Nainital, coll. N.A.

Diagnostic character : Body pitchy black, with a velvety hairy cover; membrane bronzy black; antennae pitchy black with basal joint yellow with slight tinge of brown; scutellum with a short erect tuberculous spiny tubercle; tibiae with basal ,medial and apical pitchy black annulations.

Length : 9-10 mm.

Distribution : India : Uttarakhand (Dist. Nainital), Assam, Nagaland, Sikkim, West Bengal.

Elsewhere : Mayanmar, Sri Lanka.

5. *Coranus spiniscutis* Reuter

1881. *Coranus spiniscutis* : Reuter, *Act. Soc. Sc. Fenn.*, **12** : 275.

1902. *Coranus spiniscutis* Distant, *Fauna Brit. India*, **2** : 381.

Material examined : 1ex., Pauri, Dist. Pauri Garhwal, 13.ix.2000, coll. G.C. Sen and party.

Diagnostic character : Body, head pitchy black, post ocular area with a central brownish yellow line; the first and second joint of antennae brownish yellow to clay colour; scutellum with an erect spine; first joint of antennae distinctly shorter than head; legs and abdomen beneath slight brownish yellow, annulations to femora, base and apices to tibiae and tarsi pitchy black.

Length : 9-10 mm.

Distribution : India : Uttarakhand (Dist. Pauri Grahwal), Assam, Bihar, West Bengal.

Elsewhere : Mayanmar.

Division EUAGORASARIA

Key to Division of the Euagorasaria

1. Posterior lobe of pronotum not discally spined 2

– Posterior lobe of pronotum discally spined 3

2. First joint of rostrum considerable shorter than second; head with a tubercle behind base of each antenna ..... ***Euagoras***

– First joint of rostrum longer than second; head about as long as pronotum ..... ***Endochus***

3. Anterior lobe of pronotum without any spine; head with the tubercle behind base of each antenna; scutellum without a sub erect spine ..... ***Epidaus***

– Anterior lobe of pronotum discally spied; ante and post ocular area of head about equal in length; lateral margin of abdomen dilated .... ***Brassivola***

Genus ***Euagoras*** Burm., 1835

1835. *Euagoras* Burm., *Handb.*, **2** : 226.

6. *Euagoras plagiatus* (Burm.)

1834. *Zelus plagitaus* Burm., *Nov. Act. Ac. Nat. Cur.*, **14** : Suppl-1 : 303.

1902. *Euagoras plagiatus* : Distant, *Fauna Brit. India*, **2** : 363.

Material examined : 1ex., Gular, Muni-ki-reti, Dist. Tehri Garhwal, 23.ix.2002, coll. Dr. Animesh Bal and party.

Diagnostic character : Head, pronotum and scutellum reddish yellow with a slight ting of brown, a black broad central longitudinal spot to posterior pronotal lobe, hemelytra and sternum, abdomen beneath with a black fascia on each lateral area; lateral margin of sternum, ventral side of abdomen and legs pale brownish yellow; femora streaked with black and with a sub apical black annulations.

Length : 13-14 mm.

Distribution : India : Uttarakhand (Dist. Tehri Garhwal), Assam, Meghalaya.

Elsewhere : Andaman island, Java, Mayanmar, Philippines.

Genus ***Endochus*** Stal, 1959

1959. *Endochus* : Stal, *Ofv. Vet. - Ak. Forh.*, : 194.

7. ***Endochus nigricornis*** Stal

1859. *Endochus nigricornis* : Stal, *Ofv. Vet.-Ak. Forh.*, : 194.

1902. *Endochus nigricornis* distant, *Fauna Brit. India*, **2** : 365.

Material examined : 1ex. Kalika, Dahrachula, Dist. Pithrogarh, 26.ix.04, coll. B. Mitra and party.

Diagnostic character : Body brownish yellow with a slight ting of red; anterior pronotal lobe centrally impressed at base, posterior lobe with the lateral spines produced horizontally and a little upward; two central line to the pronotal lobe, two central spot preceded by a small arcuate fascia to anterior pronotal lobe, disc of posterior lobe, lateral spine, scutellum, corium, seven lateral spots to coxae, intermediate and posterior femora black.

Length : 22-23 mm.

Distribution : India : Uttarakhand (Dist. Pirhoragarh), Assam, West Bengal.

Elsewhere : Bangladesh, Mayanmar, Malaya Peninsula.

Genus ***Epidaus*** Stal 1859

1859. *Epidaus* Stal, *Ofv. Vet. -Ak. Forh.*, : 193.

8. ***Epidaus atrispinus*** Distant

1902. *Epidaus atrispinus* : Distant, Fauna Brit. India, **2** : 372.

Material examined : 1ex., Dongitala, Dharachula, Dist. Pithoragarh, 22.ix.04, coll. B. Mitra and party.

Diagnostic character : Body pale brownish yellow; abdomen beneath and legs brownish yellow with slight reddish tint; rostrum and antennae are clay colour; head behind eyes, discal and lateral spines to posterior lobe of pronotum and scutellum black; head with a short erect tubercle behind the base of each antenna; anterior lobe of pronotum centrally impressed and posterior lobe with two long, acute, discal basal spines, the lateral spines long, acute, horizontally directed and slightly recurved.

Length : 21 mm.

Distribution : India : Uttarakhand (Dist. Pithoragarh), Sikkim, West Bengal.

Genus ***Brassivola*** Distant, 1902

1902. *Brassivola* Distant, Fauna Brit. India, **2** : 373.

9. ***Brassivola hystrix*** Distant

1902. *Brassivola hystrix* : Distant, *Fauna Brit. India*, **2** : 373.

Material examined : 1ex., Almora, Dist. Almora, 26.ix.04, coll. D.R. Maulick and party.

Diagnostic character : Body pale chocolate brown, thickly clothed with velvety hairs; antennae annulated; femora and tibiae with two central annulations, marginal spots to connexivum yellow with slight ting of brown, head strongly and transversely impressed between eyes, posterior lobe of pronotum with some scattered yellowish brown spot; membrane shining bronzy.

Length : 26 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun).

Elsewhere : Sri Lanka.

Division PILIDIDUSARIA
Genus ***Irantha*** Stal 1861

1861. *Irantha* Stal, *Stett. Ent. Zeit.*, **22** : 137.

10. ***Irantha armipes*** (Stal)

1855. *Harpactor armipes* Stal, *Ofv. Vet.-Ak.Forh.*, : 189.

1902. *Irantha armipes* : Distant, *Fauna Brit. India*, **2** : 385.

Material examined : 1ex., Rishikesh, Dist. Pauri Garhwal, 25.x.02, coll. M. Prasad and party

Diagnostic character : Body brownish yellow; first joint6 of antennae annulated with dark brown patches; head pitchy black; connexivum transversely spotted with black; posterior lobe of pronotum granulate; lateral spines to posterior pronotal lobe finely produced in male whereas it shorter and more broadly so in female.

Length : 10 mm.

Distribution : India : Urrarakhand (Dist. Pauri Garhwal).

Elewhere : Sri Lanka.

Division HARPACTORARIA

Key to genera of the Division Harpactoraria

1. Posterior lobe of pronotum neither longitudinally impressed nor elevated ..... ***Rhinocoris***

2. Posterior lobe of pronotum longitudinally impressed ..... ***Sphedanolestes***

Genus ***Rhinocoris*** Hahn, 1834

Key to species of the genus *Rhinocoris*

1. Posterior lobe of pronotum not or very obscurely rugosely ganulate, body black .... *costalis*
2. Posterior lobe of pronotum rugosely granulate ..... *marginatus*

11. ***Rhinocoris costalis*** (Stal)

1866. *Reduvius costslis* Stal, *Ofv. Vet. –Ak. Forh.*, : 285.

1902. *Harpactor costalis* : Distant, *Fauna Brit. India*, **2** : 334.

Material examined : 2exs., Mussouri, Dist.Dehra Dun, Mus. Coll.; 1ex. Kankhal. Dist. Haridwar, 24.x.01, coll. S.K. Mondal& party.

Diagnostic character : Body black, a lateral spot behind each eye and a spot in between eyes, lateral margins and basal area of posterior pronotal lobe, apex of scutellum, abdomen beneath lateral area of corium coral red; spot on the connexivum and segmental fasciae black, the apex of the membrane smoky brown and passing abdominal apex, pronotum with anterior lobe centrally impressed and sculptured but the posterior lobe not impressed.

Length : 12-14 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Haridwar), Assam, Meghalaya, West Bengal.

Elsewhere : Malaya peninsula, Mayanmar.

12. ***Rhinocoris marginatus*** (Fabr.)

1803. *Reduvius marginatus* Fabr., *Syst. Rhyng.*, : 27.

1902. *Harpactor marginatus* : Distant, *Fauna Brit. India*, **2** : 384.

Material examined : 2exs., Haridwar, Dist. Haridwar, coll. J.W.M.; 2exs., Rishikesh, Dist. Tehri Garhwal, 24.x.02, coll. M. Prasad & party.

Diagnostic character : Body blood reddish, scutellum, eyes, antennae, membrane, abdomen beneath dark black, lateral margin and base of antennae blood reddish, pronotum with anterior lobe sculptured and posterior lobe finely wrinkled.

Length : 19.5-20 mm.

Distribution : India : Uttarakhand (Haridwar, Tehri Garhwal), Andhra Pradesh.

Elsewhere : Sri Lanka.

Genus ***Sphedanolestes*** Stal, 1866

1866. *Sphedanolestes* Stal, *Ofv. Vet. –Ak. Forh.*, : 284 & 288.

Key to species of the Genus *Sphedanolestes*

1. Post ocular portion of head about as long as the ante ocular portion of head ....*funeralis*

– Post ocular portion of head much longer than ante ocular portion of head 2

2. Head distinctly a little shorter than pronotum, corium obscute, fuscous testaceous .... *fraterculus*

– Head about as long as the pronotum, corium luteous with the veins black ..... *signatus*

*13. ***Sphedanolestes fraterculus*** Begr

1908. *Sphedanolestes fraterculus* : Berg., Deutsch ent. Zeitschr., : 591.

1910. *Sphedanolestes fraterculus* Distant, *Fauna Brit. India*, **5** : 204.

Diagnostic character : Head, pronotum, scutellum, sternum, abdomen above, legs black; first joint of antennae as long as head, second joint less than half as long as first; anterior lobe of pronotum strongly centrally impressed, posterior lobe centrally and narrowly longitudinally impressed; spots to the connexivum, a broad sub lateral fascia, posterior marginal spots to abdomen beneath black.

Length : 8.5-9.5 mm.

Distribution : India : Uttarakhand (Dist. Nainital), Tamil Nadu.

Remarks : This species could not be examined due to nonavailability of the specimens, but recorded from the Fauna of British India, Vol-V. by W.L. Distant.

14. ***Spedanolestes funeralis*** Stal

1902. *Sphedanolestes funeralis* Distant, *Fauna Brit. India*, **2** : 340.

1903. *Sphedenalostes funeralis* : Distant, *A.M.N.H.*(7)**11** : 210.

Material examined : 1ex. Dehra Dun, Dist.

Diagnostic character : Body black, trochanter blood reddish, second joint of rostrum longer than

first, pronotum a little longer than head, ante ocular about as long as post ocular portion of head, basal joint of rostrum a little longer than ante ocular area of head; posterior lobe of pronotum sulcate, its posterior angle rounded, membrane passing the abdominal apex.

Length : 16.5 mm.

Distribution : India : Uttarakhand (Dehra Dun), Jammu Kashmir.

15. *Sphedanolestes signatus* Distant

1903. *Sphedanolestes signatus* : Distsnt, *Fauna Brit. India,* **2** : 341.

Material examined : 1ex. Joshi Math, Dist. Tehri Garhwal, 12.vii.58, coll. B.S. Lamba.

Diagnostic character : Body black, disc of the posterior lobe of pronotum, connexivum, abdomen beneath creamy brownish yellow, corium brownish yellow with black veins, membrane pale bronzy; ante ocular portion of head is much shorter than post ocular portion, head about as long as pronotum, second joint of rostrum longer than first, anterior pronotal lobe deeply sulcate, posterior pronotal lobe broadly and deeply grooved.

Length : 11 mm.

Distribution : India : Uttarakhand (Dist. Tehri Garhwal).

Division SYCANARIA
Genus *Sycanus* Amy & Serv., 1843

1843. *Sycanus* Amy& Serv., Hem., : 360.

16. *Sycanus collaris* (Fabr.)

1781. *Reduvius collaris* Fabr., Spec. Ins., **2** : 380.

1902. *Sycanus collaris* : Distant, Fauna Brit. India, **2** : 351.

Material examined : 2exs., Haridwar, Dist. Haridwar, 7.ix.2000, coll. G.C. Sen & party; 1ex., Haridwar, Dist. Haridwar, 19.ix.2000, coll.G.C. Sen &party; 1ex., Gular, Muni-ki-reti, Dist. Tehri Garhwal, 23ix2002, coll. Dr. Animesh Bal & party.

Diagnostic character : Body, pronotum pitchy black, apical half of corium, basal margin of membrane pale yellow, scutellar spine long, its apex distinctly bifid, abdomen strongly dilated; head about as long as pronotum and scutellum together, membrane bronzy.

Length : 22-25 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Haridwar, Tehri Garhwal), Assam, Meghalaya.

Elsewhere : Malaya Peninsula, Sri Lanka.

Subfamily STENOPODINAE
Genus *Oncocephalus* Klug, 1830

1830. *Oncocephalus* Klug, Synb. Phys., 11.

17. *Oncocephalus impudicus* Reuter

1883. *Oncocephalus impudicus* Reuter, *Act. Soc. Sc. Fenn.*, **12** : 715.

1902. *Oncocephalus impudicus* : Distant, *Fauna Brit. India,* **2** : 229.

Material examined : 1ex., Mazra, Dist. Dehra Dun, 24.ix.2000, coll. G.C. Sen & party.

Diagnostic character : Body yellowish with slight brown tinge; antennae, legs and abdomen beneath brownish yellow; lateral margin of pronotum and three transverse bands to the anterior lobe; apical spine to scutellum, long acute lateral apex of abdomen dark brown; a central spot to clavus interior cellular area of corium, a small spot behind it and a long irregular spot in outer cellular area of membrane chest nut brown.

Length : 12-13 mm.

Distribution : Uttarakhand (Dist. Dehra Dun), West Bengal.

Elsewhere : Borneo, Java, and Philippine island, Sumatra.

Subfamily ECTRICHODINAE

Key to genera of the subfamily Ectrichodinae

1. Antennae with eight joints 2

– Antennae with six joints, abdomen above rugose, beneath not longitudinally impressed or the first four segments linearly medially impressed ..... ***Physorhynchus***

2. Scutellum with two apical spinous angulations; rostrum with first joint as long as remaining joints together ..... ***Scadra***

– Scutellum with three apical spinous angulations, the middle one minute ..... ***Ectrychotes***

Genus ***Physorhynchus*** Amy&Serv., 1843

1643. *Physorhynchus* Amy. & Serv., *Hem.*, : 342.

18. ***Physorhynchus marginatus*** Reuter

1881. *Physorhynchus marginatus* Reut., *Act. Soc. Sc. Fenn.*, **12** : 301.

1902. *Physorhynchus marginatus* : Distant, *Fauna Brit. India*, **2** : 381.

Material examined : 1ex., Dehra Dun, Dist. Dehra Dun, 16.IV.05, S.K. Chakraborty & party.

Diagnostic character : Body, hemelytra, base and lateral margin of corium violaceous black, last of the two joints of rostrum and posterior margin of pro and mesosterna brownish black, most of the dorsal surface of abdomen and lateral of connexivum blood reddish; in male pronotal lobes of about equal length in female; the anterior lobe longest, abdomen beneath disk of third fourth and fifth segments blood reddish.

Length : 26-30 & 39-40 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), Assam, Meghalaya, West Bengal.

Elsewhere : Borneo, Java, Phillipine islands, Sumatra.

Genus ***Scadra*** Stal, 1859

1859. *Scdra* Stal, *Ofv. Vet.-Ak. Forh.*, : 183.

19. ***Scadra fuscicerus*** Stal

1859. *Scadra fuscicerus* Stal, Ofv. Vet.-Ak. Forh., : 183

1902. *Scadra fuscicerus* : Distant, *Fauna Brit. India*, **2** : 308.

Material examined : 1ex., Haridwar, Dist. Hardwar, 10.ix.2000, coll. A.K. Sidhu and party, 1ex., Mazra, Dist. Dehra Dun, 29.ix.2000, coll. G.C. Sen & party.

Diagnostic character : Body pale reddish to brownish yellow; membrane, three ventral segmental spots and a large spot at the interior area of corium black; posterior lobe of pronotum with two pitchy black spots, tarsi yellow with slight brownish tinge the apical joint dark brownish red.

Length : 10.5-13.5 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Haridwar).

Elsewhere : Mayanmar, Sri Lanka.

Genus ***Ectrychotes*** Burmister, 1835

1835. *Ectrychotes* Burm., Handb., **2** : 237.

20. ***Ectrychotes pilicornis*** (Fabr.)

1835. *Reduvius pilicornis* Fabr. *Mant.*, **2** : 311.

1902. *Ectrychotes pilicornis* : Distant, *Fauna Brit. India*, **2** : 314.

Material examined : 1ex., Rajaji Sanctuary, Dist. Dehra Dun, 13.vii.63, coll. J.D. Soota and party.

Diagnostic character : Body coral red; head, anterior lobe of pronotum, sternum, legs, transverse band to fourth, fifth and sixth ventral and anal segments of abdomen bright bluish black; apical halves of clavus, interior area of corium, membrane and spot on the last dorsal abdominal segment black; bases of intermediate femora, basal half of posterior femora, coxae, trochanters, and tarsi coral red.

Length : 12-13 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun).

Subfamily PIRATINAE

Key to genera of the Subfamily Piratinae

1. Anterior tibiae ampliated and incrassated; lateral angles of posterior lobe of pronotum ampliated and rounded ..... ***Androclus***
- Anterior tibiae normal, not ampliated or incrassated lateral angles of posterior lobe of pronotum obtusely prominent, not ampliately rounded 2
2. Pronotum tuberculously granulate ..... ***Catamiarus***
- Pronotum smooth or posterior lobe finely granulate 3
3. Spongy furrow occupying more than half of anterior tibiae ..... ***Ectomocoris***
- Spongy furrow occupying less or not more than half of anterior tibiae ..... ***Pirates***

Genus ***Androclus*** Stal, 1863

1863. *Androclus* Stal, *Ann. Soc. Ent. Fr.*, : 58.

Key to species of the Genus *Androclus*

1. A sub claval spot adjoining apical half of clavus & the clavus excluding base .... *granulatus*

– A large central spot to clavus and a large rounded spot on corium outside claval apex, three or four small spots at base and a large discal spot to membrane pitchy black .... *pictus*

21. *Androclus granulatus* Stal

1863. *Androclus granulatus* Stal, *Ann. Soc. Ent. Fr.*, : 58.

1902. *Androclus granulatus* : Distant, *Fauna Brit. India*, **2** : 289.

Material examined : 2exs, Dehra Dun, Dist. Dehra Dun,? Vi.33, coll. H.S. Pruthi.

Diagnostic character : Body beneath, head, pronotum, scutellum, antennae dark brown; membrane grayish brown with a large discal, clavus, a sub claval spot adjoining apical half of clavus, rostrum anterior &intermediate legs chest nut brown; lateral abdominal margins dark brown with large chest nut brown spots; pronotum granulate, anterior lobe with a tubercle near each lateral angle.

Length : 16-17 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), Assam, Meghalaya.

22. *Androclus pictus* (Herr-Schiiff)

1848. *Pirates pictus* Wanz., *Ins.*, **8** : 63.

1902. *Androclus pictus* : Distant, *Fauna Brit. India.*, **2** : 290.

Material examined : 1ex., Ranmnagar, Dist. Nainital, 14.ii.69, coll. K.V. Laxminarayan.

Diagnostic character : Body reddish brown, membrane and clavus pale smoky brown, a large central spot to clavus, a large rounded spot on corium, three or four small spots at base and a very large irregular shaped spot to the membrane dark pitchy black.

Length : 10.5-11 mm

Distribution : India : Uttarakhand (Dist. Nainital), Maharashtra.

Elsewhere : South and East Africa, Java.

Genus *Catamiarus* Amy. &Serv. 1843

1843. *Catamiarus* Amy. & Serv., *Hem.*, : 323.

23. *Catamiarus brevipennis* (Serv.)

1831. *Pirates brevipennis* Serv., *Ann. Sc. Nat.*, **23** : 271.

1902. *Catamiarus brevipennis* : Distant, *Fauna Brit. India*, **2** : 302.

Material examined : 1ex., Dehra Dun, Dist. Dehra Dun, 27.xi.61, coll. S. Lal; 6exs., Haridwar, Dist. Haridwar, coll. J.H.M.

Diagnostic character : Body black, a large rounded spot on corium adjoining apex of clavus and a very large discal spot to membrane slight brownish yellow, head with the lateral margins with long hairs; antennae with the first joint about as long as from insertion to base of head, second as long as anterior lobe of pronotum; legs and margins of the body with long hairs.

Length : 20-26 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun, Haridwar), Gujarat, Kannataka, Tamil Nadu.

Key to species of the genus *Ectomocoris*

1. Legs not unicolorus, a small spot at base of membrane and discal vein, connexivum and legs ..... *atrox*

– Legs unicolorus, a blood reddish spot on outer area of basal cell to membrane; a spot on corium confluent with apical half of clavus blood reddish ..... *cordiger*

Genus *Ectomocoris* Mayr, 1865

1865. *Ectomocoris* Mayr, *Verh. z.-b. Ges. Wein*, **15** : 438.

24. *Ectomocoris atrox* (Stal)

1855. *Pirates atrox* Stal, *Ofv.-Vet.-Ak. Forh.*, : 187.

1902. *Ectomocoris atrox* : Distant, **2** : 296.

Material examined: 1ex., ?. Vi.1933, coll. H.S. Pruthi; 2ex., Jollygrant, Dist. Dehra Dun, 18.ix.2000, coll.G.C. Sen and party.

Diagnostic character : Body pitchy black, a spot at the base of the membrane, spot to the connexivum, apices of the coxae, legs slight brownish yellow; antennae with the first joint black and the rest brownish yellow and with fine soft hairs, trochanter, anterior femora, apical halves of intermediate & posterior femora black.

Length : 12-18 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), West Bengal.

Elsewhere : China, Malayan peninsula, Mayanmar, Sri Lanka.

25. *Ectomocoris cordiger* Stal

1868. *Ectomocoris crdiger* Stal, *Ofv. Vet.-Ak. Forh.*, : 256.

1902. *Ectomocoris cordiger* Distant, *Fauna Brit. India*, **2** : 295.

Material examined : 1ex., Almora, Dist. Almora, 22-23.viii. 1911, cll. C. Paiva; 1ex., Almora, Dist. Almora, 24-31.viii. 11, coll. C. Paiva; 1ex., Nainital, Dist. Nainital, 10-13.viii.30, coll. Dr. B.P. Prasad & S.L. Hora.

Diagnostic character : Body piceous, opaque; scutellum and pronotum shining olivaceous black; legs, antennae, small spots to connexivum above and beneath yellow with slight brown tinge; a small spot on outer area of basal cell of membrane, apical half of clavus confluent with a similar size spot on corium luteous, legs and antennae covered with soft short hairs.

Length : 12-15 mm.

Distribution : India : Uttarakhand (Dist. Almora, Nainital), Maharashtra, West Bengal.

Elsewhere : Bangladesh, Sri Lanka.

Genus *Pirates* Serv., 1831

1831. *Pirates* Serv., *Ann. Sc. Nat.*, **23** : 215.

Kev to species of the genus *Pirates*

1. Membrane spotted with black; a large discal spot to membrane and a small spot near base of clavus black; spongy furrow to anterior tibiae occupying but much more than a third of their length ..... *atromaculatus*

– Membrane unicolorous, a small spot at inner angle near base of membrane; spongy furrow to anterior tibiae occupying but little more than a third part of their under surface .... *lepturoides*

26. *Pirates atromaculatus* (Stal)

1870. *Cleptocorisatromaculatus* Stal, *Ofv. Vet.-Ak. Forh.*, : 692.

1902. *Pirates atromaculatus* : Distant, *Fauna Brit. India*, **2** : 301.

Material examined : 2exs., Nainital Dist. Nainital, 27.iv.08, coll. R.H.

Diagnostic character : Body black; a small spot at the base of clavus black; corium with a longitudinal ochraceous fasciae inwardly ampliated and margined with black; spongy furrow of anterior tibiae not occupying more than a third of their length.

Length : 12 mm.

Distribution : India : Uttarakhand (Dist. Nainital), Assam, Meghalaya, Nagaland.

Elsewhere : Hong Kong, Java, Philippines, Mayanmar, Sri Lanka.

27. *Pirates lepturoides* (Wolff.)

1804. *Reduvius lepturoides* Wolff., *Ic.*, : 165.

1902. *Pirates lepturoides* : Distant., *Fauna Brit. India*, **2** : 301.

Material examined : 2exs., Saharsadhara, Dist. Dehra Dun, 11.i.62, coll. R.K.B.; 1ex., Patair, Dist. Nainital, 27.iv. 08, coll. Mus.

Diagnostic character : Body pitchy black; membrane, fuscous with a small spot at inner angle; anterior pronotal lobe centrally impressed; connexivum spotted with ochraceous above and beneath; spongy furrow occupying little more than third part of the under surface of anterior tibiae.

Length : 9-10 mm.

Distribution : India; Uttarakhand (Dist. Dehra Dun, Nainital), Maharashtra.

Elsewhere : Borneo, Java, Mayanmar, Sri Lanka.

Subfamily SALAYAVATINAE
Genus *Lisarda* Stal, 1859

1859. *Lisarda* Stal, *Ofv. Vet. -Ak. Forh.*, : 192.

28. *Lisarda annulosa* Stal

1874. *Lisarda annulosa* Stal, *En. Hem.*, **4** : 83.

1902. *Lisarda annulosa* : Distant, *Fauna Brit. India*, **2** : 237.

Material examined : 3ex., Boxar, Dist. Nainital, 19.iv.08; 1ex., Ammangarh, Dist. Nainital, 13.iv.08, coll. Mus.

Diagnostic character : Body brownish ochraceous; mottling to abdomen, hemelytra. Connexivum, Base. annulations to Second joint of antennal luteous apical spire to scutellum short, femora with a spire searoysex, auterior femora medially spiae bereath.

Length : 11 mm.

Distribution : India : Uttarakhand (Dist. Nainital).

Elsewhere : Bagladesh, Mayanmar, Sri Lanka.

Subfamily ACANTHASPIDINAE

Key to genera of the Subfamily Acanthaspidinae

Genus ***Acanthaspis*** Amy. & Serv., 1843

1843. *Acanthaspis* Amy. & Serv., *Hem.*, : 336.

Key to species of the genus *Acanthaspis*

1. Body piceous; scuteller spine obliquely ascendant; a large transverse spot beyond middle of corium ..... *angularis*

– Body dark chocolate brown; scuteller spine on the centre of the apical margin of corium ... . *micrographa*

29. ***Acanthaspis angularis*** Stal

1859. *Acanthaspis angularis* Stal, *Ofv. Vet. -Ak. Farh.* : 188.

1902. *Acanthaspis angularis* : Distant, *Fauna Brit. India*, **2** : 262.

Material examined : 1ex., Dehra Dun, Dist. Dehra Dun, ?, coll. Sukhara.

Diagnostic character : Body piceous to piceous brown; a big transverse spot beyond middle of corium; posterior angle of pronotum, spot to connexivum and legs ochraceous or luteous; first and second joints of rostrum sub equal in length; disk of the pronotum sulcate; anterior lobe strongly sculptured; lateral angle spinuously produced and recurved ; scutellar spine recurved and obliquely ascendant.

Length : 15-17 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun), Maharashtra, Tamil Nadu.

Elsewhere : Sri Lanka.

30. ***Acanthaspis micrographa*** Walker

1873 *Acanthaspis micrographa* : Distant, *Fauna Brit. India*, **2** : 269.

Material examined : 2exs., Dharmatwala forest, Dist. Dehra Dun, ?,?

Diagnostic character : Body dark brown; two spots on the posterior lobe of pronotum and a spot on the center of apical margin of corium; spots to the connexivum two annulations to tibiae and the base of the apical joint of tarsi are pale yellow with slight brownish tinge; a grayish white spot to the sub apical region of membrane; anterior lobe of pronotum sculptured, anterior angle obtuse; posterior lobe transversely rugulose,with the lateral angle dentate and their apices recurved, scutellar spine horizontally directed.

Length : 21 mm.

Distribution : India : Uttarakhand (Dist. Dehra Dun). North India.

Genus ***Reduvius*** Lamarck, 1801

1801. *Reduvius* Lamarck, Syst., : 294.

*31. ***Reduvius boyesi*** Distant

1902. *Reduvius boyesi* Distant, *Fauna Brit. India*, **2** : 252.

Diagnostic character : Body pale luteous, head, scutellum, major portion of clavus, a"W" shaped fascia at base of posterior pronotal lobe piceous or fuscous; apex of membrane and lateral marginal spot creamy whit, apex of head luteous; ocelli very large; anterior lobe of pronotum longitudinally striate, first joint of antennae as long as head.

Length : 11.5 mm.

Distribution : India : Uttarakhand (Dist. Almora).

Remarks : This species could not be examined due to the non-availability of the specimen but recorded from the Fauna Brit. India, Rhynchota, VOL-2 by W.L. Distant.

SUMMARY

This paper presents a consolidated account of 31 species under 23 genera of the family Reduviidae.27 Species under 20 genera are being recorded for the first time from the state of Uttarakhand consisting of hilly region of erstwhile Uttar Pradesh state. Distant (1902,1910) recorded four species under four genera from the hilly area

of UttarPradesh (now Uttarakhand) which are with asteric marks in the text. Key to various taxa, general diagnosis, references of genera and species, geographical distribution both in India and abroad, references to the original literature have been provided. A chart showing the distribution of each species in the state has also been incorporated.

ACKNOWLEDGEMENTS

The authors are indebted to Director, Zoological Survey of India for providing laboratory facilities. Sincere thank is also due to Dr. A.K. Hazra Scientist- SF for his constant encouragements. Co-operation received from the staff of the Hemiptera section are also thankfully acknowledged.

REFERENCES

AMBROSE, D.P. 1999. *Assassin Bugs : Science publishers*, New Hampshire, U.S.A., : 337.

BISWAS, B. AND BAL, ANIMESH. 2004. *State Fauna Series* 10 : *Fauna of Manipur, Insecta : Hemiptera : Heteroptera* :

CAPRILES, J.M. 1990. *Systematic catalogue of the Reduviidae of the world (Insecta : Heteroptera)* University of Puerto Rico (Mayaguez) : 694.

COOK, M.L. 1977. A key to the genera of Asian Ectrichodiinae (Hemiptera : Reduviidae) together with a checklist of genera and species. *Oriental Insects*, **11**(1) : 63-88.

DISTANT, W.L. 1904. *Fauna of British India including Ceylon and Burma, Rhynchota*. Vol-2. *Heteroptera* : 503.

DISTANT, W.L. 1910. *Fauna of British India including Ceylon and Burma, Rhynchota*. Vol-5. *Heteroptera :* Appendix : 189.

PAIVA, C.A. 1919. Rhynchota form the Garo hills, Assam. *Rec. Ind. Mus.*, **16** : 340-377.

RICHARDS AND DAVIS 1977. Imm's general textbook of entomology : 732

SAHAYARAJ, K. 2004. Indian insect predators in Biological control : 336.

WYGODZINSKY, P.W. 1967. A monograph of Emesinae (Reduviidae : Hemiptera), *Bull. Amm. Mus. Nat. Hist. Soc.*

Chart showing the distribution of the species of reduviidae known from different districts of Uttarakhand

Name of the Districts	Almora	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udham singh Nagar
Name of the species	1	2	3	4	5	6	7	8	9	10	11	12	13
*1. *Alloerhynchus collaris* Distant	+	+								+	+	+	+
*2. *Nabis mussooriensis* Distant			+										
3. *Bagauda caverniocola* Paiva									+				
4. *Coranus obscurus* (Kirby.)		+											
5. *Coranus spiniscutis* Reut						+							
6. *Euagoraus plagiatus* (Burm.)	-				+-								
7. *Endochus nigricornis* Stal							+						
8. *Epidaus atrispinus* Dist.							+						
9. *Brassivola hystrix* Distant	+							-					
10. *Irantha armipes* (Stal)			+										
11. *Rhinocoris costalis* (Stal)			+										
12. *Rhinocoris marginatus* Fabr.	-	-	-	+									
*13. *Sphedanolestes fraterculus* Bergr		+	-										
14. *Sphedanolestes funeralis* Stal			+										
15. *Sphedanolestes signatus* Dist.					+								
16. *Sycanus collaris* (Fabr.)			+	+	+								
17. *Oncocephalus impudicus* Reuter			+-										
18. *Scadra fuscicerus* Stal			+	+									
19. *Ectrychotes pilicornis* (Fabr.)			+										

Name of the Districts	Almora	Nainital	Dehra Dun	Haridwar	Tehri Garhwal	Pauri Garhwal	Pithoragarh	Uttarkashi	Rudraprayag	Bageshwar	Chamoli	Champawat	Udham singh Nagar
Name of the species	1	2	3	4	5	6	7	8	9	10	11	12	13
20. *Pyhsorhynchus marginatus* Reut.			+				-				-		
21. *Androclus granulatus* Stal			+										
22. *Androclus pictus* (Herr-Schiiff)		+											
23. *Catamiarus brevipennis* (Serv.)			+	+									
24. *Ectomocoris atrox* (Stal)			+										
25. *Ectomocoris cordiger* Stal	+	+											
26. *Pirates atromaculatus* (Stal)		+											
27. *Pirates lepturoides* Wolff		+	+									-	
28. *Lisarda annulosa* Stal		+											
29. *Acanthaspis angularis* Stal			+				-	-	-	-			-
30. *Acanthaspis micrographa* Walker			+										
*31. *Reduvius boyesi* Distant	+							-	-		-		

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 269-282.

INSECTA : COLEOPTERA : ADEPHAGA
Family GYRINIDAE and DYTISCIDAE

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INTRODUCTION

The aquatic insects form an important constituent of aquatic biota. Of the five families of Adephagan aquatic Coleoptera, the present paper deals with the families like Gyrinidae & Dytiscidae, which are the dominant families of them recorded from India.

The members of the family Gyrinidae are commonly known as "Whirligig beetles" because of their habit of swimming in groups on the surface of the ponds and quiet streams. The major workers who dealt with the group are Fabricius (1781), Regimbart (1882-83), Vazirani (1958-84) and very recently Biswas, Mukhopadhyay and Saha (1994), Mukhopadhyay & S.K. Ghosh (2003-07) etc.

The members of the other Family Dytiscidae are commonly known as "Predaceous diving beetles" and inhabit in all kinds of aquatic habitat in both larval and adult stages and are carnivorous and are also inhabit in both fresh and brackish water. They also serve as food for carnivorous and omnivorous fishes. The major workers on this group are Balfour-Browne (1939, 1945), Guignot (1942-49), Zimmermann (1920), Vazirani (1967-84), Brancucci (1983), Biswas, Mukhopadhyay & Saha (1994), Mukhopadhyay & Ghosh (2003-07) etc.

So far there is no comprehensive work on these families from Uttarakhand. Present study is based on the materials collected by different survey parties of Zoological Survey of India from different districts of Uttarakhand including the materials present in the National Zoological Collection of Zoological Survey of India ,Kolkata. Prior to study 10 spp. under 2 genera of 2 subfamilies of Gyrinidae and 15 spp. under 12 genera of 4 subfamilies of Dytiscidae are recorded from Uttarakhand which was earlier mentioned as Uttar Pradesh. Linnaeus (1767) has recorded the first species viz. *Eretes sticticus* (L.) from Uttarakhand (Uttar Pradesh) Present study has recorded the species *Orectochilus* (s.str.) *murinus* Regimbart of Gyrinidae for the first time from Uttarakhand and *Lacconectus* (s. str.) *basalis* Sharp belonging to the subfamily Colymbetinae : Dytiscidae is recorded for the first time from India (Uttarakhand) and 11 spp. under 8 genera of 4 subfamilies *viz.* Noterinae, Laccophilinae, Hydroporinae and Colymbetinae (Dytiscidae) are recorded for the first time from Uttarakhand.

SYSTEMATIC LIST

Family GYRINIDAE
Subfamily ENHYDRINAE
Genus ***Dineutus*** Macleay, 1825
Subgenus ***Dineutus (Spinosodineutus)*** Hatch

1. *Dineutus (Spinosodineutus)* spinosus (Fab.)

Subgenus ***Dineutus (Protodineutus)*** Ochs

2. *Dineutus (Protodineutus) indicus* Aube

Subfamily ORECTOCHILINAE
Genus ***Orectochilus Eschscholtz,*** 1833
Subgenus ***Orectochilus*** **(s.str.)** Vazirani

3. *Orectochilus (s.str.) murinus* Regimbart

Subgenus ***Orectochilus*** (Patrus) Vazirani

4. *Orectochilus (Patrus) neglectus* Ochs
5. *Orectochilus (Patrus) himalayensis* Vazirani
6. *Orectochilus (Patrus) cuneatus* Reg.
7. *Orectochilus (Patrus) metallicus* Reg.
8. *Orectochilus (Patrus) cameroni* Ochs
9. *Orectochilus (Patrus) oblongiusculus* Reg.

10. *Orectochilus (Patrus) marginipennis angustilimbus* Ochs

Family DYTISCIDAE
Subfamily NOTERINAE
Tribe HYDROCANTHINI
Genus ***Canthydrus*** Sharp, 1882

*11. *Canthydrus laetabilis* (Walker)

Subfamily LACCOPHILINAE
Genus ***Laccophilus*** Leach, 1817

*12. *Laccophilus flexuosus* Aube

*13. *Laccophilus parvulus obtusus* Sharp

14. *Laccophilus sharpi* Reg.

*15. *Laccophilus indicus* Gschwendtner

Subfamily HYDROPORINAE
Tribe HYPHYDRINI
Genus ***Hyphydrus*** Illiger, 1807
Subgenus ***Hyphydrus (Apriophorus)*** Guignot

*16. *Hyphydrus (Apriophorus) renardi* Severin

Tribe HYDROVATINI

17. *Hydrovatus ferreigatus* Reg.

Tribe BIDESSINI
Genus ***Guignotus*** Houlbert,1934

18. *Guignotus flammulatus* (Sharp)

*19. *Guignotus inconstans* (Regimbart)

Tribe HYDROPORINI
Genus ***Hyphoporus*** Sharp, 1882

20. *Hyphoporus aper* Sharp

Genus ***Potamonectes*** Zimmermann, 1921

21. *Potamonectes (s.str.) indicus* Sharp)

*22. *Potamonectes (s.str.) balli* Vazirani

Subfamily COLYMBETINAE
Tribe AGABATINI
Genus ***Lacconectus*** Mots., 1855

**23. *Lacconectus (s.str.) basalis* Sharp

Tribe AGABINI
Genus ***Agabus*** Leach, 1817
Subgenus ***Agabus (Dichonectes)*** Guignot

*24. *Agabus (Dichonectes) biguttatus* (Olivier)

Subgenus ***Agabus (Gaurodytes)*** Thomson

25. *Agabus (Gaurodytes) amoenus sinuaticollis* Reg.

*26. *Agabus (Gaurodytes) conspersus* (Marsham)

27. *Agabus (Gourodytes) debilipes* Reg.

Genus ***Platambus*** Thomson, 1860

*28. *Platambus lineatus* Gschwendtner

Tribe HYDRONEBRINI
Genus ***Platynectes*** Regimbart, 1887
Subgenus ***Platynectes (Gueorguievtes)*** Vazirani

29. *Platynectes (Gueorguievtes) kashmirenus* Balfour-Browne

Tribe COLYMBETINI
Genus ***Rhantus*** Stephens,1835

*30. *Rhantus (s.str.) sikkimensis* Reg.

31. *Rhantus (s.str.) taprobanicus* Sharp.

Subfamily DYTISCINAE
Tribe ERETINI
Genus ***Eretes*** Castelnau,1833

32. *Eretes sticticus* (Linnaeus)

Tribe HYDATICINI
Genus ***Hydaticus*** Leach,1817
Subgenus ***Hydaticus (Guignotites)*** Brinck

33. *Hydaticus (Guignotites) fabricii* Macleay

*34. *Hydaticus (Guignotites) bengalensis* Reg.

35. *Hydaticus (Guignotites) luczonicus* Aube

36. *Hydaticus (Guignotites) histrio* Clark

37. *Hydaticus (Guignotites) vittatus* (F.)

Tribe THERMONECTINI
Genus ***Sandracottus*** Sharp,1882

38. *Sandracottus dejeani* (Aube)

*39. *Sandracottus mixtus* (Blanchard)

Tribe CYBISTERINI
Genus ***Cybister*** Curtis,1827
Subgenus ***Cybister (Melanectes)*** Brinck

40. *Cybister (Melanectes) sugillatus* Erichson

SYSTEMATIC ACCOUNT

Family GYRINIDAE
Subamily ENHYDRINAE
Genus ***Dineutus*** Macleay,1825

1825. *Dineutus* Macleay, *Annulosa javanica*, ed. **1** : 30.

1833. *Cyclous* Eschscholtz, in Dejean's , *Coleopteres*, ed. **II** : 58 (Type species *australis* F.).

1837. *Cyclinus* Kirby, in Rechards, *Fauna Bor. Amer.*, **4** : 78 (Type species *assimilis* Kirby).

1984. *Dineutus*, Vazirani, *Fauna of India*, Coleoptera : Fam. Gyrinidae & Haliplidae : 16.

Subgenus ***Dineutus (Spinosodineutus)*** Hatch

1925. *Dineutus (Spinosodineutus)* Hatch, *Pap. Mick. Acd. Sci.*, **5** : 447.

1. ***Dineutus (Spinosodineutus)*** spinosus (Fab.)

1781. Gyrinus spinosus F. Species Insectorum, P. 298.

1984. *Dineutus (Spinosodineutus) spinosus* (F.): Vazirani, *Fauna of India*, pp. 16-20.

Material examined : Not seen.

Distribution : INDIA : West Bengal, Bihar, Assam, Meghalaya, Orissa, Uttar Pradesh, Tamil Nadu, Uttarakhand (Nainital).

Elsewhere : Myanmar, Thailand, Malaysia, Laos, Vietnam, Bangladesh.

Subgenus ***Dineutus (Protodineutus)*** Ochs

1926. *Dineutus (Protodineutus)* Ochs, *Ent. Z. Frankf.*, **40** : 66.

2. ***Dineutus (Protodineutus) indicus*** Aube

1838. *Dineutus indicus* Aube, *Species Coleopteres*, **6** : 772.

1926. *Dineutus (Protodineutus) indicus*: Ochs, *Ent. Z. Frankf.*, **40** : 137.

1984. *Dineutus (Protodineutus) indicus*: Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, : 22-24.

Material examined : Not seen.

Distribution : INDIA : West Bengal, Bihar, Orissa, Kashmir, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Tamilnadu, Pondicherry, Kerala, Uttarakhand (Dehradun, Mussoorie).

Elsewhere : Pakistan.

Subfamily ORECTOCHILINAE

Genus ***Orectochilus*** Eschscholtz, 1833

1833. *Orectochilus* Eschscholtz, in Dejean's *Catalogue Coleopteres*, ed II : 59.

1984. *Orectochilus* Eschscholtz : Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, : 36-107.

3. ***Orectochilus (s.str.) murinus*** Reg.

1891. *Orectochilus (s.str.) murinus* Reg., *Ann. Soc. ent. Fr.*, **60** : 709.

1930. *Orectochilus (s.str.) murinus*: Ochs, *Cat. Ind. Ins.*; pt. 19, Gyrinoidea : 18-19.

1984. *Orectochilus (s.str.) murinus*, Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, :. 39-40.

Material examined : 2 ex., INDIA : Uttarakhand : Almora : Hawalbag, 8.x.2001, Dr. P. Mukhopadhyay & Party, ex. in running water.

Distribution : INDIA : Himachal Pradesh, West Bengal, Meghalaya, Assam, Sikkim, Uttarakhand (Dehradun, Chakrata Dist., Rishikesh, Nainital).

Elsewhere : Bhutan, Indochina.

Subgenus ***Orectochilus (Patrus)*** Aube

1936-38. *Patrus* Aube, *Icon. Coleopt. Europe*, **5** : 397.

1925. *Orectochilus (Patrus)* Hatch, *Pap. Mich. Acad.Sci.*, **5** : 452.

4. ***Orectochilus (Patrus) neglectus*** Ochs

1925. *Orectochilus neglectus* Ochs, *Rec. Ind. Mus.*, **27** : 199.

1930. *Orectochilus (Patrus) neglectus* : Ochs, *Cat. Ind. Ins.*, pt. **19** : 30.

1984. *Orectochilus (Patrus) neglectus*, Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, pp. 54-55.

Material examined : Not seen.

Distribution : INDIA : Panjab, Haryana, Himachal Pradesh, Uttarakhand (Almora, Nainital, Kathgodam).

5. ***Orectochilus (Patrus) himalayensis*** Vazirani

1984. *Orectochilus (Patrus) himalayensis* Vazirani *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, pp. 56-57.

Material examined : 1 ex. INDIA : Uttarakhand : Nainital : Jeolikot, 18.ix.1952, Reg. No. 8451/H4A, P. Pillai, ex. Stream Naraini.

Distribution : INDIA : Uttarakhand (Nainital : Jeolikot)

6. ***Orectochilus (Patrus) cuneatus*** Regimbart

1891. *Orectochilus (Patrus) cuneatus* Reg. *Ann. Soc. ent. Fr.*, **60** : 702.

1930. *Orectochilus (Patrus) cuneatus* : Ochs, *Cat. Indian Ins.*, **19** : 23.

1984. *Orectochilus (Patrus) cuneatus* : Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, : 55-56.

Material examined : Not seen.

Distribution : INDIA : West Bengal, Sikkim, Punjab, Uttar Pradesh, Uttarakhand (Dehradun, Kaligad, Kathgodam).

Elsewhere : Nepal.

7. ***Orectochilus (Patrus) metallicus*** Regimbart

1883. *Orectochilus metallicus* Regimbart, *Ann. Soc. ent. Fr.* (6)**3**: 418.

1930. *Orectochilus (Patrus) metallicus* : Ochs, *Cat. Indian Ins.*, **19** : 29.

1984. *Orectochilus (Patrus) metallicus*, Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae : 67-68.

Material examined : Not seen.

Distribution : INDIA : West Bengal, Sikkim, Uttarakhand (Bhowali, Dehradun, Chakrata, Bodyar).

Elsewhere : Nepal, ? Laos.

8. ***Orectochilus (Patrus) cameroni*** Ochs

1925. *Orectochilus cameroni* Ochs, *Rec. Indian Mus.*, **27** : 195.

1930. *Orectochilus (Patrus) cameroni* : Ochs, *Cat. Indian Ins.*, pt. **19** : 20.

1984. *Orectochilus (Patrus) cameroni* : Vazirani, *Fauna of India*, Col. : Fam.Gyrinidae & Haliplidae, pp. 69-71.

Material examined : Not seen.

Distribution : INDIA : Himachal Pradesh, Uttarakhand (Dehradun, Kaligad, Mussoorie, Bhowali).

9. ***Orectochilus (Patrus) oblongiusculus*** Regimbart

1886. *Orectochilus oblongiusculus* Reg., *Ann. Soc. ent Fr.*, (6)**6** : 262, pl. 4, fig. 11.

1930. *Orectochilus (Patrus) oblongiusculus parkeri* : Ochs, *Cat. Indian Ins.*, **19** : 31.

1984. *Orectochilus (Patrus) oblongiusculus* : Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, pp. 74-76.

Material examined : Not seen.

Distribution : INDIA; West Bengal, Meghalaya, Sikkim, Punjab, Himachal Pradesh, Uttarakhand (Kumaon : Bhimtal, Almora: Gonai).

Elsewhere : Nepal, Myanmar, Laos, Vietnam.

10. ***Orectochilus (Patrus) marginipennis angustilimbus*** Ochs

1925. *Orectochilus marginipennis angustilimbus* Ochs, *Rec. Indian Mus.*, **27** : 202.

1930. *Orectochilus (Patrus) marginipennis angustilimbus*, Ochs, *Cat. Indian Ins.*, pt. **19** : 29.

1984. *Orectochilus (Patrus) marginipennis angustilimbus* : Vazirani, *Fauna of India*, Col. : Fam. Gyrinidae & Haliplidae, pp. 79-80.

Material examined : Not seen.

Distribution : INDIA : Assam, Uttarakhand (Dehradun, Lachiwala).

Family DYTISCIDAE
Subfamily NOTERINAE
Tribe HYDROCANTHINI
Genus ***Canthydrus*** Sharp, 1882

1882. *Canthydrus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 269, 838.

1977. *Canthydrus* : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.* **6** : 5-8.

11. ***Canthydrus laetabilis*** (Walker)

1858. *Hydroporus laetabilis* Walker, *Ann. Mag.nat. Hist.*, (3)**2** : 205.

1882. *Canthydrus laetabilis* : Sharp, *Sci. Trans. R. Dublin Soc*, **2** : 277.

1977. *Canthydrus laetabilis*, Vazirani, *Rec. zool. Surv. India,Occ. Paper No.* **6** :

2000. *Canthydrus laetabilis*, Ghosh, Mukhopadhyay & Biawas, *Zool. Surv. India, Fauna of Tripura, State Fauna Series 7* (Part 3) : 39.

2007. *Canthydrus laetabilis* Mukhopadhyay, & Ghosh, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, **5** (Part-3) : 444-445.

Material examined : 6 ex., Uttarakhand : Champawat : Tanakpur, 27.ii.1990, S. Biswas, ex. bank of Sarda River; 1 ex., Bageshwar : Garur, 26.iii.2001, S.K. Chakraborty & Party, ex. bank of river.

Distribution : INDIA : W.B., Bihar, Orissa, Tripura, Assam, Punjab, Rajasthan, Gujarat, Maharashtra, Uttar Pradesh, Andhra Pradesh, Kerala, Delhi, Uttarakhand.

Elsewhere : Sri Lanka, Nepal, Pakistan, Myanmar, Africa.

Remarks : This species is recorded here for the first time from this state.

Subfamily LACCOPHILINAE
Genus ***Laccophilus*** Leach, 1817

1817. *Laccophilus* Leach, *Zool. Misc.*, **3** : 69.

1882. *Laccophilus*, Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 287, 841.

1930. *Laccophilus*, Zimmermann, *Koleopt. Rdsch.*, **16** : 45

1977. *Laccophilus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.* **6** : 9-17.

12. ***Laccophilus flexuosus*** Aube

1838. *Laccophilus flexuosus* Aube, in *Dejean's species Coleopteres*, **6** : 430.

1977. *Laccophilus flexuosus*, Vazirani, *Rec. Zool.Surv. India, Occ. Paper No.*, **6** : 11-12.

1983. *Laccophilus flexuosus*, Brancucci, *Ent. Arb.Mus.Frey*, **31/32** : 318-321.

2007. *Laccophilus flexuosus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series*, **5** (Part 3) : 447.

Material examined : 2 ex.,Uttarakhand : Champawat : Tanakpur, 27.ii.1990, S. Biswas, ex. Bank of Sarda river.

Distribution : INDIA : W.B., Bihar, Orissa, Tripura, Sikkim, Manipur, Punjab, Hariyana, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu, Pondicherry, Andaman & Nicobar, Uttarakhand.

Elsewhere : Myanmar, Sri Lanka, Pakistan, Nepal, China, Indonesia, Iran, Iraq, Japan, Taiwan, Vietnam, Cambodia.

Remarks : The species is recorded here for the first time from Uttarakhand.

13. ***Laccophilus parvulus obtusus*** Sharp

1880-82. *Laccophilus parvulus obtusus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 311.

1983. *Laccophilus parvulus obtusus*, Brancucci, Ent. Arb. Mus. Frey, **31/32** : 360-362.

2007. *Laccophilus parvulus obtusus*, Mukhopadhyay & Ghosh, Zool. Surv. India, *Fauna of Andhra Pradesh, State fauna Series*, **5** (Part 3) : 448.

Material examined : 5 ex., Uttarakhand : Champawat : Tanakpur, 27.ii.1990, S. Biswas, ex. Bank of Sarda river.

Distribution : INDIA : W. B., Tripura, Assam, Manipur, Bihar, M.P., Andhra Pradesh, Goa, Maharashtra, Orissa, Rajasthan, Gujarat, TamilNadu, Uttarakhand.

Elsewhere : Myanmar, Sri Lanka, Bangladesh, Pakistan, Thailand, Malayasia, Indonesia, Vietnam.

Remarks : This species is recorded for the first time from this state.

14. ***Laccophilus sharpi*** Regimbart

1889. *Laccophilus sharpi* Regimbart, *Ann.soc. Ent Fr.*, **6**(9) : 151.

1977. *Laccophilus sharpi*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.* **6**, pp. 15-16.

2003. *Laccophilus sharpi*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part-3) : 26.

Material examined : 2 ex. Uttarakhand : Champawat : Tanakpur, 27.ii.1990, S. Biswas, ex. Bank of Sarda river.

Distribution : INDIA : Bihar, M.P., Maharashtra, Orissa, Rajasthan, Gujarat, Tamil Nadu, Uttar Pradesh, Andaman Island, Sikkim, Uttarakhand.

Elsewhere : Pakistan, Myanmar, Nepal, Srilanka, Iraq, China, Japan.

15. ***Laccophilus indicus*** Gschwendtner

1936. *Laccophilus solutus var. indicus* Gsch., *Rec. Indian Mus.*, **37**(1935) : 367.

1983. *Laccophilus indicus* Gsch., *Brancucci, Ent. Arb. Mus. Frey*, **31/32** : 322-323.

2003. *Laccophilus indicus*, Mukhopadhyay & Ghosh, *Zool.Surv. India*, State Fauna Series, **9** (Part 3) : 25.

Material examined : 10 ex., Uttarakhand : Champawat; Tanakpur, 27.ii.1990, S. Biswas, ex. Bank of Sarda river.

Distribution : INDIA : W.B., Sikkim, Assam,Punjab, Uttarakhand.

Elsewhere : Bangladesh.

Remarks : This species is recorded here for the first time from Uttarakhand.

Subfamily HYDROPORINAE
Tribe HYPHYDRINI
Genus ***Hyphydrus*** Illiger, 1807

1807. *Hyphydrus* Illiger, *Mag. Ins.*, **6** : 349.

1977. *Hyphydrus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper. No.*, **6** : 20-24.

Subgenus *Hyphydrus (Apriophorus)* Guignot.

1936. *Hyphydrus (Apriophorus)* Guignot, *Mem. Mus. Natr. Hist. nat.*, **8** : 12.

16. ***Hyphydrus (Apriophorus) renardi*** Severin

1890. *Hyphydrus renardi* Severini, *Ann. Soc. ent. Belg.*, **34** Bull (4)**12** : 191.

1977. *Hyphydrus (Apriophorus) renardi*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 23.

Material examined : 2 ex., Uttarakhand : Kumaon : Bhimtal, 10.v.1911, 3962/H4, Dr. S.W. Kemp; 8 ex., Kumaon : Naukuchia Tal, 5.v.1911, 3961/H4, Dr. S.W. Kemp.

Distribution : INDIA : Bihar, Madhya Pradesh, Tamil Nadu, Orissa, Uttar Pradesh, Uttarakhand, Rajasthan, W.B.

Elsewhere : Myanmar.

Tribe HYDROVATINI
Genus ***Hydrovatus*** Mots. 1855

17. ***Hydrovatus ferrugatus*** Regimbart

1877. *Hydrovatus ferrugatus* Regimbart, *Ann. Soc. ent. Fr., Bull.*, : 79.

1899. *Hydrovatus ferrugatus*, Regimbart, *Ann. Soc. ent. Fr.*, **68** : 232.

1977. *Hydrovatus ferrugatus* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 27.

Material examined : 17 ex. INDIA : Uttarakhand : Bageshwar : Bageshwar, 2.ix.2005, S.K. Chatterjee & party.

Distribution : INDIA : W.B., Bihar, Karnataka, Punjab, Uttarakhand.

Elsewhere : Myanmar, Srilanka, Indonesia, Vietnam, Phillippines, New Guinea.

Remarks : This species has been recorded here for the first time from this state.

Tribe BIDESSINI
Genus ***Guignotus*** Houlbert, 1934

1934. *Bidessus (Guignotus)* Houlbert *Fauna Ent. Arm., Hydrocanthares*, pp. 54.

1945. *Guignotus*, Guignot, *Mem. Mus. Natn. Hist. nat.*, **19** : 226.

1977. *Guignotus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 31-37.

18. ***Guignotus flammulatus*** (Sharp)

1882. *Bidessus flammulatus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 359.

1920. *Bidessus (s.str.) flammulatus* : Zimmermann, *Coleopt. Cat.*, **4** : 51.

1954. *Guignotus flammulatus* : Guignot, *Opusc. ent. Lund.*, **19** : 221.

1977. *Guignotus flammulatus* (Sharp) : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 32.

Material examined : 1 ex., INDIA : Uttarakhand : Bageshwar : Garur, 26.iii.2001, S.K. Chakraborty & Party; 1 ex., Udhamsing nagar : Khatima, 18.iii.2005, B. Mitra & Party.

Distribution : INDIA : Uttarakhand, Bihar, Madhya Pradesh, Tamil Nadu, Orissa, W.B., Rajasthan, Maharastra, Gujarat, Uttar Pradesh

Elsewhere : Sri Lanka, Bangladesh, Pakistan, China, Japan, Indonesia, Vietnam, Thailand.

19. ***Guignotus inconstans*** (Regimbart)

1891. *Bidessus inconstans* Regimbart, *Ann. Soc. ent. Fr.*, **36** : 119.

1899. *Bidessus (s.str.) inconstans* : Regimbart, *Ann. Soc. ent. Fr.*, **68** : 227.

1963. *Guignotus inconstans* : Fernando, *Bull. Fish. Res. Stn. ceylon*, **16**(1) : 26.

1977. *Guignotus inconstans* (Regimbart): Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 33-34.

Materials examined : 5 ex., INDIA : Uttarakhand : Bageshwar, Garur, 26.iii.2001, S.K. Chakraborty & Party.

Distribution : INDIA : Uttarakhand, Bihar, Orissa, Rajasthan, Maharashtra, Goa, Karnataka.

Elsewhere : Sri Lanka, Malaysia, Nepal, Bhutan, Myanmar, Indonesia.

Remarks : The species recorded here for the first time from this state.

Tribe HYDROPORINI
Genus ***Hyphoporus*** Sharp, 1882

1882. *Hyphoporus* Sharp, Sci. Trans. R. Dublin Soc., **2** : 390, 859.

1997. Hyphoporus, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 44-47.

20. ***Hyphoporus aper*** Sharp

1882. *Hyphoporus aper* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 390.

1977. *Hyphoporus aper*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 44.

Material examined : 1 ex., INDIA : Uttarakhand : Dehradun : Surajbagh, 28.ix.1911, 4830/H4, Mus. Collection.

Distribution : INDIA : Maharashtra, Bihar, M.P., Punjab, Uttar Pradesh, W.B., Karnataka, Uttarakhand.

Genus ***Potamonectes*** Zimmermann, 1921

1919. *Deronectes (Potamodytes)* Zimmermann, *Arch. Naturgesch.*, **83A**(12) : 184.

1920. *Potamonectes* Zimmermann, *Ent. Blatt.*, **17** : 87.

1934. *Rhabdonectes* Houlbert, *Fauna Ent. Arm. Col. Hydr.*, pp68.

1977. *Potamonectes*, Vazirani, *Rec. zool. Surv. India*, Occ. Paper No. **6** : 50-55.

21. ***Potamonectes (s.str.) indicus*** (Sharp)

1882. *Deronectes indicus* Sharp, *Sci. Trans. R. Dublin. Soc.*, **2** : 431.

1899. *Hydroporus indicus*, Regimbart, *Ann. Soc. ent. Fr.*, **68** : 198.

1921. *Deronectes (Potamodytes) indicus*, Zimmermann, *Coleopt. Cat.*, **4** : 127.

1959. *Potamonectes (s.str.) indicus*, Guignot, *Bull. mens. Soc. Linn. Lyon*, **28** : 10.

1977. *Potamonectes (s.str.) indicus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 51.

Material examined : 1 ex., INDIA : Uttarakhand : Kumaon : Malwa Tal, 7.v.1911, 3993/H4, Dr. S.W. Kemp; 1 ex., Kumaon : Kathgodam, 2.v.1911, 3994/H4, Dr. S.W. Kemp; 1 ex., Kumaon, Nainital, 2.v.1911,3995/H4, Dr. N. Annandale; 4 ex., Dehradun : Massoorie, 16.iv.1930, 3996-97/H4, Dr. B.N. Chopra; 2 ex., Mussoorie, 10.ix.1929, 3998-3999/H4, Dr. B.N. Chopra.

Distribution : INDIA : Himachal Pradesh, Uttar Pradesh, Bihar, Uttarakhand, Tamil Nadu, Arunachal Pradesh.

Elsewhere : Pakistan.

22. ***Potamonectes (s.str.) balli*** Vazirani

1970. *Potamonectes (s.str.) balli* Vazirani, *Oriental Ins.*, **4** : 127.

1977. *Potamonectes (s.str.) balli* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 50.

Material examined : 1 ex., INDIA : Dehradun : Kotalgate : Mussoorie road, 18.viii.1973, Dr. R.N. Chopra; 8 ex., Bageshwar, Garur, 26.iii.2001; 15 ex., Baijula, 1.x.2004; 3 ex., Rudraprayag, 6,xi,2002, Dr. P. Mukhopadhyay & Party; 3 ex., Pithoragarh: Munsiyari, 26.iii.2005, B. Mitra & Party; ex. in ditches; 1 ex., Pithoragarh : Berinag, 30.iii.2005, B. Mitra & Party; 1 ex., Pithoragarh : Chowkari, 31.iii.2005, B. Mitra & Party.

Distribution : INDIA : Himachal Pradesh, Uttarakhand.

Elsewhere : Pakistan.

Remarks : This species is recorded here for the first time from Uttarakhand.

Subfamily COLYMBETINAE
Tribe AGABATINI
Genus ***Lacconectes*** Motschulsky, 1855

1855. *Lacconectes* Motschulsky, *Etude Entomologiques*, **4** : 83.

1977. *Lacconectes*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 58-61.

23. ***Lacconectes (s.str.) basalis*** Sharp

1882. *Lacconectes basalis* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 598.

1970. *Lacconectes (s.str.) basalis* : Vazirani, *Oriental Ins.*, **4** : 322.

1977. *Lacconectes (s.str.) basalis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 58.

Material examined : 2 ex., INDIA : Uttarakhand : Bageshwar : Kausani, 23.iii.2001, S.K. Chakraborty & Party.

Distribution : INDIA : Uttarakhand.

Elsewhere : Myanmar, Thailand, Cambodia.

Remarks : The species is recorded here for the first time from India : Uttarakhand.

Tribe AGABINI
Genus ***Agabus*** Leach, 1817

1817. *Agabus* Leach, *Zool. Miscell.*, **3** : 69-72.

1882. *Agabus*, Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 493, 876.

1977. *Agabus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 61-65.

Subgenus ***Agabus (Dichonectes)*** Guignot

1945. *Agabus (Dichonectes)* Guignot, *Bull. Soc. ent. Fr.*, pp. 21.

24. ***Agabus (Dichonectes) biguttatus*** (Olivier)

1795. *Dytiscus biguttatus* Olivier, *Hist. nat. Ins. Coleopteres*, 3(40) : 26.

1882. *Agabus biguttatus*, Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 499.

1920. *Agabus (Gaurodytes) biguttatus*, Zimmermann, *Coleopt. Cat.*, **4** : 157 (in part)

1958. *Agabus (Dichonectes) biguttatus*, Guignot, *Bull. Mens. Soc. Linn. Lyon*, **27** : 29.

1977. *Agabus (Dichonectes) biguttatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 62.

Material examined : 5 ex., India : Uttarakhand : Dehradun : Mussoorie : Lamdour bazaar, 18,vi,1930, 4460-4464/H4, B.N. Chopra; 5 ex., Kumaon : Bagarkote, 1.v.1914, 4466-70/H4, Tytler.

Distribution : INDIA : Kashmir, Uttarakhand

Elsewhere : Iran, Afghanistan, Mongolia, U.S.S.R., Turkestan, Asia Minor, North & North East Africa, Europe.

Remarks : The species is recorded here for the first time from the state.

Subgenus ***Agabus (Gaurodytes)*** Thomson

1859. *Agabus (Gaurodytes)* Thomson, *Skand. Coleopt.*, **1** : 14 (in part).

25. ***Agabus (Gaurodytes) amoenus sinuaticollis*** Regimbart

1899. *Agabus sinuaticollis* Regimbart, *Ann. Soc. ent. Fr.*, **68** : 271.

1970. *Agabus (Gaurodytes) amoenus sinuaticollis*: Vazirani, *Oriental Ins.* **4** : 336.

1977. *Agabus (Gaurodytes) amoenus sinuaticollis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 64.

2000. *Agabus (Gaurodytes) amoenus sinuaticollis*, Mukhopadhyay, Ghosh, Saha & Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part 3, pp. 85.

2003. *Agabus (Gaurodytes) amoenus sinuaticollis*, Mukhopadhyay & Ghosh, *Zool. Surv. India, State Fauna Series 9 , Fauna of Sikkim (Part 3)* : 28-29.

Material examined : 1 ex., INDIA : Uttarakhand : Kumaon : Nainital, 11.v.1911, 4477/H4, Dr. S.W. Kemp; 8 ex., Kumaon : Bhimtal, 10.v.1911, 4478-85/H4, Dr. S.W. Kemp; 1 ex., Nainital : Bhimtal, 21.iv.1989, G.K. Srivastava; 1 ex., Almora : Kosi, 05.x.2001, Dr. P. Mukhopadhyay & Party, ex. in ditches; 12 ex., Pithoragarh, Berinag, 30.iii.2005, B. Mitra & Party, ex. in ditches; 1 ex., Pithoragarh : Chaukari, B. Mitra & Party, ex. in ditches

Distribution : INDIA : Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh, Uttarakhand.

Elsewhere : China.

26. ***Agabus (Gaurodytes) conspersus*** (Marsham)

1802. *Dytiscus conspersus* Marsham, *Entomologica Britannica*, **1**, *Coleopteres*, pp. 427.

1882. *Agabus conspersus* : Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 515.

1920. *Agabus (Xanthodytes) conspersus* : Zimmermann, *Coleopt. Cat.*, **4** : 176.

1959. *Agabus (Gaurodytes) conspersus* : Guignot, *Bull. Mens. Soc. Linn. Lyon.*, **27** : 29.

1977. *Agabus (Gaurodytes) conspersus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 64-65.

Material examined : 1 ex., Uttarakhand : Kumaon : Bhimtal, 2.v.1911, 4707/H4, Dr. S.W. Kemp.

Distribution : INDIA : Kashmir, Himachal Pradesh, Uttarakhand.

Elsewhere : Iran, Afghanistan, Europe.

Remarks : This species has been recorded here for the first time from the state.

27. *Agabus (Gaurodytes) debilipes* Regimbart

1899. *Agabus debilipes* Regimbart, *Ann. Soc. ent. Fr.*, **68** : 273.

1920. *Agabus (Gaurodytes) debilipes*, Zimmermann, *Coleopt.Cat.*, **4** : 164.

1977. *Agabus (Gaurodytes) debilipes*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 65.

Material examined : 2 ex., INDIA : Uttarakhand : Chamoli : Badrinath, alt. 3069 m., 2.11.2002, Dr. P. Mukhopadhyay & Party, ex. in Ditches.

Distribution : INDIA : Himachal Pradesh, Kashmir, Punjab, Uttarakhand.

Remarks : This species is recorded here for the first time from this state.

Genus *Platambus* Thomson, 1860

1860. *Platambus* Thomson, *Skandiniviens Coleopteres*, **2** : 54.

1960. *Platambus* : Guignot, *Ann. Mus. R. Congo belge*, (8)**78** : 68.

1964. *Platambus*, Vazirani, *Proc zool. Soc. Calcutta*, **18** : 25.

1977. *Platambus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 65-66.

28. *Platambus lineatus* Gschwendtner

1935. *Platambus lineatus* Gschwendtner, *Koleopt. Rdsch.*, **21** : 62.

1965. *Platambus lineatus*, Vazirani, *Proc. Zool. Soc. Calcutta*, **18** : 26.

1977. *Platambus lineatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 66.

Material examined : 1ex. INDIA : Uttarakhand : Champawat : Tanakpur, 27.ii.1990, S. Biswas, ex. running water in sarda river.

Distribution : INDIA : Arunachal Pradesh, Uttarakhand.

Remarks : This Species is recorded here for the first time from this state.

Tribe HYDRONEBRINI
Genus *Platynectes* Regimbart 1887

1887. *Platynectes* Regimbart, *Ann. Soc. ent. Fr.*, (5)**8** : 454, 462.

1977. *Platynectes* : Vazirani, *Rec. zool. Surv. India, Occ. P maper No.*, **6** : 66-68.

Subgenus *Gueorguievtes* Vazirani

1976. *Platynectes (Gueorguievtes)* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **71** : 170.

29. *Platynectes (Gueorguievtes) kashmirensis* Balfour-Browne

1944. *Platynectes* kashmirensis Balfour-Browne, *Ann. Mag. nat. Hist.*, (11)**11** : 352. nom. nov.

1971. *Platynectes (s.str.) kashmirensis* : Gueorguievtes, *Izv. Inst. zool. Sof.*, **34** : 42.

1970. *Platynectes (s.str.) kashmirensis*: Vazirani, *Orient. Ins.*, **4** : 341.

1977. *Platynectes (Gueorguievtes) kashmirensis* : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 68.

2003. *Platynectes (Gueorguievtes) kashmirensis* : Mukhopadhyay & Sengupta, *zool. surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part 3) : 29.

Material examined : 3 ex. INDIA : Uttarakhand : Bageshwar : Kausani, 21.iii.2001, S.K. Chakraborty & Party; 5 ex. Almora : Binsar, 30.ix.2001, Dr. P. Mukhopadhyay & party; 1 ex, Dehradun : Mussoorie : Bhatta, 16.vi.1930, 4726/H4, dr. B.N. Chopra; 1 ex. Kumaon : Bhimtal, 10.v.1911, 4727/H4, Dr. S.W. Kemp; 1 ex. Kumaon : Nainital, 10.v.1911,4728? H4, Dr. N Annandale; 5 ex. Almora, Kosi, 5.x.2001, P. Mukhopadhyay & party

Distribution : INDIA : Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh, W.B., Assam, Manipur, Sikkim, Uttarakhand.

Tribe COLYMBETINI
Genus *Rhantus* Stephens, 1835

1835. *Rhantus* Stephens, *Illustrated Brit. Ent. Mand;* 5 app : 395.

1978. *Rhantus* : Vazirani, *Rec. zool Surv. India, Occ. Paper No.*, **6** : 70-73.

30. *Rhantus (s.str.) sikkimensis* Regimbart

1899. *Rhantus sikkimensis*, Regimbart, *Ann. Soc. ent. Fr.*, **68** : 306.

1970. *Rhantus (s.str.) sikkimensis* : Vazirani, *oriental Ins.*, **4** : 355.

1977. *Rhantus (s.str.) sikkimensis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 72-73.

2003. *Rhantus (s.str.) sikkimensis* : Mukhopadhyay & Ghosh, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part 3) : 30.

Material examined : 11 ex. INDIA : Uttarakhand : Almora : Binsar, 30.ix.2001, Dr. P. Mukhopadhyay & party; 1 ex. Garhwal, 1.iv.1926, 4407/H4, Dr. S.L. Hora; 1 ex. Kumaon, 1.viii.1920, 4408/H4, Dr. B. Prasad & S.L. Hora; 5 ex. Nainital, 1.viii.1920, 4409-13/H4, Dr. N. Annandale; 3 ex. Dehradun : Mussoorie, 16.vi.1930, 4414-16/H4, Dr. B.N. Chopra; 1 ex. Rudraprayag : Rudraprayag, 6.xi.2002, Dr. P. Mukhopadhyay & Party; 1 ex. Pithoragarh : Berinag, 30.iii.2005, B. Mitra & party; 7 ex. Nainital : Bhimtal, 12.x.2001, Dr. P. Mukhopadhyay & Party, ex. in ditches; 1 ex. Almora : Kosi, 5.x.2001, Dr. P. Mukhopadhyay & party, ex. in ditches.

Distribution : INDIA : Himachal Pradesh, W.B., Meghalaya, Punjab, Sikkim,Uttarakhand.

Elsewhere : Pakistan, Myanmar, China.

Remarks : This species is recorded here for the first time from Uttarakhand.

31. ***Rhantus (s.str.) taprobanicus*** Sharp

1890. *Rhantus (s.str.) taprobanicus* Sharp, *Trans. Ent. Soc. London*, : 346.

1977. *Rhantus (s.str.) taprobanicus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 73.

2000. *Rhantus (s.str.) taprobanicus*, Mukhopadhyay, Ghosh, Saha & Biswas, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, **4** : Part 5, pp. 86.

Material examined : 4 ex., INDIA : Uttarakhand : Kumaon : Bhimtal, 10.v.1911, 4352-55/H4, Dr. S.W. Kemp; 4 ex. Kathgodam, 2.v.1911, 4356-59/H4, Dr. S.W. Kemp; 3 ex. Nainital,29.ix.1907, 4361-63/H4, R. Hodgart.

Distribution : INDIA : Karnataka, Tamil Nadu, Pondicherry, Maharashtra, Rajasthan, Uttar Pradesh, Bihar, Meghalaya, West Bengal, Uttarakhand.

Elsewhere : Pakistan, Sril Lanka.

Subfamily DYTISCINAE
Tribe ERETINI
Genus ***Eretes*** Castelnau, 1833

1833. *Eretes* Castelnau, *Ann. Soc. ent. Fr.*, **2** : 397.

1977. *Eretes* : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 73-74.

32. ***Eretes sticticus*** (Linnaeus)

1767. *Dytiscus sticticus* Linnaeus, *Syst. Nat.*; ed. 12, pp 666.

1833. *Eretes sticticus* (L.) : Castalnau, *Ann. Soc. ent. Fr.*, (5)**8** : 450.

1977. *Eretes sticticus*: Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 73-74.

2003. *Eretes sticticus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part 3) : 30-31.

2007. *Eretes sticticus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Andhra Pradesh, State fauna Series*, **5** pp. 452-453.

Material examined : 6 ex. INDIA, Uttarakhand : Pauri : Srinagar, 26.vi.2004, S.K. Chakraborty & Party, ex. bank of Alakananda river; 3 ex. Dehradun, 12.vii.1930, 4086-88/H4, Dr. B.N. Chopra; 1 ex. Nainital, 13.x.1911, 4033/H4, J.W. Counter

Distribution : INDIA : West Bengal, Bihar, Orissa, Kashmir, Assam, Sikkim, Manipur, Punjab, Uttar Pradesh, Maharashtra, Rajasthan, Gujarat, Delhi, Karnataka, Andhra Pradesh, Uttarakhand, Tamil Nadu, Goa, Andaman Island.

Elsewhere : Nepal, Pakistan, Myanmar, Thailand.

Remarks : This species is cosmopolitan in distribution.

Tribe HYDATICINI
Genus ***Hydaticus*** Leach,1817

1817. *Hydaticus* Leach, *Zool. Miscell.* **3** : 69, 72.

1977. *Hydaticus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 75-82.

Subgenus ***Hydaticus (Guignotites)*** Brinck

1943. *Hydaticus (Guignotites)* Brinck, *Kungl. Fysiogr. Sallsk. Lund Forh*, **13** : 8.

33. ***Hydaticus (Guignotites) fabricii*** Macleay

1833. *Hydaticus (Guignotites) fabricii* Macleay, *Annulosa Javanica*, p. 134.

1977. *Hydaticus (Guignotites) fabricii*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 76-77.

2003. *Hydaticus (Guignotites) fabricii*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part 3) : 31.

2007. *Hydaticus (Guignotites) fabricii*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Andhra Pradesh, State fauna Series* 5, pp. 452-453.

Material examined : 1 ex. INDIA : Uttarakhand : Dehradun, 29.x.2000, Dr. P. Mukhopadhyay & Party, ex. at light; 1 ex., Almora : Kosi, 5.x.2001, Dr. P. Mukhopadhyay & party, ex. ditches; 1 ex. Pithoragarh, 30.3.2005, B. Mitra & party.

Distribution : INDIA : Sikkim, Manipur, Rajasthan, UttarPradesh, Uttarakhand, Andhra Pradesh, Tamil Nadu, Goa, Andaman Is.

Elsewhere : Indonesia, Vietnam, Philippines.

34. *Hydaticus (Guignotites) bengalensis* Regimbart

1899. *Hydaticus (Guignotites) bengalensis* Regimbart, *Ann. Soc. ent. Fr.*, **68** : 322.

1977. *Hydaticus (Guignotites) bengalensis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.*, **6** : 75.

Material examined : 1ex. INDIA : Uttarakhand : Uttarkashi : Uttarkashi, 6.v.2002, S.K. Chakraborty & party.

Distribution : INDIA : West Bengal, Uttarakhand.

Elsewhere : Myanmar.

Remarks : This species is recorded here for the first time from this state.

35. *Hydaticus (Guignotites) luczonicus* Aube

1838. *Hydaticus (Guignotites) luczonicus* Aube, *In Dejean's Species Coleopteres*, **6** : 179.

1977. *Hydaticus (Guignotites) luczonicus* : Vazirani, *Rec. zool. Surv. India, Occ. Paper* No., **6** : 79.

Material examined : 1 ex. INDIA : Uttarakhand : Kumaon : Sattal, 10.v.1911, 4515/H4, Dr. S.W. Kemp; 1 ex. Kumaon : Naukuchia Tal, 5.v.1911, 4516/H4, Dr. S.W. Kemp; 1 ex. Kumaon : Bhimtal, 10.v.1911, 4521/H4, Dr. S.W. Kemp

Distribution : INDIA : Bihar, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Uttar Pradesh, West Bengal, Uttarakhand.

Elsewhere : Thailand.

36. *Hydaticus (Guignotites) histrio* Clark

1864. *Hydaticus (Guignotites) histrio* Clark, *Trans. ent. Soc. Lond.*, (3)**1** : 221.

1966. *Hydaticus (Guignotites) histrio* : Gueorguiev, *Reichenbschi Mus. Tier Dresden*, **5**(11) : 115.

1977. *Hydaticus (Guignotites) histrio*, Vazirani, *Rec. zool. Surv. India, Occ. Paper* No., **6** : 77.

Material examined : 1 ex. INDIA : Uttarakhand : Kumaon : Naukuchia Tal, 5.v.1911, 4534/H4, Dr.S.W. Kemp.

Distribution : INDIA : Bihar, Himachal Pradesh, Punjab, Uttar Pradesh, Uttarakhand.

Elsewhere : Pakistan, Iran, Afghanistan, Saudi Arabia.

37. *Hydaticus (Guignotites) vittatus* (Fabricius)

1775. *Dytiscus vittatus* F., *Syst. ent. App.* 825.

1838. *Hydaticus vittatus*, Aube, *in Dejean's Species Coleopteres*, **6** : 208.

1970. *Hydaticus (Guignotites) vittatus*, Vazirani, *Rec. zool. Surv. India, Occ. Paper* No. **6** : 81-82.

2003. *Hydaticus (Guignotites)vittatus*, Mukhopadhyay & Ghosh, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (part 3) : 31.

2007. *Hydaticus (Guignotites)vittatus*, Mukhopadhyay & Ghosh, *Zool. Surv. India*, Fauna of Andhra Pradesh, State Fauna Series 5, Part3, pp. 453.

Material examined : 1ex. INDIA : Uttarakhand : Pithoragarh : Chaukori, 31.iii.2005, B. Mitra & Party; 1ex. Kumaon : Sat Tal, 10.v.1911, 4544/H4, Dr. S.W. Kemp; 1ex. Kumaon : Naukuchia Tal, 5.v.1911, 4545/H4, Dr. S.W. Kemp; 2ex. Kumaon : Bhimtal : 10.v.1911, 4546-47/H4, Dr. S.W. Kemp; 1ex, Bhimtal, 10.v.1911,4548/H4, Dr. S.P. Aghaskar; 1ex, Kumaon : Nainital, 10.v.1911, 4549/H4, Dr. B. Prasad & Dr. S.L. Hora.

Distribution : INDIA : West Bengal, Sikkim, Tripura, Manipur, Gujarat, Rajasthan, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Uttarakhand.

Elsewhere : Myanmar, Pakistan, Sri Lanka, Nepal, Bangladesh, China, Formosa, Japan, Indonesia.

Tribe THERMONECTINI
Genus ***Sandracottus*** Sharp, 1882

1882. *Sandracottus* Sharp, *Sci. Trans. R. Dublin. Soc,* **2** : 685-910.

1977. *Sandracottus,* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.,* **6** : 83-86.

38. ***Sandracottus dejeani*** (Aube)

1838. *Hydaticus dejeani* Aube, *in Dejean's Species Coleopteres,* **6** : 165.

1882. *Sandracottus dejeani* (Aube) : *Sharp, Sci. Trans. R. Dublin. Soc.,* **2** : 686.

1977. *Sandracottus dejeani,* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.,* **6** : 83-84.

Material examined : 1ex. INDIA : Uttarakhand : Dehradun, Suraj bagh, 21.v.1926, 4629/H4, Dr. S.L. Hora.

Distribution : INDIA : Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Gujarat, Rajasthan, Uttar Pradesh, Tamil Nadu, Uttarakhand.

Elsewhere : Pakistan.

39. ***Sandracottus mixtus*** (Blanchard)

1853. *Acilius mixtus* Blanchard, *Voy. Pd. Sud.,* **4** : 47.

1944. *Sandracottus mixtus,* Ballfour Browne, *Ann. Mag. nat. Hist.* (11)**11** : 355.

1977. *Sandracottus mixtus* : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.,* **6** : 85.

2007. *Sandracottus mixtus,* Mukhopadhyay & Ghosh, *zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series,* **5** (Part-3) : 455.

Material examined : 1ex. INDIA : Uttarakhand : Rudraprayag : Rudraprayag, 6.xi.2002, Dr. P. Mukhopadhyay & party, ex. bank of Alakananda river.

Distribution : INDIA : West Bengal, Nagaland, Andhra Pradesh, Tamil Nadu, Uttarakhand.

Elsewhere : Myanmar, China, Indonesia, Vietnam, Indochina.

Remarks : This species is recorded for the first time from Uttarakhand.

Tribe CYBISTERINI
Genus ***Cybister*** Curtis, 1827

1827. *Cybister* Curtis, *Brit. Ent.,* **4** : 151.

1977. *Cybister* : Vazirani, *Rec. zool. Surv. India, Occ. Paper No.,* **6** : 86-93.

Subgenus ***Cybister (Melanectes)*** Brinck

1944. *Cybister (Melanectes)* Brinck, *Klungl. Fys. Salls Handl.,* **56** : 11.

40. ***Cybister (Melanectes) sugillatus*** Erichson

1834. *Cybister sugillatus* Er., *Nova Acta Leop. Carol.,* **16** : 227.

1977. *Cybister (Melanectes) sugillatus,* Vazirani, *Rec. zool. Surv. India, Occ. Paper No.,* **6** : 89.

2003. *Cybister (Melanectes) sugillatus,* Mukhopadhyay & Ghosh, *zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9** (Part 3) : 32.

Material examined : 1ex. INDIA : Uttarakhand : Almora : Katvamri, 3.x.2001, Dr. A. Bal & party, 1ex. Kumaon : Naukuchia Tal, 5.v.1911, 4160/H4, Dr. S.W. Kemp; 4ex, Bhimtal, 10.v.1911, 4161-64/H4, Dr. S.W. Kemp.

Distribution : INDIA : Assam, Madhya Pradesh, Uttar Pradesh, Orissa, Tamil Nadu, West Bengal, Maharashtra, Manipur, Sikkim, Uttarakhand.

Elsewhere : China, Tibet, Japan, Indonesia, Philippines.

SUMMARY

The present paper deals with 10 spp. under 2 genera of the family Gyrinidae & 30 spp. under 16 genera belonging to the 5 subfamilies viz. Noterinae, Laccophilinae, Hydroporinae, Colymbetinae & Dytiscinae. Of which the species, Orectochilus (s. str.) murinus Reg. is recorded for the first time from Uttarakhand. And 15 species under 10 genera belonging to the subfamilies viz. Noterinae, Laccophilinae, and Colymbetinae of

Dytiscidae are recorded for the first time from Uttarakand and the species, *L. (s. str.) basalis* Sharp is recorded for the first time from India. A comprehensive account of Gyrinidae & Dytiscidae Known from Uttarakhand (INDIA) is presented. Besides this a systematic list and distributional data of species has also been given from the published records as well as actual study of the specimens. Important synonymies have also been provided.

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REFERENCES

Aube, C. 1838. Species General des Hydrocanthares et. Gyriniens 804 Paris.

Balfour Browne, J 1939. A contribution to the study of Dytiscidae I (Col. : Adephaga). *Ann. Mag. Nat. Hist.*, (11)**3** : 97-114.

Balfour Browne, J. 1945. Aquatic Coleoptera Oceania (Dytiscidae, Gyrinidae & Palpicornia). *Occ. Pap.* B. Bishop Museum, **18**(7) : 103-132.

Biswas, S. Mukhopadhyay, P. & Saha S.K. 1995. Insecta : Coleoptera : Adephaga : Fam. Dytiscidae., Zool. Surv. India, *Fauna of West Bengal, State Fauna Series,* **3** (Part-6A) : 77-120.

Brancucci, M. 1983 Revision des especies est-Palearctiques, Orientales et australiennes du genre *Laccophilus* (Col. Dytiscidae). *Ent. Arb. Mus. Frey,* **31/32** : 241-426.

Castalenau, F.L. 1835 Etuds Entomologiques, Pt. 1, Paris : 1-154, 4pls.

Ghosh, S.K. Mukhopadhyay, P. & Biswas S. 2000 Insecta : Coleoptera : Fam. Gyrinidae, Dytiscidae & Hydrophilidae. Zool. Surv. India, *Fauna of Tripura, State Fauna Series,* **7** (Part-3) : 35-51.

Guignot, F 1942 Contribution a 1' etude des *Bidessus. Bull. Soc. Sci. Nat.* **10** : 51-61, 10 figs (1939)

Motschulsky, V 1859. *Nouveautes. Etud. Ent.*, **8** : 1-187.

Mukhopadhyay, P& Ghosh S.K. 2003 Zool. Surv.India, *Fauna of Sikkim, State Fauna Series,* **9** (Part-3) : 19-33.

Mukhopadhyay, P. & Ghosh S.K., Saha S.K. & Biswas S., 2000. Insecta : Coleoptera : Gyrinidae, Dytiscidae & Hydrophilidae, Zool. Surv. India, *Fauna of Meghalaya, State Fauna Series.* **4** (Part-5) : 77-92.

Mukhopadhyay, P. and Ghosh, S.K. 2004. Insecta : Coleoptera : Adephaga : (Fam. Haliplidae, Fam. Gyrinidae, Fam. Dytiscidae) Zool. Surv. India, *Fauna of Manipur, State Fauna Series,* **10** (Part-2), : 359-370.

Mukhopadhyay, P. and Ghosh, S.K. 2007. Insecta : Coleoptera (Aquatic) : Adephaga : Fam. Gyrinidae and Fam. Dytiscidae. Zool. Surv. India, *Fauna of Andhra Pradesh, State Fauna Series,* **5** (Part-3) : 439-459.

Ochs, G. 1925. Description of new Asiatic Gyrinidae. *Rec. Ind. Mus.*, **27** : 193-204.

Regimbart, M. 1882. Essai Monographique de la Famille des Gyrinidae. *Annls. Soc. ent. Fr;* (6)**2** : 379.

Regimbart, M. 1889. Revision des Dytiscidae de la Region Ino-Sino-Malaise. *Ann. Soc. ent. Fr;* **68** : 186-367.

Sharp, D. 1880-82. On Aquatic Carnivorous Coleoptera : Dytiscidae. Sci. Trans. Roy. Dublin *Soc.*, **21** : 179-1003.

Vazirani, T.G. 1967. Contribution to the study of aquatic beetles (Coleoptera) 2. A review of the subfamilies Noterinae, Laccophilinae, Dytiscinae and Hydrophilinae (in Part) from India. *Ori. Ins.*, **2**(3-4) : 221-341.

Vazirani, T.G. 1977. Catalogue of Oriental Dytiscidae. *Rec. zool. Surv. India, Occ. Paper* No., **6** : 1-111.

Vazirani, T.G. 1984. Coleoptera : Fam. Gyrinidae and Fam. Haliplidae. *Fauna of India,* XIV + 140 pls fig. 55.

Zimmermann, A. 1920. Coleopterorum Catalogous berlin, **4** : 1-296 [(Pars 71) : Dytiscidae, Haliplidae, Hygrobiidae, Amphizoidae].

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 283-301.

INSECTA : COLEOPTERA : COCCINELLIDAE

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INTRODUCTION

Coccinellid beetles are generally found in agricultural and in forested area. They are popularly known as 'Lady Bird beetle'. They bear fantastic color patterns and the size varies from a pin head to a coat button. By their feeding habits this group of insects are divided into two major groups. The major portion is carnivorous in habit. Feeding on the small and soft bodied insects like, *Aphids, Coccids, Aleuryds, Plant mites* etc. Members of the tribe : Psylloborini are mycophagus and members of the subfamily Epilachninae are strictly phytophagus. So they are helping the forest and agriculture in one hand and destructing the agriculture specially by the other hand. As because the members of the subfamily Epilachninae profusely feed on cultivated plants of family *Solanaceae, Cucurbitaceae and Papillionaceae.*

The state of Uttarakhand has been carved out of Uttar Pradesh, consisting mainly the hilly areas and valleys. For this reason the fauna has got a very close affinity to the fauna of Sikkim, Nepal, Bhutan, Darjeeling Dist. Of West Bengal and China.

In the present study thirty nine species have been recorded under twenty three genera. Of these thirty nine species eight were recorded earlier from the undivided state. Two species are recorded for the first time from India as well as the state of Uttarakhand. A new species, *H. chamolika* has been described.

Materials from different parts were collected by the author and the other survey parties of this department. Information on relevant synonymies, distributional data, key to the subfamilies, tribes, genera and species studied from Uttarakhand has been provided.

Further exploration along the China border may reveal more unknown fauna of Coccinellidae from the state.

SYSTEMATIC ACCOUNT LIST OF TAXA

Family COCCINELLIDAE
Subfamily SCYMNINAE
Tribe SCYMNINI
Genus ***Pullus*** Mulsant 1846

1. *P. Bourdilloni* Kapur 1955

Genus ***Scymnus*** Kugelan 1794

2. *(Pullus) fuscatus* Bohemann 1858
3. *(Pullus) hilaris* (Motschulscky) 1858
4. *(Pullus) pyrocheilus* Mulsant 1853
5. *(Scymnus) lateralis* Sicard 1912
6. *(Scymnus) nubilus* Mulsant 1850
7. *(Scymnus)* sp.

Subfamily CHILOCHORINAE
Tribe PLATYNASPINI
Genus ***Platynaspis*** Redtenbacher 1843

8. *P. saundersi* Crotch 1874

Tribe CHILOCHORINI
Genus ***Brumus*** Mulsant 1850

9. *B. suturalis* (Fabricius) 1798

Genus ***Chilocorus*** Leach 1815

10. *C. bijugus* Mulsant 1853

Genus ***Egius*** Mulsant 1850

11. *Egius* Sp.

Genus ***Exochomus*** Redtenbacher 1843

12. *E. uropygialis* Mulsant 1853

Subfamily COCCIDULINAE
Tribe NOVIINI
Genus ***Rodolia*** Mulsant 1850

13. *R. guerini* (Crotch) 1874

Tribe EXOPLECTRINI
Genus ***Sumnius*** Weise 1892

14. *S. cardoni* Weise 1892

Subfamily COCCINELLINAE
Tribe COCCINELLINI
Genus ***Anisolemnia*** Crotch 1874

15. *A. dilatata* Fabricius 1775

Genus ***Adonia*** Mulsant 1846

16. *A. variegata* (Goeze) 1777

Genus ***Coelophora*** Mulsant 1850

17. *C. bissellata* Mulsant 1850
18. *C. sexareata* Mulsant 1853

Genus ***Menochilus*** Timberlake 1943

19. *M. sexmaculatus* (Fabricius) 1781

Genus ***Oenopia*** Mulsant 1850

20. *O. kirbyi* Mulsant 1850
21. *O. luteopustulata* Mulsant 1850
22. *O. sauzeti* Mulsant 1866

Genus ***Ballia*** Mulsant 1850

23. *B. eucharis* Mulsant 1853

Genus ***Callineda*** Crotch 1874

24. *C. sedecimnotata* (Fabricius) 1801

Genus ***Coccinella*** Linnaeus 1758

25. *C. septempunctata* Linn. 1758
26. *C. transversalis* Fabricius 1781

Genus ***Micraspis*** Dejean 1835

27. *M. cardoni* (Weise) 1892
28. *M. vincta* (Gorhm) 1895

Tribe PSYLLOBORINI
Genus ***Illeis*** Mulsant 1850

29. *I. confusa confusa* Timberlake 1943

Subfamily EPILACHNINAE
Tribe EPILACHNINI
Genus ***Epilachna*** Chevrolat 1837

30. *E. decemmaculata* Redtenbacher 1844
31. *E. expansa* (Dieke) 1947
32. *E. marginicollis* (Hope) 1831
33. *E. monsuna* Bielawski 1979

Genus ***Henosepilachna*** Li 1961

34. *H. chamolika* sp. nov.
35. *H. dodecastigma* (Weidmann) 1823
36. *H. ocellata* (Redtenbacher) 1844
37. *H. vigintioctopunctata* (Fabricius) 1775

Genus ***Afidenta*** Dieke 1947

38. *A. mimetica* Dieke 1947

Genus ***Afidentula*** Kapur 1955

39. *A. manderstjernae* (Mulsant) 1853

Key to the Subfamilies of Coccinellidae known from Uttarakhand

1. Antennae relatively short, at most about two-third as long as head width, often very short, strongly modified and inserted frontally, laterally or ventrally; the terminal segment of maxillary palpi generally nearly parallel sided, never strongly divergent apically; clypeus normal or strongly expanded laterally; meso and metasterna usually broadly and compactly articulated and middle coxal cavities broadly separated; femora relatively stout or sometimes strongly depressed 2

– Antennae relatively long, at least about one-half as long as head width, usually longer than two thirds and inserted fomtally, laterally or dorsally; the terminal segment of maxillary palpi usually strongly divergent apically; clypeus never strongly expanded laterally; meso and metasterna always feebly and narrowly articulated, separating middle coxal cavities narrowly; femora relatively slender, never strongly depressed 3

2. Clypeus strongly expanded laterally; anterior margin of pronotum deeply and trapezoidally concave and lateral portions very strongly descending below; elytral base distinctly broader than pronotal base; metasternum distinctly impressed for the reception of the middle femora; elytral epipleura relatively broad and its inner carina reaching elytral apex; tibiae often angulate externally..... ..... CHILOCORINAE

– Clypeus not strongly expanded laterally; anterior margin of pronotum not deeply or not trapezoidally concave, lateral portion descending below but not very strongly; elytral base slightly broader than pronotal base; elytral epipleura very narrow and its inner carina not reaching the elytral apex but ending near two-thirds of elytral length from base ..... SCYMNINAE

3. Female genital plate (9th sternite) always very elongate; dorsum pubescent, weakly or moderately convex; compund eyes sometimes coarsely facetted; antennae eight to eleven segmented and laterally inserted; abdomen composed of five or six visible segments; tarsi true tetramerous, cryptotetramerous or true trimerous ....COCCIDULINAE

– Female genital plate (9th sternite) not elongate, oval or transverse; dorsum glabrous or pubescent, if pubescent, it is strongly convex; compound eyes never coarsely facetted; antennae always eleven segmented and more or less dorsally inserted; abdomen composed of six visible segments; tarsi cryptotetramerous 4

4. Dorsum glabrous; mandibles with a bifid or multidenticulate tip and also with a basal tooth; mesepimeron nearly triangular, its posterior margin almost straight or slightly angulate, mentum relatively narrowly articulated with submentum and distinctly divergent apically; inner margin of female genital plate without notch or small emergination and with a stylus near the inner corner; sipho of male genitalia rather long and usually strongly curved with a well developed capsule, median piece of tegmen usually not very slender ....COCCINELLINAE

– Dorsum pubescent; mandibles with a multidenticulate tip and without a basal tooth; mesepimeron quadrate, its posterior margin distinctly angulate; mentum very broadly articulated with submentum and convergent apically; inner margin of female genital plate with notch or small emergination and with a stylus at far outward from the inner corner of female genital plate; sipho of male genitalia rather short and weakly curved without a well developed capsule, median piece of tegmen tubular and slender .... EPILACHNINAE

Subfamily SCYMNINAE

This subfamily includs five Tribes viz. (i) Stethorini, (ii) Scymnini, (iii) Aspidimerini, (iv) Hyperaspini and (v) Ortalini. Amongst five tribes we have received only the tribe-Scymnini.

Tribe SCYMNINI

Character : Eyes exposed anteriorly, moderate in size, with or without a moderately deep or shallow postantennal emargination, inner ocular margins not paralleled to each other; antennae nine to eleven segmented, usually shorter than two-third of head width; elytral epipleurae very narrow without distinct foveae; trochanters normal, femora cylindrical and stout; tarsi trimerous or cryptotetramerous; first abdominal segment not convex posteriorly; fmale genital plate (coxite) usually elongate, rarely transverse with a stylus on each.

Tribe SCYMNINI

Key to the genera of Tribe Scymnini known from Uttarakhand

1. Femoral line of the first abdominal sternite complete ..... ***Pullus***

– Femoral line of the first abdominal sternite incomplete ..... ***Scymnus***

Genus ***Pullus*** Mulsant 1846

1846. *Pullus* Mulsant, *Sulcicolles-Securipalpes*, **4** : 214.

1931. *Pullus*, Korschefsky, *Coleoptm. Cat.*, **16**(118) : 116.

1. ***Pullus bourdilloni*** Kapur

1955. *Pullus bourdilloni* Kapur, *Rec. Indian Mus.*, **53**(3 & 4) : 335-338. (Type locality : Nepal)

2003. *Pullus bourdilloni*, S.K. Chakraborty and Biswas, *Zool. Surv. India, State Fauna Series, 9*, Fauna of Sikkim (Part-3) : 125.

Material studied : 1ex., Nainital, Dist. Nainital, 11.x.2001, P. Mukhopadhyay coll., ex. "Spiny bushes"

Distribution : India : Uttarakhand, Sikkim and Manipur. Also known from Nepal.

Remarks : This species is recorded for the first time from the state.

Genus ***Scymnus*** Kugelann

1794. *Scymnus* Kugelann, *Neues Magazin Liebh. Ent.* **1**(5) : 545-546.

1931. *Scymnus* Kugelann : Korschefsky, *Coleoptm, Cat.*, **16**(118) : 115.

Key to the species of the genus *Scymnus* known from Uttarakhand

1. Elytra black 2
– Elytra brown 5
2. Pronotum testaceous with a central, basal black spot 3
– Pronotum black entirely 4
3. Basal black spot occupy the anterior margin, elytral apical margin testaceous, almost one-third of its length, posterior margin convex ..... *(Pullus) pyrocheilus* Mulsant
4. Pronotum black entriely except the anterior corners which are reddish testaceous, elytra with the apical margin testaceous, one third of its length, posterior margin convex ..... *(Pullus) hilaris* Motschulsky
– Pronotum brown, base fuscus or blackish brown; sutural margin and middle portion of the lateral margin fuscus brown ..... *(Pullus) fuscatus* Boheman
5. Pronotum and elytra entirely light brown, without any markings, only the sutural margin is entirely and narrowly black ..... *(S. str.) lateralis* Sicard
– Pronotum and elytra dark brown, pronotum with a central black spot extending narrowly along the sutural margin; lateral margins of elytra tinged with black ..... *(S. str.) nubilus* Mulsant

2. ***Scymnus (Pullus) fuscatus*** (Boheman)

1858. *Scymnus fuscatus* Boheman, *Eugenines Resa*, P. 208. (*Type locality* : Java)

1931. *Scymnus (Scymnus) fuscatus* Korschefsky, *Coleoptm. Cat.*, **16**(118) : 143.

1955. *Scymnus (Pullus) fuscatus*, Mader, *Ent. Arb. Mus. Frey*, **6**(3) : 908.

2000. *Pullus fuscatus* (Boheman), Chakraborty and Biswas, *Zool. Surv. India, State Fauna Series 4, Fauna of Meghalaya* (5) : 210.

Material studied : 1ex., Hawal Bag, Dist. Almora, 7.x.2001, P. Mukhopadhyay coll., ex. "on leaf"

Distribution : India : Uttarakhand, Meghalaya and Tripura. Also known from China, Japan, Burma, Philippines, Thailand, Sumatra, Sri Lanka and Indonesia.

Remarks : New record of the species from Uttarakhand.

3. ***Scymnus (Pullus) hilaris*** (Motschulsky)

1858. *Scymnus hilaris* Motschulsky, *Etud. Ent.* **7** : 119. (*Type locality* : Ceylon)

1931. *Scymnus (Pullus) hilaris* Korschefsky, *Coleoptm. Cat.*, **16**(118) : 127.

1961. *Scymnus (Pullus) hilaris*, (Mots.) : Kamiya, H., Journ. of th Faculty of Agric., Kyushu Univ., Japan. **11**(3) : 324.

Material studied : 8exs., Kalisauri, Dist. Rudraprayag, 8.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand and Sikkim. Also known from Japan, West Indies, Myanmar and Sri Lanka.

Remarks : New record from the state.

4. ***Scymnus (Pullus) pyrocheilus*** (Mulsant)

1853. *Scymnus (Pullus) pyrocheilus* Mulsant, *Ann. Soc. Linn. Lyon.* **1** : 281. (*Type locality* : Calcutta, West Bengal).

1874. *Scymnus pyrocheilus*, Crotch, *Revis. Cocc.*, P. 256.

1931. *Scymnus (Pullus) pyrocheilus* Korschefsky, *Coleoptm. Cat.*, **16**(118) : 144.

2000. *Pullus pyrocheilus*, Chakraborty & Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part-**5** : 210.

Material studied : 1ex., Dwarahat, N. of Ranikhet, dist. Almora, 22.iii.2001 and 1 ex., Gwalakot, Dist. Almira, 27.iii.2001, S.K. Chakraborty & Party coll., 1ex., Kalisauri, Dist. Rudraprayag, 8.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, West Bengal and Andamans. Also known from Nepal.

Remarks : First record of the species from the state.

5. ***Scymnus (Scymnus) lateralis*** Sicard

1912. *Scymnus lateralis* Sicard, *Ann. Soc. Ent. Fr.*, **81** : 502. (*Type locality* : Burma).

1931. *Scymnus lateralis* Korschefsky, *Coleoptm. Cat.*, **16**(118) : 143.

Material studied : 1ex., Kalisauri, Dist. Rudraprayag, 8.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand. Also known from Mayanmar.

Remarks : First record of the species from the state.

6. *Scymnus (Scymnus) nubilus* Mulsant

1850. *Scymnus nubilus* Mulsant, *Ann. Soc. Agric, Lyon* (2)2 : 972. (*Type locality* : Assam).

1931. *Scymnus (Scymnus) nubilus*, Korschefsky, *Coleoptm. Cat.*, **16**(118) : 143.

2007. *Scymnus (Scymnus) nubilus*, Chakraborty, *Zool. Surv. India, Fauna of Andhra Pradesh, State Fauna Series* 5 (Part-3) : 381.

Material studied : 1ex., Kalisauri, Dist. Rudraprayag, 8.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Assam, West Bengal, Andhra Pradesh and Goa. Also known from Mayanmar.

Remarks : A very widely distributed species. Recorded for the first time from the state.

7. *Scymnus* sp.

Material studied : 1ex., Kalisauri, Dist. Rudraprayag, 8.xi.2002 and 1 ex., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & Party coll.

Remarks : Examples are dark brown in color, pronotum with a central black spot, extending into elytra to form an elliptical black spot on the disk of the elytra, reaching almost three fourth of the elytral length. Genitalia not studied.

Subfamily CHILOCORINAE
Tribe PLATYNASPINI
Genus *Platynaspis* Redtenbacher 1843

1843. *Platynaspis* Redtenbacher, *Tentamen Dispos. Gen.*, P. 6, 11.

1931. *Platynaspis*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 231.

8. *Platynaspis saundersi* Crotch

1874. *Platynaspis saundersi* Crotch, *Revis. Cocc.*, P. 197. (*Type locality* : Saunders, India).

1931. *Platynaspis saundersi*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 235.

Material studied : 1ex., Karnaprayag, Dist. Chamoli, 29.x.2002; 2 exs., Kalisauri, Dist. Rudraprayag, 8.xi.2002 and 1 ex., Bainoli, dist. Rudraprayag, 30.ix.2004, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Jammu, Kashmir and West Bengal (Darjeeling Dist.), Saunders (India).

Remarks : First record of the species from the state.

Tribe CHILOCORINI

Key to the genera of the tribe *Chilocorini* known from Uttarakhand

1. Anterior tibiae with a tooth on the external margin near the tibio-femur joint 2
– Anterior tibiae without any such tooth 3
2. Prothorax sinuous on both of its posterior margin ..... *Chilocorus* Leach
– Prothorax without such sinuosity ..... ***Egius*** Muls
3. Elytral epipleurae subhorizontal, less higher than the length of the femur; clypeus narrowed and obliquely passing on the lateral border of the labrum, labrum more exposed ..... ***Brumus*** Mulsan
– Elytral epipleurae much inclined, higher than the length of femur, clypeus not narrowed, obliquely passing on the lateral border of the labrum, which is less exposed ..... ***Exochomus*** Redtn

Genus *Brumus* Mulsant

1850. *Brumus* Mulsant, *Spec. Trim. Securipalp.*, P. 492.

1932. *Brumus*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 265.

9. *Brumus suturalis* (Fabricius)

1798. *Coccinella suturalis* Fabricius, *Suppl. ent. Syst.*, P. 78. (*Type locality* : India).

1850. *Brumus suturalis* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon.*, (2)2 : 494.

1932. *Brumus suturalis*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 267.

Material studied : 1ex., Kandiala, Dist. N. Tehri Garhwal, 11.iv.2003, B.G. Kundu & Party coll.; 1 ex., Garhwal Univ., Srinagar, Dist. Pauri Garhwal, 3.ix.2006, A.K. Sindhu & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Manipur, Tripura, West Bengal, Madhya Pradesh, Maharastra, Karnataka, Andhra Pradesh, and Goa. Also known from Nepal, Bhutan, Sri Lanka and Luzon.

Remarks : Widely distributed species. Recorded for the first time from the state.

Genus ***Chilocorus*** Leach

1815. *Chilocorus* Leach, in Brewster, *Edinb. Encycl.*, ix, P. 116.

1932. *Chilocorus*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 237.

10. ***Chilocorus bijugus*** Mulsant

1853. *Chilocorus bijugus* Mulsant, *Ann. Soc. Linn. Lyon* (2)**1** : 189 (*Type locality* : East India).

1932. *Chilocorus bijugus*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 242.

1954. *Chilocorus bijugus*, Kapur, *Rec. Indian Mus.*, **52** : 259-262.

Material studied : 7exs., Kainchi, Dist. Nainital, 11.x.2001, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Kumaon Hills : Almora; Uttar Pradesh, Kashmir and Assam.

Remarks : The species is already recorded from the state by Mr. R.N. Parker (2.vii.1923) as reported by Kapur. These insects generally feed on the San Jose' scale insects.

Genus ***Egius*** Mulsant

1850. *Egius* Mulsant, *Spec. Trim. Securipalp.*, P. 452.

1932. *Egius*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 252.

11. ***Egius*** sp.

Material studied : 1 ex., Kainchi, Dist. Nainital, 11.x.2001, P. Mukhopadhyay & Party coll.

Remarks : Only one species viz. *E. Platycephalus* Muls. is known from Cuba. There is no record of the genus or its species from the Indian subcontinent. So it appears to be the new record of the genus from India as well as the state.

Genus ***Exochomus*** Redtenbacher

1843. *Exochomus* Redtenbacher, *Tentamen Dispos.* Gen., P. 11.

1932. *Exochomus*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 252.

12. ***Exochomus uropygialis*** Mulsant

1853. *Exochomus uropygialis* Mulsant, *Ann. Soc. Linn. Lyon*, **1** P. 196. (*Type Locality* : Kashmir)

1932. *Exochomus uropygialis*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 261.

Material studied : 2 exs., Kherna, Dist. Nainital, 12.xi.2000 and 1x; Gangotri, Dist. Uttarkashi, 12.x.2001, S. K. Mondal & Party, coll.; 1 ex., Gwalakot, Dist. Almora, 27.iii.2001, S.K. Chakraborty & Party coll.; 2 exs., Gagas (Ranikhet), Dist. Almora, 29.ix.2001, Animesh Bal & Party coll; 12 exs., Binsar, Dist. Almora, 5.iv.2001 and 10 exs., 30.ix.2001; 8 exs., Pathlibagal, Dist. Almora, 7.x.2001 and 2 exs., Kasi, Dist. Almora, 5.x.2001, P. Mukhopadhyay & Party coll.; 3 exs., Almora 1, 12.x.2001; 27 exs., Binsar, 14-16.x.2001, 4 exs., Binsar Camp, 14-16.x.2001 and 1 ex., Cousam camp, 18-22.x.2001, all in Dist. Almora, R.C. Basu & Party coll.; 7 exs., Binsar, Dist. Almora, 16.x.2001, B.C. Das & Party coll.

Distribution : India : Uttarakhand, Kashmir (Type locality). Also known from Bhutan.

Remarks : The species is recorded for the first time from the state.

Subfamily COCCIDULINAE
Tribe NOVIINI
Genus ***Rodolia*** Mulsant

1850. *Rodolia* Mulsant, *Spec. Trim. Securipalp.*, P. 901-902.

1931. *Rodolia*, Korschefsky, *Coleoptm. Cat.*, **16**(118) : 98.

13. ***Rodolia guerini*** (Crotch)

1874. *Vadalia guerini* Crotch, *Revis. Cocci.*, P. 282. (*Type locality* : Pondicherry).

1931. *Rodolia guerini*, (Crotch) : Korschefsky, *Coleoptm. Cat.*, **16**(118) : 101.

1949. *Rodolia guerini*, Kapur, *Bull. Ent. Res.*, **39** : 535.

Material studied : 10 exs., Nachiketa Tal, Dist. Uttarkashi, 7.v.2002, ex. "under leaf", S.K. Chakraborty & Party coll.

Distribution : India : Uttarakhand, Uttar Pradesh and Sikkim. Also known from Bhutan.

Tribe EXOPLECTRINI
Genus ***Sumnius*** Weise

1892. *Sumnius* Weise, *Ann. Soc. ent. Belg.*, **36** : 29.

1931. *Sumnius*, Korschefsky, *Coleoptm. Cat.*, **16**(118) : 94.

14. ***Sumnius cardoni*** Weise

1892. *Sumnius cardoni* Weise, *Ann. Soc. Ent. Belg.*, **36** : 30 (*Type locality* : Bengal).

1931. *Sumnius cardoni*, : Korschefsky, *Coleoptm. Cat.*, **16**(118) : 94.

2003. *Sumnius cardoni*, Chakraborty & Biswas, *State Fauna Series 9, Fauna of sikkim*, Part-3, P. 131.

Material studied : 5 exs., Srinagar, Dist. Pauri Garhwal, 14.v.2002, ex. "Sweeping"; 10 exs., Byasi, Dist. Tehri Garhwal, 18.v.2002, ex. "Sweeping"; 9 exs., Bhagirathi van Gular, dist. Tehri Garhwal, 19.v.2002, ex., "sweeping"; 16 exs., Raiwala 20.v.2002 and 15 exs., Narendra Nagar, Dist. Dehra Dun, 21.v.2002, S.K. Chakraborty & Party coll.

Distribution.: India : Uttarakhand, Orissa, West Bengal and and Sikkim. Also known from S. China and Thailand.

Remarks : Recorded for the first time from Uttarakhand.

Subfamily COCCINELLINAE
Tribe COCCINELLINI
Genus ***Anisolemnia*** Crotch

1874. *Anisolemnia* Crotch, *Revis. Cocci.*, P. 146.

1932. *Anisolemnia*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 269.

15. ***Anisolemnia dilatata*** Fabricius

1775. *Anisolemnia dilatata* Fabricius, *Syst. Ent.*, P. 82 (*Type locality* : Indochina).

1932. *Anisolmnia dilatata*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 269.

2003. *Anisolemnia dilatata*, Chakraborty & Biswas, *State Fauna Series 9, Fauna of Sikkim*, Part-3 : 137.

Material studied : 1 ex., Sharar Ghat (Binsor), Dist. Almora, 6.iv.2002, S. Roy Chowdhury & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya. Also known from Nepal, Manchuria, China and Indonesia.

Remarks : Large colourful beetle, recorded for the first time from Uttarakhand.

Genus ***Adonia*** Mulsant

1846. *Adonia* Mulsant, *Securipalp*, P. 39.

1850. *Adonia* Mulsant, *Spec. Trim. Securipalp.*, P. 36.

1932. *Adonia*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 345.

16. ***Adonia variegata*** (Goeze)

1777. *Coccinella variegata* Goeze, *Entomol. Beytrage*, **1** : 247 (*Type locality* : Europe).

1846. *Adonia variegata* (Goeze) : Mulsant, *Securipalp*, P. 39.

1932. *Adonia variegata*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 346.

Material studied : 4 exs., Someshwar, Dist. Almora, 25.iii.2001; 1 ex., Garur, Dist. Bageswar, 26.iii.2001; 2 exs., Gwalakot, 27.iii.2001 and 1 ex., Katpuriya, 29.iii.2001, Dist. Almora; 2 exs., Kharadi, 12.xi.2003; 1 ex., Purola, 13.xi.2003 and 1 ex., Yamunotri, 15.xi.2003, all from Dist. Uttarkashi, S.K. Chakraborty & Party coll.; 1 ex., Kausam Camp, Dist. Almora, 18-22.x.2001, R.C. Basu & party coll.; 3 ex., Dwarahat (Ranikhet), Dist. Almora, 11.iv.2002 and 2 exs., Bhimtal, Dist. Nainital, 15.iv.2002, S. Roy Choudhury & Party coll. 8 exs., Bhatwari, dist. Uttarakashi, 3.iv.2003; 27 exs., Dobata, Dist. Chamba/New Tehri, 7.iv.2003; 1 ex., Nagni, Dist. Chamba, 8.iv.2003; 4 exs., Jamnikhal, Dist. Deoprayag, 13.iv.2003 and 1 ex., Bahadrabad, Dist. Haridwar, 15.iv.2003, B.G. Kundu & Party coll.; 2 exs., Kafarkhan, 2.x.2001 and 1 ex., Kasi, 9.x.2001, Dist. Almora; 1 ex., near Kedarnath, 2.x.2004; 4 exs., Agasthamuni, Dist. Rudraprayag, 7.x.2004, ex. "white flowers of wild herbs", P. Mukhopadhyay & Party coll.; 1 ex., Garur, 30.viii.2005 and 1 ex. Baijnath, 31.viii.2005, Dist. Bageswar, S.K. Chatterjee & party coll.

Distribution : India : Uttarakhand, Mussoorie Hills, Sikkim, West Bengal (Darjeeling Dist.) and Kashmir. Also known from Nepal, Tibet, China and Middle Africa.

Remarks : Already recorded from Mussorie Hills, Previously placed under U.P.

Genus *Coelophora* Mulsant

1850. *Coelophora* Mulsant, *Spec. Trim. Securipalp.*, PP. 374, 390.

1932. *Coelophora*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 290.

Key to the species of the genus *Coelophora* Muls. known from Uttarakhand

1. Pronotum yellowish, with two median, broadly oval black spots near the base and two small round black spots, one at ach postero-lateral corner; elytra yellowish brown, each elytron with six large, round black spots, of which two semicircular and sutural, common to both the elytron .... *bissellata* Muls

– Pronotum black, except the lateral margins, which are flavus, almost quadrangular and extends almost near the base; elytra yellowish brown, each elytron completely margined with black border and divided into two anterior and one posterior compartments by black markings ..... *sexareata* Muls

17. *Coelophora bissellata* Mulsant

1850. *Coelophora bissellata* Mulsant, *Spec. Trim. Securipalp.*, P. 400 (*Type locality* : Bengal).

1932. *Coelophora bissellata*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 291.

Material studied : 1 ex., Deoprayag, Dist. Pauri Garhwal, 4.xi.2000, ex. "on spinig wild plant; 1 ex., Hawal Bag, Dist. Almora, 7.x.2001; 1 ex., Karnaprayag, Dist. Chamoli, 29.x.2002; 1 ex., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002; 1 ex., Bainoli, 30.ix.2004 and 1 ex., Kot Maheswar, 6.x.2004, Dist. Rudraprayag, P. Mukhopadhyay & Party coll.; 1 ex., Dhanolti, Dist. Dehra Dun, 4.ii.2002, M. Prasad & Party coll.; 1 ex., Byasi, Dist. Tehri Garhwal, 24.ix.2002, Animesh Bal & Party coll.; 5 exs., Garur, 30.viii.2005 and 2 exs., Baijnath, Dist. Bageswar, 31.viii.2005, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, Assam, West Bengal, U.P. (Kumaon Hills) and S. India. Also known from Nepal, Bhutan, Indonesia, Malacca, Philippines and New Guinea.

Remarks : The species is already recorded from Kumaon Hills, Presently under the state of Uttarakhand.

18. *Coelophora sexareata* Mulsant

1853. *Coelophora sexareata* Mulsant, *Ann. Soc. Linn. Lyon.*, **1** : 181 (*Type locality* : N. India).

1932. *Coelophora sexareata*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 296.

Material studied : 1 ex., Bobota, Dist. Chamba/New Tehri, 7.iv.2003, 13. G. Kundu & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Assam, Tripura and West Bengal. Also known from Nepal, Bhutan, Myanmar and China.

Remarks : The species was originally described from North-India. Exact locality is not known. We record this species from Utarakhand for the first time.

Genus *Menochilus* Timberlake

1943. *Menochilus* Timberlake, *Hawaii, Plant, Rec.*, **47**(1) : 40.

1965. *Menochilus*, Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ. Ser. II, *Nat. Sci. No.* **15** : 61.

19. *Menochilus sexmaculatus* (Fabricius)

1781. *Coccinella sexmaculatus* Fabricius, *Spec. Ins.*, P. 96 (*Type locality* : East India).

1850. *Chilomenes sexmaculatus*, (Fab.) : Mulsant, *Spec. Trim. Securipalp.*, P. 144.

1943. *Menochilus sexmaculatus* (Fab.) : Timberlake, *Bull. Hawaiian Sug. Plrs. Ass. Exp. Stn. (Ent. Series)* **47**(22) : 40-41.

Material studied : 1ex., Lacchiwala Forest, Dist. Dehra Dun, 20.x.2000, S.K. Mitra & party coll; 1ex., Bhowali, Dist. Nainital, 16.iii.2001; 1ex., Gwalakot, Dist. Almora, 27.iii.2001 and 1ex., Jeolikote, Dist. Nainital, 1.iv.2001, S.K. Chakraborty & Party coll.; 1ex., Ranibag, Kathgudam, Dist. Nainital. 25.ix.2002, P.H. Roy & Party coll.; 1ex., Kalisauri, Dist. Rudraprayag, 8.xi.2002; 3exs., Byasi, Dist. Tehri Garhwal, 11.xi.2002; 7exs., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002; 1ex., Hardwar, Dist. Hardwar, 13.xi.2002 and 3exs., Bainoli, Dist. Rudraprayag, 30.ix.2004, P. Mukhopadhyay & Party coll.; 1ex., Kashipur, Doraha, Dist. Udham Singh Nagar, 15.xii.2003; 5exs., Pirankalia, Dist. Hardwar, 16.iv.2003 and 1ex., Sitargunj, Dist.

Udham Singh Nagar, 23.xii.2003, B.G. Kundu & Party coll.; 2exs., Gananath, Dist. Almora, 27.viii.2005, and 1ex., Garur, 30.viii.2005 and 1ex., Baijnath, 31.viii.2005, both from Dist. Bageswar, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura West Bengal, Andhra Pradesh and Andaman Islands. Also known from Nepal, Indonesia, Philippines, Thailand, Celebes, New Guinea and Japan.

Remarks : This is a new record of this species from the state.

Genus ***Oenopia*** Mulsant

1850. *Oenopia* Mulsant, *Spec. Trim. Securipalp.*, P. 420.

1932. *Oenopia*, Korschfsky, *Coleoptm. Cat.*, **16**(120) : 287.

Key to the species of the genus *Oenopia* Muls. known from the state

1. Each elytron completely bordered black on its lateral as well as sutural margin, sutural margin thickened in the middle; each elytron furnished with a premedian large, irregularly rounded and a post median large irregularly oval black spots; pronotum black except the anterolateral two-third flavus .... *kirbyi* Muls

– Each elytron bordered black only on the sutural margin 2

2. Sutural margin much thickened near the base, often with one elongated black spot at the humeral callus and one irregularly rounded black spot at the posterior two thirds ..... *luteopustulata* Muls.

– Sutural margin dilated into a large round black spot just beyond the middle, and into a smaller one immediately before the apex, there are also two black spots on each elytron, one quadrangular discoidal, just touching the callus and the other rounded near the margin at posterior two-third .... *sauzeti* Muls

20. ***Oenopia kirbyi*** Mulsant

1850. *Oenopia kirbyi*, Mulsant, *Spec. Trim. Securipalp.*, P. 425. (*Type Locality* : Eastern India)

1932. *Oenopia kirbyi* Korschefsky, *Coleoptm. Cat.*, **16**(120) : 288.

Material studied : 1ex., Someswar, Dist. Almora, 25.iii.2001, ex. "Sweeping" and 2 exs., Bhatwari, Dist. Uttarkashi, 6.v.2002, ex. "on leaf" S.K. Chakraborty & Party coll.; 2 exs., Rudraprayag, 6.xi.2002; 2 exs., Bainoli, 30.ix.2004 and 1ex., Agasthamuni, 7.x.2004, all from Dist. Rudraprayag, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya and West Bengal. Also known from Bhutan and Myanmar.

Remarks : This is a new record of the species from the state.

21. ***Oenopia luteopustulata*** Mulsant

1850. *Oenopia luteopustulata*, Mulsant, *Spec. Trim. Securipalp.*, P. 421. (*Type Locality* : Assam)

1932. *Oenopia luteopustulata* Korschefsky, *Coleoptm. Cat.*, **16**(120) : 288.

Material studied : 1ex., Jeolikote, Dist. Nainital, 11.xi.2000, S.K. Mondal & Party coll.; 5exs., Kausam Camp, Dist. Almora, 18-22.x.2001, R.C. Basu & Party coll.; 10exs., Binsar, Dist. Almora, 5.iv.2001 & 30.ix.2001; 4exs., Karnaprayag, Dist. Chamoli, 29.x.2002 and 3exs., Biyasi, Dist. Tehri Garhwal, 11.xi.2002; 5exs., Takula, Dist. Almora, 1.x.2001; 2exs., Kafarkhan, Dist. Almora, 2.x.2001; 2exs., Katliger, Dist. Bageswar, 4.x.2001; 4exs., Karnaprayag, Dist. Chamoli, 29.x.2002; 1ex., Hanumanchati, Dist. Chamoli, 1.xi.2002; 1ex., Byasi, 11.xi.2002 and 2exs., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002; 4exs., Hardwar, Dist. Hardwar, 13.xi.2002; 3exs., Deoprayag, Dist. Pauri Garwal, 4.xi.2000; 6exs., Takula, Dist. Almora, 1.x.2001; 2exs., Deoprayag, Dist. Pauri Garwal, 4.xi.2000; 6exs., Takula, Dist. Almora, 1.x.2001; 2exs., Dinapani, Dist. Almora, 3.x.2001, P. Mukhopadhyay & Party coll.; 1ex., Byasi, Dist. Tehri Garhwat, 24.ix.2002, Animesh Bal & Party coll.; 2 exs., Muni Ki Reti, Dist. New Tehri, 10.iv.2003; 3exs., Kandiala, Dist. New Tehri, 11.iv.2003; 1ex., Jamnikhal, Dist. Deoprayag, 13.iv.2003; 1ex., Pirankalia, Dist. Haridwar, 16.iv.2003; 1ex., Kashipur, Doraha, Dist. Udham Singh Nagar, 15.xii.2003; 1exs., Jaspur, 16.xii.2003 and 1ex., Sitargunj, Dist. Udham Singh Nagar, 23.xii.2003, B.G. Kundu & Party coll., 3exs., Chopra, Dist. Almora, 11.x.2001, B.C. Das & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Manipur, Assam, Tripura, H.P. (Simla) and Kumaon Hills, Plains of U.P., West Bengal, Andhra Pradesh and Andaman Island. Also known from Nepal, Bhutan, Myanmar, Tibet, Thailand and Chamba.

Remarks : Very widely distributd species. During this present study, I found the varieties *Pracuae* Weise and *nigromaculata* Mader.

22. *Oenopia sauzeti* Mulsant

1866. *Oenopia sauzeti*, Mulsant, *Monogr Coccinell.*, P. 281. (*Type Locality* : India)

1932. *Oenopia sauzeti* Korschefsky, *Coleoptm. Cat.*, **16**(120) : 288.

Material studied : 2exs., Dharasu, Dist. Uttarkashi, 5.v.2002 and 2 exs., Guptakashi, Dist. Rudraprayag, 2.vii.2004, ex. "wild flower" and "on leaf" respectively, S.K. Chakraborty & Party coll., 1ex., Hawal Bag. Dist. Almora, 7.x.2001; 2exs., Karnaprayag, 29.x.2002; 1ex., Hanumanchati, 1.xi.2002 and 1ex., Pandukeswar, 2.xi.2002, Dist. Chamoli; 2exs., Rudraprayag, 6.xi.2002 and 1ex., Kalisauri, 8.xi.2002, Dist. Rudraprayag; 1ex., Narendra Nagar Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & party coll., 1ex., Dehra Dun, Dist. Dehra Dun, 4.x.2001, S.K. Mondal & Party coll., 1ex., Garur, Dist. Bageswar 30.viii.2005, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim, Kumaon Hills, (U.P.), Muree, Tripura, West Bengal and Dalhousie Hills (Punjab). Also known from Nepal and Bhutan.

Remarks : Widely distributed species. Already recorded from Kumaon Hills.

Genus *Ballia* Mulsant

1850. *Ballia* Mulsant, *Spec. Trim. Securipalp.*, P. : 1042.

1932. *Ballia*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 278.

23. *Ballia eucharis* Mulsant

1853. *Ballia eucharis* Mulsant, *Opusc. Ent.*, **3** : 39 (*Type locality* : India).

1932. *Ballia eucharis*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 278.

Material studied : 3exs., Binsar wild Life Sanctuary, Dist. Almora, 17.xi.2000, S.K. Mondal & Party coll.; 1ex., Sarkunda, alt. 9950 ft., Dist. Tehri Garhwal, 23.xi.2003, ex. "Mustard flower", S.K. Chakraborty & party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya. Also known from Bhutan and South China.

Remarks : Recorded for the first time from Uttarakhand.

Genus *Callineda* Crotch

1874. *Callineda* Crotch, *Revis. Cocc.*, P. : 161.

1932. *Callineda*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 282.

24. *Callineda sedecimnotata* (Fabricius)

1801. *Coccinella 16-notata* Fab., *Syst. Eleuth*, **1** : 370 (*Type locality* : Philippines).

1874. *Callineda sedecimnotata* (Fab.), *Crotch, Revis. Cocc.*, P. 161.

1932. *Callineda sedecimnotata*, (F.), Korschefsky, *Coleoptm. Cat.*, **16**(120) : 282.

Material studied : 1ex., Kathyal Sain, Dist. Chamoli, 28.x.2002; 3exs., Rampur, Dist. Rudraprayag, 4.x.2004, ex., "beating bushes", P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Sikkim, West Bengal (Darjeeling). Also known from Philippines, Indonesia, Malacca, Celebes and Ceram.

Remarks : This is a new record of the species from Uttarakhand.

Genus *Coccinella* Linnaeus

1758. *Coccinella* Linnaeus, *Syst. Nat.*, ed-10 : 364.

1932. *Coccinella*, Leach; Korschefsky, *Coleoptm. Cat.*, **16**(120) : 439.

1965. *Coccinella* Linnaeus, Kamiya, *Mem. Fac. Lib. Arts.* Fukui Univ., Ser-II, Nat. Sci., No. 15, P-35.

Key to the species of the genus *Coccinella* known from Uttarakhand

1. Elytra yellowish brown, each elytron with three small oval black spots and a common pear shaped scutellar black spot, totalling to seven spots; in some examples the elytral spots are enlarged and confluent; pronotum black, except the anterior corners, which are flavus and quadrangular .... *septempunctata* L

– Elytra testaceous yellow, each elytron with a triangular black marking on the subhumeral area, with a wavy, black, post-median band confluent with the black sutural margin, a subquadrate black spot at three-fourths the external margin, further two common spots, one immediately behind the scutellum and another before the apex, present on the suture ..... *transversalis* F

25. ***Coccinella septempunctata*** Linnaeus

1758. *Coccinella septempunctata* Linn., *Syst. Nat.*,(ed. X) : 365. (*Type locality* : Europe).

1932. *Coccinella septempunctata,* Korschefsky, *Coleoptm. Cat.,* **16**(120) : 486.

Material studied : 8exs., Mallital, Dist. Nainital, 16.iii.2001, ex. "sweeping"; 14exs., Khairna, Dist. Nainital, 17.iii.2001, ex., "on grass", 4exs., Bhujan, Dist. Nainital, 18.iii.2001, ex. "sweeping"; 1ex., Bhimtal, Dist. Nainital, 19.iii.2001, ex., "on grass"; 2exs., Ranikhet Forest Bungalow, 21.iii.2001; 7exs., Dwarahat, 22.iii.2001, both from dist. Almora; 9exs., Baijnath, Dist. Bageswar, 24.iii.2001, ex., "sweeping"; 5exs., Someswar, Dist. Almora, 25.iii.2001; 4exs., Garur, Dist. Bageswar, 26.iii.2001; 3exs., Gwalakot, Dist. Almora, 27.iii.2001, ex. "on wheat plant"; 15exs., Katpuriya, 29.iii.2001, ex., "sweeping" and 1ex., Artola, 30.iii.2001, ex. "on leaf", both from Dist. Almora; 1ex., Dharasu, 5.v.2002, ex. "wild flower" and 3 exs., Bhatwari, 6.v.2002, ex. "on leaf", both from Dist. Uttarakashi; 4 exs., Kharadi, 12.xi.2003 and 6 exs., Purola, 13.xi.2003, both from Dist. Uttarashi; 2exs., Yamuna, Dist. Tehri, 21.xi.2003; 4exs., Doiwala Forest and 2exs., Raiwala Forest, Dist. Dehra Dun, 27.xi.2003 and 1ex., Khankra, Dist. Pauri, 27.vi.2004, ex. "on leaf", S.K. Chakraborty & Party coll. 1ex., Lachchiwala forest, Dist. Dehra Dun, 28.x.2000, ex. "on leaf"; 2exs., Tehri, Dist. Tehri Garhwal, 2.xi.2000, ex. "on leaf"; 1ex., Deoprayag, Dist. Pauri Garhwal, 4.xi.2000; 19exs., Jwalpa Devi, Dist. Pauri Garhwal, 5.xi.2000; 2exs., Binsar, 5.iv.2001; 5exs., Khairna, 28.ix.2001; 3ex., Takula, 1.x.2001; 13exs., Kafarkhan, 2.x.2001, all from Almora Dist.; 5exs., Kafliger, Dist. Bageswar, 4.x.2001; 4 exs., Hawal Bag, Dist. Almora, 7.x.2001, ex. "on leaf"; 20 exs., Nainital, Dist. Nainital, 10.x.2001; 4 exs., Kainchi, 11.x.2001; 9 exs., Bhimtal, 12.x.2001, both from Dist. Nainital; 2exs., Karnaprayag, Dist. Chamoli, 29.x.2002; 4exs., Byasi, Dist. Tehri Garhwal, 11.xi.2002; 2exs., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002; 1ex., near Kedar Nath, 2.x.2004 and 1ex., Agasthmuni, 7.x.2004, both in Dist. Rudraprayag, P. Mukhopadhyay & Party coll. 1ex; Lachchiwala Forest, Dist. Dehra Dun, 28.x.2000, S.K. Mitra & Party coll.; 3exs., Dellapani, Dist. Binsar, 15.x.2001, B.C. Das & Party coll. 3 exs., Jeolikote, 11.xi.2000; 5exs., Kherna, Dist. Nainital, 12.xi.2000; 3exs., Binsar, 17.xi.2000 and 1ex., Panna Nulla, 20.xi.2000; 2exs., Kausani, all from Dist. Almora, 19.xi.2000; 1ex., Pithoragarh, Dist. Pithoragarh, 21.xi.2000; 2exs., Chakrata Road, 4.x.2001; 3exs., Z.S.I. campus, 4-5.x.2001; 2exs., Kempty, 6.x.2001, all from Dist. Dehra Dun; 1ex., Gangotri, Dist. Uttarkashi, 12.x.2001; 4exs., Gauchar, 21.viii.2002 and 3exs., Badrinath, 23.viii.2002 and 2exs., on the way to Badrinath, 27.viii.2002, Dist. Chamoli and 1ex., Rurki, Dist. Tehri Garhwal, 5.ix.2002, S.K. Mondal & Party coll. 1ex., Someswar, Dist. Almora, 5.ix.2002 and 1ex., Kausani, Dist. Bageswar, 14.ix.2002; 4exs., Jeolkote, 23.ix.2002 and 1ex., Ranibag, Dist. Nainital, P.H. Roy & Party coll. 16exs., Barachhina, 3.iv.2002; 1ex., Purula, 4.iv.2002; 7exs., Gananath, 5.iv.2002, 3exs., Sharar Ghat, 6.iv.2002; 1ex., Dwarahat, 11.iv.2002; 6 exs., Mahadev, 12.iv.2002, all from almora Dist.; 5exs., Kilbury, 13.iv.2002; 1ex., Sattal, 14.iv.2002 and 2exs., Bhimtal, 15.iv.2002, all from Nainital Dist. S. Roy Chowdhury & Party coll. 1ex., Binsar, 14-16.x.2001 and 6exs., Kausani, 15-22.x.2001, R.C. Basu & Party coll. 13exs., Gangas, 29.ix.2001 and 9exs., Katvamri, 3.x.2001, both from Dist. Almora; 1ex., Maskhali, Dist. Almora, 30.ix.2001; 5exs., Koddukhal (Srinagar), Dist. Tehri Garhwal, 18.ix.2002; 2 exs., Jollygrant, Dist. Dehra Dun, 20.ix.2002; 1ex., Byasi, Dist. Tehri Garhwal, 24.ix.2002 and 1ex., Gun Hill (Mussoorie), Dist. Dehra Dun, 27.ix.2002, Animesh Bal & Party coll.; 1ex., Rishikesh, Dist. Tehri Garhwal, 24.x.2002; 3exs., Srinagar, Dist. Pauri Garhwal, 29.x.2002; 1ex., Dehra Dun, 3.xi.2002 and 2exs., Beniwara Forest, Dist. Dehra Dun, 5.xi.2002, M. Prasad & Party coll. 4exs., Garur, Dist. Bageswar, 30.viii.2005; 6exs., Jhaltola, Dist. Pithoragarh, 3.ix.2005 and 2exs., Bhimtal, Dist. Nainital, 7.ix.2005, S.K. Chatterjee & Party coll. 2exs., Bhatwari, Dist. Uttarkashi, 3.iv.2003; 1ex.,

Chauhal Gaon, 6.iv.2003; 3exs., Dobata, 7.iv.2003; 1ex., Nagani, 8.iv.2003; 1ex., Narendranagar, 10.iv.2003 and 1ex., Kandiala, 11.iv.2003, all from Chamba, Dist.; 8exs., Bahadrabad, Dist. Haridwar, 15.iv.2003; 1ex., Kalinagar, Rudrapur, 10.xii.2003; 2exs., Simla bahadur, Rudrapur, 12.xii.2003 and 2exs., Nanakmatta, 22.xii.2003, all from Udham Singh Nagar Dist., B.G. Kundu & Party coll. 5exs., Yomnotri, Borkat, Dist. Uttarkashi, 20.ix.2005, A.K. Sidhu & Party coll. 3exs., Chopra, Dist. Almorah, 11.x.2001, B.C. Das & Party coll. 3exs., Dobata, 7.iv.2003 and 2exs., Gular, 7.iv.2003, Dist. Chamba/New Tehri; 7exs., Shyampur, Rishikesh, Dist. Dehra Dun, 9.iv.2003; 5exs., Narendra Nagar, Dist. New Tehri, 10.iv.2003; 1ex., Kaudiala, Dist. New Tehri, 11.iv.2003; 3exs., Jamnikhal, Dist. Deoprayag, 13.iv.2003; 1ex., Pirankalia, Dist. Haridwar, 16.iv.2003; 4 exs., Rudrapur, Dist. Udham Singh Nagar, 15.xii.2003; 1ex., Nanakmatta, Dist. Udham Singh Nagar, 22.xii.2003; B.G. Kundu & Party coll. 1ex., Chalthi and 1ex., Chanki, Dist. Champawat, 16.iv.2004; 2exs., Barla, Didihat, 24.ix.2004 and 2exs., Chaukori, Dist. Pithoragarh, 31,iii,2005, B. Mitra & Party coll. 3exs., Baijnath, Kausani, Dist. Bageswar, 27.ix.2004, Mrs. M. Ghosh & Party.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Manipur, Tripura and West Bengal. Also known from Nepal, Bhutan and Japan.

Remarks : This one is a very widely distributed species. Well suited to the valleys and base of the hills. First time recorded from Uttarakhand.

26. ***Coccinella transversalis*** Fabricius

1781. *Coccinella transversalis* Fab. *Spec. Ins.*, P. 97. (*Type locality* : Coromandal, S. India).

1980. *Coccinella transversalis*, Fab. : Chunaram & Sasaji, *Oriental Insects*, **14**(4) : 485.

Material studied : 1ex., Nagni, Dist. Chamba/ New Tehri, 8.iv.2003; 1ex., Jamnikhal, Dist. Deoprayag, 13.iv.2003; 1ex., Rudrapur, Phulchungi, 12.xii.2003 and 1ex., Nanakmatta, 22.xii.2003, both from Dist. Udham Singh Nagar, B.G. Kundu & Party coll. 6exs., Garur, Dist. Bageswar, 30.viii.2005, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, Manipur, West Bengal, Andhra Pradesh, Kerala, S. India, Goa and Andaman Islands. Also known from Southeast Asia, Thailand, Japan and Australia.

Remarks : A very widely distributed species, generally found in plains. Recorded first time from the state.

Genus ***Micraspis*** Dejean

1835. *Micraspis* Dejean, *Cat. Coleopt.*, : 459.

1965. *Micraspis*, Kamiya, *Mem. Fac. Lib. Arts.* Fukui Univ., Ser-II, Nat. Sci., No. **15** : 59.

Key to the species of the genus *Micraspis* known from Uttarakhand

1. Elytra testaceous, each elytron with a black, long, external semicircular marking, starting near the scutellum and running two-third of the elytral length, there are another black marking inside the semicircular one, almost straight anteriorly and bented externally at the posterior end, a small black spot near the apex, sutural margin black, slightly thickened at middle; pronotum yellowish brown with a narrow basal black marking and two discal small black spots ..... *cardoni (weise)*

– Elytra reddish yellow, each elytron with one longitudinal narrow black marking starting from humeral callus and extending upto the sub-apical zone; pronotum and sutural margin as above ..... *vincta* (Gorham)

27. ***Micraspis cardoni*** (Weise)

1892. *Verania cardoni* Weise., *Ann. Soc. ent. Belg.*, **36** : 19 (*Type locality* : Chota Nagpur).

1932. *Coelophora cardoni*, Korschefsky, *Coleoptm. Cat.*, **16**(120) : 588.

1943. *Micraspis cardoni* (Weise) : Timberlake, *Bull. Hawaiian Sug. plrs. Ass. Exp. Stn. (Ent. Ser.)*, No. 22, **47** : 28.

Material studied : 1ex., Z.S.I. Campus, Dehra Dun, Dist. Dehra Dun, 5.x.2001, S.K. Mondal & Party coll.

Distribution : India : Uttarakhand, Bihar, West Bengal, Maharashtra, Karnataka, Andhra Pradesh and Goa. Also known from Sri Lanka.

Remarks : Generally found in the plains, population size is generally very small. First record of the species from Uttarakhand.

28. ***Micraspis vincta*** (Gorham)

1895. *Verania vincta* Gorham, *Ann. Mus. Civ. Genova,* **34**(2) : 686. (*Type locality* : Burma).

1968. *Micraspis vincta,* (Gorham) : *Sasaji, Mushi,* Furuoka, **42** : 132.

Material studied : 2exs., Kherna, Dist. Nainital, 12.xi.2000; 1ex., Dhalwal, Rishikesh, Dist. Tehri Garhwal, 8.x.2001, S.K. Mondal & Party coll. 1ex., Muni Ki Reti, Dist. New Tehri, 10.iv.2003; 1ex., Rudrapur, Haridaspur, 11.xii.2003; 3exs., Rudrapur, Phulchungi, 12.xii.2003; 12exs., Kashipur, Doraha, 15.xii.2003; 3exs., Jaspur, 16.xii.2003 and 1ex., Sitargunj, 23.xii.2003, all from Dist. Udham Singh Nagar, B.G. Kundu & Party coll. 2exs., Someshwar, 25.iii.2001 and 1ex., Gwalakot, 27.iii.2001, both from Dist. Almora, S.K. Chakraborty & Party coll. 1ex., Baijnath, Dist. Bageswar, 9.x.2001 and 1ex., Nainital, Dist. Nainital, 10.x.2001, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Meghalaya, Tripura, Assam, Manipur, West Bengal, Bihar, South India and Andhra Pradesh. Also known from Myanmar, Thailand, Bangladesh, Nepal and Bhutan.

Remarks : Recorded for the first time from Uttarakhand.

Tribe PSYLLOBORINI
Genus ***Illeis*** Mulsant

1850. *Illeis* Mulsant, *Spec. Trim. Securipalp,* 1026 P.

1932. *Illeis,* Korschefsky, *Coleoptm. Cat.,* **16**(120) : 558.

29. ***Illeis confusa confusa*** Timberlake

1943. *Illeis confusa confusa* Timberlake, P.H., Bull. *Exp. Stn. Hawaiian Sug. Pl. Ass., Honolulu, ent. Ser.,* No. **22**, 67 pp. (*Type locality* : China, Hongkong).

1961. *Illeis confusa confusa,* Timberlake : Bielawski, *Annales Zoologici,* **19**(8) : 361-362.

Material studied : 12exs., Herbertpur, Dist. Dehra Dun, 30.x.2000, 4exs., Byasi, Dist. Tehri Garhwal, 11.xi.2002, P. Mukhopadhyay & Party coll. 1ex., Nachiketa Tal, Dist. Uttarkashi, 7.v.2002, ex. "under leaf", S.K. Chakraborty & Party coll. 1ex., Bhowali, Dist. Nainital, 21.xii.2003, B.G. Kundu & Party coll.

Distribution : India : Uttarakhand. Also known from China.

Remarks : This is a new record of the species from India as well as Uttarakhand.

Subfamily EPILACHNINAE
Tribe EPILACHNINI

Key to the genera of the tribe *Epilachnini* known from Uttarakhand

1. Tarsal claws without any basal tooth, body oval, moderate in size ..... ***Epilachna*** Chevrolat
– Tarsal claws with basal tooth 2
2. Sixth visible abdominal sternite of female longitudinally divided; body oval, large, yellowish setae present on upper edge of male aedeagus ..... ***Henosepilachna*** Li
– Sixth visible abdominal sternite of female entire, not divided longitudinally 3
3. Body subhemispherical; antennae shorter than head width; mandibles large, curved, provided with three major teeth situated at different levels, the apical tooth is the longest and has two prominent dentules one on either side, the subapical and median tooth as well as the molar surface bear a large number of dentules; basal tooth on tarsal claws subquadrate; male genitalia not well developed ..... ***Afidenta*** Dieke
– Body short-oval, small, antennae subequal to the head-width; mandibles subtriangular in shape, apex is provided with three teeth, without any dentulation; basal tooth on tarsal claws sub-triangular; male genitalia well developed ..... ***Afidentula*** Kapur

Genus ***Epilachna*** Chevrolat

1837. *Epilachna* Chevrolat, *in Dejean's Cat. Coleopt., ed.* **3** : 460-461.

1898. *Solanophila* Weise, *Deutsche Ent. Zeitschr.,* **1898** : 99, 101.

1947. *Afissa* Dieke, *Smithson. Misc. Coll.,* **106**(15) : 8, 113.

1961. *Epilachna,* Li & Cook, *Pacific Insect,* **3**(1-4) : 51.

Key to the species of the genus *Epilachna* known from Uttarakhand

1. Elytra black, with seven yellow moderately sized spots, none of the spots reaches the lateral margin or the suture; scutellum black;

pronotum with a large black spot covering most of its surface so that only the lateral margins and sometimes the frontal margin are testaceous; ventral side black, except the lateral margin of the abdominal segments which are brownish .... *marginicollis* Hope

– Elytra not black 2

2. Elytra testaceous or light reddish brown 3

– Elytra dark brown 4

3. Pronotum with a rather large, transverse black spots; scutellum pale; each elytrae with five black spots, the humeral spot is slightly emarginate towards the suture, rarely the humearl spot and the scutellar spots are enlarged and almost contiguous; legs pale . ..... *decemmaculata* Redt

– Pronotum light testaceous with a large, black, almost heart shaped spot in the middle; scutellum pale; elytrae light testaceous, with six black spots, the humeral spot may reach the lateral margin over very short space, preapical spot transversely elongated in various degrees ..... *monsuna* Bielawski

4. Pronotum with a big transverse spot, leaving only a narrow margin of the pronotum; scutellum light; elytrae each with five large spots, which often partly coalesce to form transverse band; in the darker specimen ventral side and most of the abdomen and femora black ..... *expansa* (Dieke)

30. ***Epilachna decemmaculata*** Redtenbacher

1844. *Epilachna decemmaculata* Redtenbacher, *Kaschmir und das Reich der Siek*, **4**, pp-497-564. (*Type locality* : Kashmir).

1947. *Afissa decemmaculata*, (Redtn.) : Dieke, *Smithson. Misc. Coll.*, **106**(15) : 144.

1979. *Epilachna decemmaculata* Redtn. : Bielawski, *Entomologica Basiliensia*, **4** : 93-94.

Material studied : 1ex., near Kedarnath, Dist. Rudraprayag, 2.x.2004, ex. "by beating bushes" P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, United Province and Kashmir. Also known from Nepal, Bhutan, China and Tibet.

Remarks : The species appears to be a hilly one. It was earlier recorded from Chabua and Bhawaki 5000 ft. Kumaon range U.P., in the year 1944.

31. ***Epilachna expansa*** (Dieke) Comb. Nov.

1947. *Afissa expansa*, Dieke, *Smithson. Misc. Coll.*, **106**(15) : 141. (*Type Locality* : China)

Material studied : 1ex., Kausani, Dist. Bageswar, 14.ix.2002, P.H. Roy & Party coll.

Distribution : India : Uttarakhand. Also known from China.

Remarks : This is the first record of the species from India as well as Uttarakhand.

32. ***Epilachna marginicollis*** Hope

1831. *Coccinella marginicollis*, Hope, *in Gray, Zoological Miscellany*, P. 31 (*Type Locality* : Nepal)

1850. *Epilachna marginicollis* (Hope) : Mulsant, *Ann. Soc. Agric. Lyon.*, **3** : 728.

1955. *Afissa marginicollis* (Hope) : Kapur, *Rec. Indian Mus.*, **53** : 315.

1979. *Epilachna marginicollis* (Hope) : Bielawski, *Entomologica Basiliensisa*, **4** : 88-91.

Material studied : 1ex., Yamunotri, alt. 3185 m., Dist. Uttarkashi, 15.xi.2003, S.K. Chakraborty & Party coll.

Distribution : India : Uttarakhand, Sikkim and North Bengal. Also known from Nepal, Bhutan and Myanmar.

Remarks : The distribution pattern indicates the species to be a high altitude member of the family Coccinellidae. It is first time recorded from the state.

33. ***Epilachna monsuna*** Bielawski

1979. *Epilachna monsuna* Bielawski, *Entomologica Basiliensisa*, **4** : 100-103 (*Type locality* : Bhutan).

Material studied : 1ex., Kosi, Dist. Almora, 5.x.2001 and 1ex., Hanuman Chati, Dist. Chamoli, 1.xi.2002, P. Mukhopadhyay & Party coll. 1ex., Phata, Dist. Rudraprayag, 30.vi.2004, S.K. Chakraborty & Party coll.

Distribution : India : Uttarakhand. Also known from Bhutan.

Remarks : This is a new record of the species from India as well as Uttarakhand.

Genus ***Henosepilachna*** Li

1961. *Henosepilachna,* Li, *Pacific Insects.*, **3** : 35.

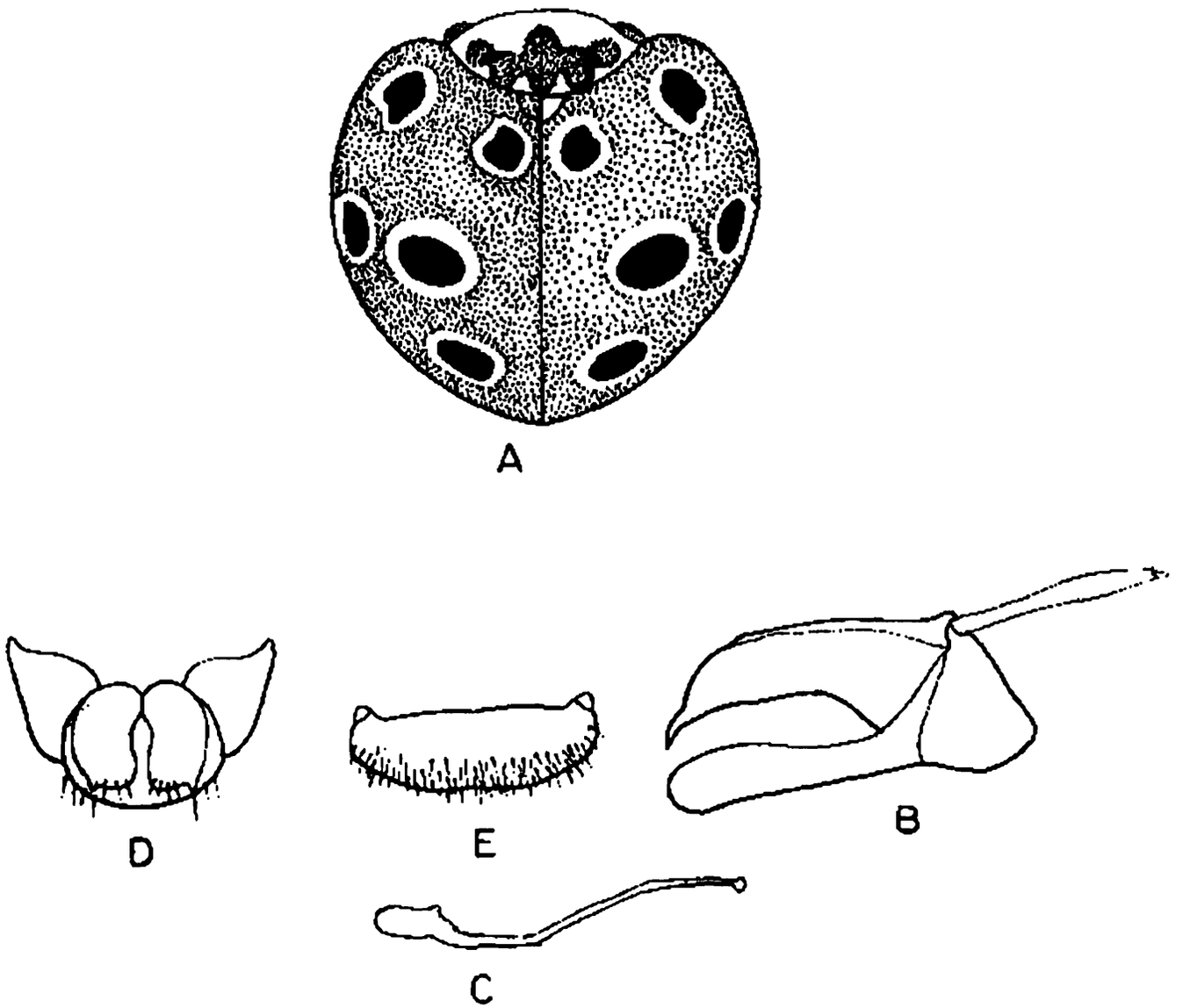
Key to the species of the genus *Henosepilachna* Li known from Uttarakhand

1. Elytral black spots with ocelli (surrounded by a lightler ring) 2
- Elytral black spots without any ocelli 3
2. Pronotum and elytra straw yellow in colour; pronotum with five black spots, covering almost the pronotum leaving some testaceous portion anteriorly; scutellum black; elytrae with six small black spots, arranged as 2+2+2, none touching the sutural or lateral margin, each black spots are surrounded by very light yellow ring; ventral side black; legs yellowish brown except femurs which are tinged with black .... *chamolika* sp. nov.
- Pronotum reddish brown with five black spots, occupying almost the pronotum leaving testaceous portion anteriorly; scutellum black; elytra greyis with six large black spots, arranged as 2+2+2+, spot no. 4, touching the lateral margin, each black spot is surrounded by distinct brown ring; ventral side black; legs uniformly yellowis brown .... *ocellata* (Redtnb.)
3. Elytral apex rounded, the external, median black spot of the elytrae generally touching the external margin; colour reddish brown .....*dodecastigma* (Wied)
- Elytral apex angular, the external median black spot never touching the external margin, colour as above .... *vigintioctopunctata* (F.)

34. ***Henosepilachna chamolika*** sp. nov.

Body rounded oval, (fig. A) Convex; pubescens whitish, even on the black spots on elytron. Head light brown, with a pieceous ill-defined marking on the vertex and two such markings above the eyes; eyes black; frons depressed, antennae 11 segmented, brownish uniformly. Pronotum brown, with five black spots which are sometimes enlarged and fused together to cover the entire pronotum leaving a narrow, irregular brownish border along the anterior margin. The pronotal spots when distinct, are arranged as follows : the largest spot situated in the middle, elongate and irregular in outline, extending from the base to the anterior margin and as wide as one-fourth the width of pronotum. A pair of smaller spots situated obliquely on either side of the median spot, the proximal one of these spots usually smaller than the distal one, situated near the base; the distal spots are subquadrate to oblong in shape. Scutellum black. Elytron straw-yellow, with six black spots, spots are smaller in comparison to the body size, each spot is surrounded by a light yellow ring (ocelli), none of the spots touch the sutural or lateral margins, spots are arranged as 2+2+2+. Underside black except for the light brown mouth parts, elytral epipleurae, legs and posterior margins of the abdominal sternites. Threefourth portion of the femur pieceous.

Head minutely and fairly, closely punctuate; pubescence long and moderately close. Pronotum widely emarginate anteriorly, the anterior angles and lateral margins widely rounded and slightly elevated; punctation and pubescence similar to that of head. Scutellum triangular, with the sides longer than the base, apex pointed, punctation and pubescence similar to that of head. Elytra with a distinct humeral callus, covered with the spot no. 2.; humeral angle a bit projected, obtusely rounded, external margin bordered, raised to form a groove along the elytral margin; apical angle rounded, not making a sharp point with the suture; punctures uniform, except on the margins which are coarser, sparser and moderately impressed; pubescence similar to that of pronotum. Underside with the abdominal lines complete, punctuation on abdominal sternite fine, pubscence less dense than on the upper surface. Fifth sternite in the male slightly longer than the preceding sternite; the sixth with a distinct emargination at the apex. In the female, fifth sternite broadly and shallowly emarginatd, sixth segment splited longitudinally. Male genitalia (Fig. B. C) with the sipho slender, ribon like, anterior half twisted, tip bented with a fine notch, siphonal capsule tubular, slightly constrictd in the middle. Basal plate relatively less developed; penis well developed, widest in the basal one-third of the length, thick weakly convex,



Text Fig. *Henosepilachna chamolika* sp. nov. A. showing the outline and spot pattern. B. Male genitalia without sipho. C. sipho. D. Female genitalia. E. subgenital plate.

apex abruptly narrowed into a curved tip, a few short setae present near the bend; paramera nearly as long as penis, spoon shaped, the tip of the paramera covered with a row of moderately long setae. Female genitalia (fig D.) with the subgenital plates (IX sternite) weakly emarginated in the middle of the inner margin, outer margin rounded, stylus rather well developed, covered with long setae; tenth tergite (Fig. E) slightly emarginated in the middle, rounded at the sides. Length. 7 mm.; width 7.33 mm.

Type specimen-Holotype : Female, India, Uttarakhand, Goaldam, Dist. Chamoli, 1.ix.2005, S.K. Chatterjee & Party coll.

Paratype : Ten examples, male and female, with same data as the holotype; in the Zoological Survey of India, Kolkata.

Remarks : This species may be easily placed in the ocellata group. But it differs from the present members of the group by its colour, spot size and orientation, with the difference in the structure of the male genitalia and female genital plate. From the genital point of view, it comes closer to *E. ocellata* Redtn., but differs considerably by the structure of the penis. In *ocellata,* the upper surface of penis is straight and the tip is gradually narrowed and bented anteriorly whereas in the *chamolika* the upper surface is weakly convex, the anterior part abruptly narrowed and curved into a sharp hook. The sipho also differs considerably. It differs considerably from the female genital plate in *ocellata.* In *ocellata* the genital plate is weakly emarginated for the greater length of the inner margin and of the apical one-third of the outer margin whereas in *chamolika* the inner margin is very weakly emarginate and the anterior one-third of the outer margin not emarginated, entire, smoothly curved. This species has also been compared with *H. anita* Kapur, *H. nana* Kapur and *H. manipurensis* Kapur, and differ from all of them by the spot pattern, colouration and male and female genitalia.

35. ***Henosepilachna dodecastigma*** (Wiedmann)

1823. *Coccinella dodecastigma,* Wiedmann, *Zool. Mag., Kiel,* **2** : 73-74 (*Type Locality* : Bengal).

1850. *Epilachna dodecastigma* (Wied) : Mulsant, *Ann. Soc. Agric. Lyon.,* **2** : 789.

1979. *Henosepilachna dodecastigma* (Wied): Hoang, *Entomological Rev.,* **56**(1) : 98-108.

Material studied : 1ex., Byasi, Dist. Tehri Garhwal, 11.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, West Bengal and Andaman Islands. Also known from Myanmar, North Vietnam and Indonesia.

Remarks : It is a new record of the species from the state.

36. ***Henosepilachna ocellata*** (Redtenbacher)

1844. *Epilachna ocellata,* Redtenbacher, (in Hiigel) *Kaschmir und das Reich der Siek,* **IV**(2) : 497-564 (*Type Locality* : Kashmir).

1874. *Epilachna oculea,* Crotch, *Revis. Cocci,* P. 87 (synonymized with *ocellata*)

1952. *Epilachna ocellata,* Kapur, *Rec. Ind. Mus.,* **48**(3 & 4) : 18-22.

1967. *Henosepilachna ocellata* (Redtn.) : Miyatake, *Trans. Sikoku. ent. soc.,* **9** : 70.

Material studied : 10exs., Badrinath, Dist. Chamoli, 23.viii.2002, S.K. Mondal & Party coll. 1ex., Hanuman Chati, Dist. Chamoli, 1.xi.2002, P. Mukhopadhyay & Party coll. 1x., Khirakot, Dist. Bageswar, 29.viii.2005, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim, Kashmir, Simla, Punjab and West Bengal. Also known from Nepal and Bhutan.

Remarks : The species was earlier recorded from Kumaon Hills, U.P.

37. ***Henosepilachna vigintioctopunctata*** (Fabricius)

1775. *Coccinella 28-punctata,* Fabricius, *Syst. ent.,* P. 84 (*Type Locality* : Tranquebar).

1850. *Epilachna vigintioctopunctata* (Fab.) : Mulsant, *Spec. Trim. Securipalp,* P. 834.

1980. *Henosepilachna vigintioctopunctata* (Fab.) : Chunaram & Sasaji, *Oriental Insects,* **14**(4) : 484.

Material studied : 1ex., Rurki, Dist. Tehri Garhwal, 5.ix.2002, S.K. Mondal & Party coll. 1ex., Muni Ki Reti, Dist. New Tehri, 10.iv.2003 and

1ex., Rudrapur, Haridaspur, Dist. Udham Singh Nagar, 11.xii.2003, B.G. Kundu & Party coll. 1ex., Tanakpur, Dist. Champawat, 12.ix.2004, B. Mitra & Party coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, West Bengal, U.P., M.P., Punjab, Haryana, Himachal Pradesh, Goa, Kerala, Tamil Nadu and Andaman Islands. Also known from Bhutan, China, Japan, Formosa, Philippines, Sunda Islands, Thailand, New Guinea, Australia and Tasmania.

Remarks : Very widely distributed species. Earlier it was recorded from U.P.

Genus ***Afidenta*** Dieke

1947. *Afidenta* Dieke, *Smithson. Misc. Coll.*, **106**(15) : 109.

38. ***Afidenta mimetica*** Dicke

1947. *Afidenta mimetica*, Dieke, *Smithson. Misc. Coll.*, **106**(15) : 110-111. (*Type Locality* : Indochina).

Material studied : 1ex., Narendra Nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & Party coll.

Distribution : India : Uttarakhand. Also known from Indochina, China and Tibet.

Remarks : It's a new record of the species from Uttarakhand although its subspecies *mimetica simplex* have been recorded from Sikkim and other places.

Genus ***Afidentula*** Kapur

1955. *Afidentula* Kapur, *Rec. Indian Mus.*, **53** : 324.

39. ***Afidentula manderstjernae*** (Mulsant)

1853. *Epilachna manderstjernae*, Mulsant, *Ann. Soc. Linn. Lyon.* I. P-256. (*Type Locality* : Asia, Sikkim).

1955. *Afidentula manderstjernae* (Muls.) : Kapur, *Rec. Indian Mus.*, **53** : 325.

Material studied : 1ex., Baijnath, 30.ix.2004 and 1ex., Kanak Chauri, 1.x.2004, both from Dist. Rudraprayag, P. Mukhopadhyay & Party coll. 3exs., Gananth, Dist. Almora, 27.viii.2005, S.K. Chatterjee & Party coll.

Distribution : India : Uttarakhand, Sikkim and West Bengal. Also known from Nepal, Bhutan and China.

Remarks : This is the first time record of the species from the state.

SUMMARY

The present paper deals with 914 examples of Coccinellidae beetles belonging to 39 species under 23 genera and 5 subfamilies. Out of 39 species 8 species were recorded carlier from Kumaon Hills and other places under U.P., Two species are recorded first time from India as well as the state. A new species, *H. chamolika* has been described. Genus *Egius* Mulsant has been recorded for the first time from India as well as the state. A new combination has been reported [*Epilachna expansa* (Dieke) = *Afissa expansa* Dieke] Keys to the subfamilies, tribes, genera and species have been provided. Relevant synonymies, collection data and geographical distribution have also been provided.

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REFERENCES

BIELAWSKI, R. 1961-Bemerkungen Uber die mannlichen genitalien von arten der Gattung *Illeis* Muls., nebst Beschreibung einer neuen Art and einter unterart (Coleoptera : Coccinellidae), *Annals. Zool. Warsz.*, **19** : 353-368.

BIELAWSKI, R. 1979-Engebnisse der Bhutan Expedition 1972, der Natur historischen Museums in Basel, Coleoptera : Coccinellidae, *Entomologica Basiliensia,* **4** : 83-125.

CHAKRABORTY, S.K. & BISWAS, S. 2003-Zoological Survey of India, State Fauna Series 9, Fauna of Sikkim, Insecta : Coleoptera : Coccinellidae. : 117-152.

CHUNARAM, S & SASAJI, H. 1980-A contribution to the Coccinellidae (Coleoptera) of Thailand, *Oriental Insects,* **14**(4) : 473-491.

CROTCH, G.R. 1874.-*A revision of the Coleopterous family Coccinellidae, London* : 311 pp.

DIEKE, G.H. 1947-Lady beetles of the genus Epilachna (Sensolato) in Asia, Europe and Australia, *Smithson. Misc. Colln.,* **106**(15) : 1-183.

FABRICIUS, J.C. 1798-*Supplementum Entomologiae Systematicae.* Hafniae, Profet Storch, 8, 2U. 572 pp.

KAMIYA, H. 1961-A revision of the tribe Scymnini from Japan and the Loochoos (Coleoptera : Coccinellidae) Part I & II. *Journal of the Faculty of Agriculture, Kyushu University,* Vol. **XI**, ine 3, pp. 275-301, 302-330.

KAMIYA, H. 1965-A revision of the tribe Coccinellini of Japan and the Ryukyus (Coleoptera : Coccinellidae) *Mem. Fac. Lib. Arts,* Fukui Univ., Ser. II, Nat. Sci., 15, Part 3, pp. 27-71, Pls. I-III.

KAPUR, A.P. 1949-On the Indian species of *Rodolia* Mulsant (Coleoptera : Coccinellidae). *Bulletin of Entomological Research,* **39**(4) : 531-538.

KAPUR, A.P. 1951-A note on *Epilachna ocellata* Redt. (Coleoptera : Coccinellidae) with description of three species hitherto confused with it. *Record of the Indian Museum,* Delhi, **48**(3-4), pp. 17-29.

KAPUR, A.P. 1955-The Coccinellidae of Nepal. *Record of the Indian Museum,* Delhi, **52** (3 & 4) : 309-338.

KAPUR, A.P. 1963-The Coccinellidae of the Third Mount Everest Expedition, 1924. (Coleoptera). *Bulletin of the British Museum (Natural History) Entomology,* London. pp. 1-48.

KAPUR, A.P. 1966-The Coccinellidae (coleoptera) of the Andamans. *Proceedings of the National Institute of Sciences of India,* **32**, B, Nos. 3 & 4, pp. 149-189.

KORSCHEFSKY, R. 1931-32-Coccinellidae *Coleopterum Catalogus, W. Junk editus, A.S. Shenkling,* Pars 118, 120, 659 pp.

LI & COOK. 1961-Epilachninae of Taiwan. *Pacific Insects,* **3** : 31-91, 159 Figures.

MULSANT, M.E. 1846-Histoire Naturelle des Coleopteres de France : *Sulcicollis Securipalpes,* Paris, **4,** 280 pp.

MULSANT, M.E. 1850-Species de Coleopteres trimeres Securipalpes. *Ann. Soc. Agric. Jyon,* (2)**2** : 1-1104.

MULSANT, M.E. 1853-Supplement a la Monographie des Coccinellides. *Ann. soc. Linn. Lyon.* **1** : 137-333.

SASAJI, H. 1968-Phylogeny of the Family Coccinellidae (Coleoptera). *Etigenia,* No. 35, 375 pp.

WEISE, J. 1895- Insects du Bengalae, 36e Memoire Coccinellidae. *Ann. Soc. ent. Belg.* **38** : 151-157.

WIEDEMANN, C.R.W. 1823-Zweihundert neue Kafer von Java, Bengalen und dem Vorgebirge der guten Hoffrung. *zool. Mag.,* **2** : 1-133.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 303-309.

INSECTA : COLEOPTERA : HISTERIDAE

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INTRODUCTION

Histeridae beetles are generally black and shining in colour, sometimes with metallic lusture. There size vary from very small to medium, with hard exoskeleton and shape vary from round, oval to elongate one. They occur in variety of habitats like in soil, in dung of various animals, in termite and ant's nests, under bark, and in dead bodis of fish and animals. They are strongly predaceous in habit both in larval and adult forms.

Indian fauna of Histeridae was studied by earlier workers like Fabricius (1798), Paykul (1811), Wiedmann (1819-21) and others. Marseul (1853-54), Lewis (1892-1906) and Bickhardt (1913-21) described a large number of Indian species. Later Therond (1970-78), Mazur (1975-85) and Gomy (1976) contributed further knowledge to our national fauna. Biswas & Pal (1985), Biswas & Chakraborty (1995-2000) worked out national fauna of Histeridae further.

About 176 species under 34 genera are known from India in comparison to about 3000 species under 200 genera from all over the world.

As regards Histeridae fauna of Uttarakhand nothing was recorded earlier. All the species dealt within this paper are new records from the state. In this present work only 12 species under 9 genera have been reported. Further exploration will definitely increase the number of species from the state.

SYSTEMATIC LIST

Family HISTERIDAE
Subfamily DENDROPHILINAE
Tribe PAROMALINI
Genus ***Paromalus*** Erichson 1834

1. *P. babaulti* (Cooman) 1935

Genus ***Platylomalus*** Cooman 1948

2. *P. oceanitis* (Marseul) 1855

Subfamily HISTERINAE
Tribe HISTERINI
Genus ***Pachylister*** Lewis 1904

3. *P. Chinensis* (Quens) 1806

Genus ***Santalus*** Lewis 1906

4. *S. orientalis* (Paykul) 1811

Genus ***Hister*** Linnaeus 1767

5. *H. pullatus* Erichson 1834

Genus ***Atholus*** Thomson 1862

6. *A. coelestis* (Marseul) 1857
7. *A. philippinensis* (Marseul) 1854
8. *A. silvicola* (Lewis) 1901

Genus ***Peranus*** Lewis 1906

9. *P. bimaculatus* (Linnaeus) 1758
10. *P. maindroni* (Lewis) 1892

Tribe PLATYSOMINI
Genus ***Platylister*** Lewis 1892

11. *P. atratus* (Erichson) 1834

Genus ***Platysoma*** Leach 1817

12. *P. brevistriatum* Lewis 1888

Family HISTERIDAE

Key to the Subfamilies of HISTERIDAE of Uttarakhand

1. Antennal groove situated at the middle of the lateral (pectoral) border of the prosternum before the anterior coxae; pectoral border provided with a deeply incised cleft to receive the antennal funicle, smaller in size .... DENDROPHILINAE

   Antennal groove situated at the anterior angles of prosternum; lateral (Pectoral) border not incised, medium to larger beetles .... HISTERINAE

Subfamily DENDROPHILINAE

Key to genera of subfamily Dendrophilinae known from Uttarakhand

1. Prosternum margined laterally upto the middle from the base; constricted a little above

the base and diverging anteriorly ..... ***Paromalus*** Er.

Prosternum margined as above, constricted as above but extending anteriorly, parallel to each other ..... ***Platylomalus*** Cooman

Tribe PAROMALINI
Genus ***Paromalus*** Erichson

1834. *Paromalus* Erichson, *In Klug Jahrb. Ins.*, **1** : 167.

1910. *Paromalus*, Bickhardt, *Coleopt. Cat.*, 8, Pars, **24** : 61.

1. ***Paromalus babaulti*** (Cooman)

1935. *Microlomalus babaulti* Cooman, *Rev. France. Ent.*, **2** : 177.

1948. *Paromalus babaulti* (Cooman) : Cooman, *Notes Ent. Chin. Mus., Heude*, **12** : 135.

1985. *Paromalus babaulti*, T.K. Pal & S. Biswas, *Rec. zool. Surv. India*, 1982 (1-4) : 135.

Material studied : 3 exs. Narendra nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand. Also known from Arunachal Pradesh (Namdapha), Kashmir (Pahalgam) and Himachal Pradesh.

Remarks : Recorded first time from Uttarakhand.

Genus ***Platylomalus*** Cooman

1948. *Platylomalus* Cooman, *Notes Ent. Chin.*, **12** : 134.

1970. *Platylomalus*, Therond, *Opusc. Zool.*, **10** : 336.

2. ***Platylomalus oceanitis*** (Marseul)

1855. *Paromalus oceanitis* Marseul, *Ann. Soc. Ent. Fr.*, (3)**3** : 110-11.

1910. *Paromalus oceanitis* Bickhardt, *Coleopt. Cat.*, **8** : Pars 24 : 62.

1970. *Paltylomalus oceanitis* (Marseul) : Therond, *Opusc. Zool.*, **10** : 336.

Material Studied : 1ex. Narendra nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand, Meghalaya, Tripura and West Bengal. Also Known from Myanmar, Malacca, Philippines, Malayasia and Sumatra.

Remarks : This is the new record of the species from the state.

Subfamily HISTERINAE

Key to the tribes of subfamily Histerinae

1. Tarsal groove of front tibiae straight, distinctly bordered at the inner edge only .. .. HISTERINI

   Tarsal groove of the front tibiae 'S' shaped, strongly cleft, sharply defined .... PLATYSOMINI

Tribe HISTERINI

Key to the genera of the tribe *Histerini* of Uttarakhand

1. Pronotum with distinct foveae in the antero lateral angles 2

   Pronotum without such foveae 4

2. Mesosternum roundly truncated in front; frontal stria arched, entire; elytra with a subhumeral, five dorsal and one sutural striae ..... *Atholus* Thomson

   Mesosternum weakly to strongly sinuous in front 3

3. Head concave with biarcuate frontal stria, entire; elytra generally without any humeral stria, 5th and sutural stria when complete join at the base ..... *Peranus* Lewis

4. Body large sized; mandibles asymmetrical; labrum trasverse but projecting anteriorly antennal fossette absent; anterior tibiae 3 dentate ..... *Pachylister* Lewis

   Body medium sized; mandible symmetrical; antennal fossette present; anterior tibiae 3-4 dentate 5

5. Body oblong, parallel laterally, somewhat convex; labrum semicircular; antennal fossette longitudinally excavated behind the pronotal angle; internal lateral striae on the pronotum always distant from the margin ..... *Santalus* Lewis

   Body oval, convex; labrum oval; antennal fossette well defined; internal lateral stria on the pronotum close to the margin, often with an external stria, more or less shortened ... . *Hister* Linnaeus

Genus ***Pachylister*** Lewis

1904. *Pachylister* Lewis, *Ann. Mag. Nat. Hist.;* (7)**14** : 145.

1910. *Pachylister,* Bickhardt, *Coleopt. Cat.;* **8**, Pars **24** : 37.

3. ***Pachylister chinensis*** (Quens)

1806. *Hister Chinensis* Quens, in Schonh. *Sys. Ins.*, **1** : 88.

1904. *Pachylister Chinensis* (Quens) : Lewis, *Ann. Mag. Nat. Hist.*, (7)**14** : 146.

1910. *Pachylister Chinensis,* Bickhardt, *Coleopt. Cat.* 8, Pars **24** : 38.

Material Studied : 1ex., Kafligar, Dist. Bageshwar, 4.x.2001; 1ex. Binsar, Dist. Almora, 30.x.2001; 2exs., Agasthamuni, Dist. Rudraprayag, 7.x.2004, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand, Tripura and Meghalaya. Also known from Tonkin, China.

Remarks : This species is recorded for the first time from the state.

Genus ***Santalus*** Lewis

1906. *Santalus* Lewis, *Ann. Mag. Nat. Hist.*, (7)**17** : 341.

1910. *Santalus* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 36.

4. ***Santalus orientalis*** (Paykul)

1811. *Hister orientalis* Paykul, *Mon,* P. 17, t. 13, f. 7.

1906. *Santalus orientalis* (Paykul) : Lewis, *Ann. Mag. Nat. Hist.*, (7)**17** : 341.

1910. *Santalus orientalis,* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 36.

Material Studied : 1ex. Bhowali, 16.iii.2001, ex. "Cow Dung" and 1ex., Lalkua, 2.iv.2001, ex. "Horse Dung", both from Nainital Dist., S.K. Chakraborty & Party Coll. 1ex., Nagrasu, Dist. Rudraprayag, 7.xi.2002, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand, Andhra Pradesh and West Bengal. Also Known from Sri Lanka.

Remarks : The species is recorded for the first time from Uttarakhand.

Genus ***Hister*** Linnaeus

1767. *Hister* Linnaeus, *Syst. Nat.*, ed. 12. II. P. 566.

1910. *Hister,* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 35.

5. ***Hister pullatus*** Erichson

1834. *Hister pullatus* Erichson, in Klug. *Jahrb. Ins.*, **1** : 138.

1910. *Hister pullatus,* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 47.

Material Studied : 1ex., Narendra nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay Coll. 1ex., Sonari, ex, "Cow Dung" 26.viii.2005 and 6exs., Gananath, 27.viii.2005, Dist. Almora, S.K. Chatterjee & Party Coll.

Distribution : India : Uttarakhand, Meghalaya, Assam, Tripura and West Bengal.

Remarks : Recorded for the first time from the state.

Genus ***Atholus*** Thomson

1862. *Atholus* Thomson, *Skand. Coll.*, **4** : 228.

1910. *Atholus,* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 53.

Key to the species of the genus *Atholus* known from Uttarakhand

1. 1-4 dorsal stria entire, pronotum with foveae at the anterior angles 2

   1-3 dorsal stria entire, pronotum without any foveae 3

2. 5th dorsal stria and sutural stria of same length, reaching the middle; internal subhumeral stria reduced to an oblong puncture .....*A. coelestis* (Mars.)

   5th dorsal stria reaching the middle, sutural stria a little longer than the 5th; internal subhumeral stria long and deep near the base ..... *A. silvicola* (Lew.)

3. 4th dorsal stria reaching beyond the middle, 5th and sutural shorter, apical almost reaching the middle; subhumeral stria strong, like a furrow, shortened at both the ends .. .. *A. Philippinensis* (Mars.)

6. ***Atholus coelestis*** (Marseul)

1857. *Hister coelestis* Marseul, *Ann. Soc. Ent. Fr.*, (3)**5** : 416-417.

1910. *Atholus coelestis* (Marseul) : Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 53.

Material Studied : 1ex., Bhowali, Dist. Nainital, 16.iii.2001, S.K. Chakraborty & Party Coll; 8exs., Agasthamuni, Dist. Rudraprayag, 7.x.2004, ex. "Cow Dung" P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand, Sikkim, Meghalaya, Tripura, West Bengal, Andhra Pradesh and Tamil Nadu. Also known from China, Myanmar and Sri Lanka.

Remarks : It is a very widely distributed species, recorded for the first time from Uttarakhand.

7. ***Atholus philippinensis*** (Marseul)

1854. *Hister philippinensis* Marseul, *Ann. Soc. Ent. Fr.* (3)**3** : 547-548.

1910. *Atholus philippinensis* (Marseul) : Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 25.

Material Studied : 2exs., Hanuman Chati, Dist. Uttarkashi, 1.xi.2002, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand, and Meghalaya (Khasi Hills). Also known from Burma and Philippines.

Remarks : First record of the species from the state.

8. ***Atholus silvicola*** (Lewis)

1901. *Hister silvicola* Lewis, *Ann. Mag. Nat. Hist.* (7)**8** : 376-377.

1910. *Atholus silvicola* (Lewis) : Bickhardt, *Coleopt. Cat.*, 8 Pars **24** : 55.

Material Studied : 4exs., Bhowali, 16.iii.2001; 1ex., Khairana, 17.iii.2001; 3exs., Bhujan, 18.iii.2001, Dist. Nainital; 6exs., Batrojkhan W. of Ranikhet, Dist. Almora, 21.iii.2001, ex. "Cow Dung", S.K. Chakraborty & Party Coll; 1ex., Hanuman Chati, Dist. Uttarkashi, 1.xi.2002, and 1ex., Agasthamuni, Dist. Rudraprayag, 7.xi.2004, ex. "Garbage", P. Mukhopadhyay & Party Coll; 1ex., Sonari, Dist. Almora, 26.viii.2005 and 1ex., Khirakot, Dist. Bageswar, 29.viii.2005, S.K. Chatterjee & Party Coll.

Distribution : India : Uttarakhand, Meghalaya (Khasi Hills) and West Bengal.

Remarks : The species appears to be an indigenous species. First time recorded from Uttarakhand.

Genus ***Peranus*** Lewis

1906. *Peranus* Lewis, *Ann. Mag. Nat. Hist.*, (7)**18** : 401.

1909. *Atholister*, Reitter, *Fauna Germanica*, **11** : 286.

1910. *Peranus*, Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 53.

Key to the species of Genus *Peranus* known from the state

1. Smaller in size (4-4.50 mm), frons plane; elytral suture 1-5 entire, sutural shortened, extending beyond the middle, each elytron with a triangular red macula, starting from the humeral margin and reaching to the sutural angle diagonally covering the lateral and apical margin of elytra; mesosternal stria entire; anterior tibia 4 dentate .... *P. bimaculatus* (Linn.)

- Larger species (6-7 mm), frons depressed anteriorly; elytral suture 1-4 entire, 5th shortened before the middle, sutural obsolete, without any spot or macula; mesosternal stria interrupted at middle; anterior tibia 3-dentate ..... *P. maindroni* (Lew.)

9. ***Peranus bimaculatus*** (Linnaeus)

1758. *Hister bimaculatus* Linnaeus, *Syst. Nat.*, ed. XI, p. 358.

1909. *Atholister bimaculatus* (Linnaeus) : Reitter, *Fauna Germanica*, **11** : 286.

1910. *Peranus bimaculatus* (Linnaeus) : Lewis, *Ann. Mag. Nat. Hist.*, (8)**6** : 56.

1910. *Peranus bimaculatus*, Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 53.

Material Studied : 1ex., Jeolikote, Dist. Nainital, 1.iv.2001, ex. "Cow Dung", S.K. Chakraborty & Party Coll.

Distribution : India : Uttarakhand, Andhra Pradesh and Gujrat. Also known from Europe, North America and Argentina.

Remarks : It appears to be an widely distributed species. Recorded for the first time from the state.

10. ***Peranus maindroni*** (Lewis)

1901. *Hister maindroni* Lewis, *Ann. Mag. Nat. Hist.* (7)**7** : 243.

1906. *Peranus maindroni* (Lewis) : Lewis, *Ann. Mag. Nat. Hist.* (7)**18** : 401-402.

1910. *Peranus maindroni*, Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 53.

Material Studied : 8exs., Jeolikote, 1.iv.2001, ex., "Cow Dung" and 4exs., Lalkua, 2.iv.2001, ex., "Horse Dung", all from Nainital Dist., S.K. Chakraborty & Party Coll.

Distribution : Inida : Uttarakhand and Sikkim. Also known from Kurrachi, Pakistan.

Remarks : This is the second record of the species from India as well as first from the state. Sikkim was the first.

Tribe PLATYSOMINI

Key to the genera of the tribe Platysomini of Urrarakhand

1. Small to medium size (2.5mm-4.0mm) beetles, Pygidium triangular, strongly inclined, convex ..... ***Platysoma***

- Medium to large (4.5mm-7.0mm) size beetles, pygidium triangular, not inclined, arched with the external margin ..... ***Platylister***

Genus ***Platylister*** Lewis

1892. *Platylister* Lewis, *Ent. Month. Mag.*, **28** : 103.

1910. *Platylister* Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 19.

11. ***Platylister atratus*** (Erichson)

1834. *Platysoma atratum* Erichson, *In Klug. Jahrb. Ins.* : 110.

1910. *Platylister atratus* (Erichson) : Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 19.

Material Srudied : 2 exs., Narendra nagar, Dist. Tehri Garhwal, 12.xi.2002, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttrakhand, Sikkim, Meghalaya, West Bengal and South India. Also known from Myanmar.

Remarks : This species is recorded for the first time from Uttarakhand.

Genus ***Platysoma*** Leach

1817. *Platysoma* Leach, *Zool. Misc.*, III, P. 77.

1853. *Platysoma*, Marseul, *Ann. Soc. Ent. Fr.*, (3)**1** : 248.

1910. *Platysoma*, Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 19.

12. ***Platysoma brevistriatum*** Lewis

1888. *Platysoma brevistriatum* Lewis, *Ann. Mus. Genova*, (2)**6** : 637.

1910. *Platysoma brevistriatum*, Bickhardt, *Coleopt. Cat.*, 8, Pars **24** : 21.

Material Studied : 1ex., Garur Gaon, Dist. Chamoli, 4.xi.2001, P. Mukhopadhyay & Party Coll.

Distribution : India : Uttarakhand and West Bengal (Darjeeling Dist.). Also known from Burma.

Remarks : Very sparsely distributed species. First time recorded from Uttarakhand.

SUMMARY

The present paper deals with 12 species under 9 genera and 2 subfamilies. All these 12 species are recorded for the first time from the state. Keys to the subfamilies, tribes, genera and species have been provided. Relevant collection data and important references have also been provided under each species. A chart showing district wise occurance of species has also been provided.

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REFERENCES

Bickhardt, H. 1910. Histeridae, *Coleopterorum Catalogus*, Vol. 8, Pars 24, W. Junk & Schenkling edt. : 1-137.

Chakraborty, S.K. and Biswas, S. 2003. *Insecta : Coleoptera, Histeridae, Fauna of Sikkim, State Fauna Series*, **9**(Part-3) : 45-56.

Chakraborty, S.K. 2004. *Insecta : Coleoptera, Histeridae. Fauna of Manipur, State Fauna Series,* **10**(Part-2) : 433-436.

Chakraborty, S.K. 2007. *Insecta : Coleoptera, Histeridae. Fauna of Andhra Pradesh, State Fauna Series,* **5**(Part-3) : 393-401.

Erichson, W.F. 1834. Unberischt der Histeroides, *Klug Jahrb, Insecter Kunde* **1** : 83-208.

Lewis, G. 1888. Histeridae from Burma, *Ann. Mus. Genova,* (2)**6** : 630-645.

Lewis, G. 1892. Histeridae from Burma, *Ann. Mus. Genova,* (2)**12** : 16-39.

Marseul, S.A. 1853. Essai Monographique Sus La Famille des Histerides. *Ann. Soc. Ent. Fr.,* (3)**1** : 131-294.

Pal, T.K. and Biswas, S. 1985. Histeridae Fauna of Namdhapa, Arunachal Pradesh. *Rec. zool. Surv. India,* **82**(1-4) : 129-137.

Paykul, G. 1811. Monographia Histeroidum, Upsaliae, Palmllad, 6, 4 U, 112 u, 2p, 13taf.

Thomson, G.G. 1862. *Scandinaviens Insecter,* Lund 8, 44, 204, 392 P. I Taf., 139 Fig.

S. No.	Name of species	DISTRICTS of Uttarakhand												
		Udham Singh Nagar	Cchampawat	Pittoragarh	Bageshwar	Almorah	Nani-Tal	Hharidwar	Dehra-Dun	Tehri Garhwal	Pauri	Rudraprayag	Chamoli	Uttarkashi
1.	*Paromalus babaulti* (Cooman)									+				
2.	*Platylomalus aceanitis* (Marseul)									+				
3.	*Pachylister Chinensis* (Quens)				+	+						+		
4.	*Santalus orientalis* (Paykul)						+					+		
5.	*Hister pullatus* Erichson					+				+				
6.	*Atholus coelestis* (Marseul)						+					+		
7.	*A. philippinensis* (Marseul)													+
8.	*A. silvicola* (Lewis)				+	+	+					+		+
9.	*Peranus bimaculatus* (Linn.)						+							
10.	*P. maindroni* (Lewis)						+							
11.	*Platylister atratus* (Erichson)									+				
12.	*Platysoma Brevistriatum* Lewis												+	

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 311-321.

INSECTA : COLEOPTERA : SCARABAEIDAE (CETONIINAE, DYNASTINAE AND RUTELINAE)

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INTRODUCTION

The Scarabaeidae is one of the largest family of the order Coleoptera (Insecta), under the Superfamily Scaraboidea. This group is commonly known as "Dung Beetles" Despite their wide availability in India the high altitude and the Himalayan parts are inadequately explored. Most of the species are nocturnal in habit but a few are also diurnal; often they feed upon the plant juices, leaves, flowers, roots and decaying vegetative matters.

Earlier workers like Brenske (1897 and 1898) and Arrow (1910 and 1917) built up the knowledge of fauna on the group Scarabaeidae specially Cetoniinae, Dynastinae and Rutelinae. Subsequently monographical works was published by Miksic (1976 and 1977). More recently some Indian workers Biswas and Chatterjee (1986), Chatterjee and Biswas (1995), Chatterjee (2007), Chandra (1999) added to the knowledge of fauna from various states of India.

Uttarakhand is the northern hilly part of erstwhile Uttar Pradesh State. The present work is based mainly on the collection of material by different survey parties of ZSI in recent times as well as earlier collection of the group in ZSI so as to bring out and updated status of the group from this state.

Altogether 147 examples comprising 44 species under 16 genera belonging to 3 subfamilies are included in this paper of which 6 species are new record from the state. Keys to the subfamilies, genera, species, and synonymes have been provided. Species which has been recorded earlier from U.P. not mentioned here as a new record from this state.

SYSTEMATIC LIST

Family SCARABAEIDAE

Subfamily CETONIINAE

Genus ***Torynorrhina*** Arrow

1. *T. opalina* (Hope)

Genus ***Rhomborrhina*** Hope

2. *R. glaberrima* (Westwood)

Genus ***Heterorrhina*** Westwood

3. *H. mutabilis* (Hope)
4. *H. nigritarsis* (Hope)

Genus ***Anthracophora*** Burmeister

5. *A. crucifera* Olivier
6. *A. dalmanni* (Hope)

Genus ***Cetonia*** Fabricius

7. *C. bensoni* (Westwood)
8. *C. rhododendri* Gestro

Genus ***Protaetia*** Burmeister

9. *P. neglecta* Hope
10. *P. confusa* (Gory & Percheron)
11. *P. alboguttata* (Vigors)

Genus ***Oxycetonia*** Arrow

12. *O. albopunctata* (Fabricius)
13. *O. jucunda* (Faldermann)

Genus ***Chiloloba*** Burmeister

14. *C. acuta* (Wiedemann)

Genus ***Clinteria*** Burmeister

15. *C. spilota* (Hope)
16. *C. klugi* (Hope)

Subfamily DYNASTINAE

Genus ***Xylotrupes*** Hope

17. *X. gideon* (Linnaeus)

Genus ***Eophileurus*** Arrow

18. *E. planatus* (Wiedemann)

Subfamily RUTELINAE

Genus ***Popillia*** Serville

19. *P. cyanea* Hope
20. *P. laevicollis* Kraatz
21. *P. cupricollis* Hope
22. *P. lucida* Newmann
23. *P. sulcata* Redtenbacher
24. *P. pilosa* Arrow

Genus ***Trichanomala*** Arrow

25. *T. fimbriata* (Newmann)

Genus ***Mimela*** Kirby

26. *M. horsfieldi* Hope

Genus ***Anomala*** Samouelle

27. *A. dorsalis* (Fabricius)
28. *A. polita* Blanchard
29. *A. rugosa* Arrow
30. *A. varicolor* (Gyllenthal)
31. *A. tristis* Arrow
32. *A. propinqua* Arrow
33. *A. siliguria* Arrow
34. *A. lineatopennis* Blanchard
35. *A. xanthoptera* Blanchard
36. *A. dimidiate* (Hope)
37. *A. rufiventris* Redtenbacher
38. *A. stoliczkae* Sharp
39. *A. flavipes* Arrow

Genus ***Rhinyptia*** Burmeister

40. *R. meridionalis* Arrow

Genus ***Adoretus*** Castelnau

41. *A. costopilosus* Ohaus
42. *A. bimarginatus* Ohaus
43. *A. lithobius* Ohaus
44. *A. versutus* Harold

SYSTEMATIC ACCOUNTS

Key to the subfamilies

1. Labrum membranous, not visible externally 2

   Labrum thick more or less exposed 3

2. Mandibles not visible externally, front coxae vertical ..... CETONIINAE

   Mandibles visible externally, front coxae transverse ..... DYNASTINAE

3. Claws unequal, separately movable, the shorter one always undivided .... RUTELINAE

Subfamily CETONIINAE

Key to the genera of Subfamily Cetoniinae known from Uttarakhand

1. Sides of the scutellum straight, convex or sinuous 2

   - Sides of the scutellum concaved, apex extremely sharp ..... ***Clinteria*** Burmeister

2. Page of the pronotum in a transverse line 3

   Page of the pronotum not in a transverse line 5

3. Front margin of the clypeus simple 4

   - Front margin of the clypeus notched or toothed ..... ***Heterorrhina*** Westwood

4. Sternal process transverse, dilated in front .. .. ***Torynorrhina*** Arrow

   Sternal process not transverse, not dilated in front ..... ***Rhomborrhina*** Hope

5. Sides of the elytra not distinctly sinuated behind the shoulders .... ***Anthracophora*** Burmeister

   Sides of the elytra distinctly sinuated behind the shoulders 6

6. Sternal process laterally compressed .... ***Cetonia*** Fabricius

   Sternal process broad and flat or absent 7

7. Clypeus elongate, rather broad in front..... ..... ***Protaetia*** Burmeister

   Clypeus elongate, flat and narrow in front .. .. ***Oxycetonia*** Arrow

Genus ***Clinteria*** Burmeister 1842

1842. *Clinteria* Burmeister, *Handb. Ent.*, **3** : 299.

1910. *Clinteria*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 176.

Key to the species of genus *Clinteria* known from Uttarakhand

1. Elytra decorated with numerous irregular markings ..... *spilota* Hope
- Each elytra decorated with 4 or 5 spots..... ..... *klugi* Hope

Clinteria spilota (Hope)

1831. *Cetonia spilota* Hope, *Gray's Zool. Misc.*, P. 25.

1910. *Clinteria spilota*, Arrow, *Fauna Brit. India (Coleoptera :Lamellicornia)*, **1** : 184-185.

Material examined : 3exs., Gun Hill (Mussoorie), 27.ix.2002, Animesh Bal Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, & West Bengal.

Clinteria klugi (Hope)

1831. *Cetonia klugi* Hope, *Gray's Zool. Misc.*, P. 25.

1842. *Clinteria hilaris* Burmeister, *Handb. Ent.*, **3** : 303.

1910. *Clinteria klugi*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 187-188.

Material examined : 5exs.; 3ex., Kausani (Bageshwar Dist.), 27.ix.2004, Maya Ghosh Coll., 1ex., kaddukhal (Tehri Garwal Dist), 18.ix.2002, A. Bal Coll., 1ex., Purola (Uttarkashi), 13.xi.1993, S.K. Chakraborty Coll.

Distribution : INDIA : Uttarakhand, Maharashtra.

Remarks : First time recorded from Uttarakhand.

Genus ***Heterorrhina*** Westwood 1842

1842. *Heterorrhina* Westwood, *Arcana Ent.*, **1** : 132.

1842. *Coryphocera* Burmeister, *Handb. Ent.*, **3** : 220.

1910. *Heterorrhina*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 90.

Key to the species of genus Heterorrhina known from Uttarakhand

1 Mesosternal process short, body short, compact and moderately depressed, pygidium rugose ..... *mutabilis* Hope

Mesosternal process long, body rather long, depressed, pygidium granulose..... ..... *nigritarsis* Hope

Heterorrhina mutabilis (Hope)

1831. *Cetonia mutabilis* Hope, *Gray's Zool. Misc.*, p. 24.

1842. *Heterorrhina hopei* Westwood, *Arcana Ent.*, **1** : 134, pl. 33, fig. 3.

1842. *Heterorrhina bengalensis* Westwood, *Arcana Ent*, **1** : 137, Pl. 35.

1910. *Heterorrhina mutabilis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 91-92.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, West Bengal.

Elsewhere : Bhutan, Nepal.

Heterorrhina nigritarsis (Hope)

1831. *Cetonia nigritarsis* Hope, *Gray's Zool. Miscell.*, P. 24.

1910. *Heterorrhina nigritarsis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 99-100.

Material examined : 2ex, Bhowali (Nainital Dist.), 8.ix.2005, S.K. Chatterjee Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, West Bengal.

Genus ***Torynorrhina*** Arrow 1907

1907. *Torynorrhina* Arrow,*Ann. mag. Nat. Hist.*, (7)**19** : 433.

Torynorrhina opalina (Hope)

1831. *Cetonia opalina* Hope, *Grayls Zool. Misc.*, P. 24.

1910. *Torynorrhina opalina*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 84.

Material examined : 2ex.; 1ex., Taragtal (Almora Dist.), Alt. 5700 ft. 5.x.1958, B.S. Lamba Coll., 1ex., Bhimtal (Nainital Dist) 25.ix.1967, Mus. Coll.

Distribution : INDIA : Uttarakhand, Punjab, Sikkim and West Bengal.

Elsewhere : Nepal.

Genus ***Rhomborrhina*** Hope 1837

1837. *Rhomborrhina* Hope, *Coleop. Man.*, **1** : 120.

1842. *Anomalocera* Westwood, *Arcana Ent.*, **1** : 120.

1910. *Rhomborrhina* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 84.

Rhomborrhina glaberrima (Westwood)

1842. *Anomalocera glaberrima* Westwood, *Arcana Ent.*, **1** : 136, Pl. 34, fig. 1.

1910. *Rhomborrhina glaberrima*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 87.

Material examined : Nil

Distribution : INDIA : Uttarakhand, Punjab and West Bengal

Genus ***Anthracophora*** Burmeister 1842

1842. *Anthracophora* Burmeister, *Handb. Ent.*, **3** : 633.

1910. *Anthracophora*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 109.

Key to the species of genus *Anthracophora* known from Uttarakhand

1 Sternal Process conical, elytra with small sooty patches ..... *crucifera* Olivier

- Sternal process semicircular, elytra decorated with irregular brick-red spots .... *dalmanni* Hope

Anthracophora crucifera Olivier

1789. *Cetonia crucifera* Olivier, *Ent.* **16** : 39, Pl. 5, fig. 29.

1910. *Anthracophora crucifera*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 110-111.

Material examined : 1ex., Garur (Bageswar Dist.), 30.viii.2005, S.K. Chatterjee Coll.

Distribution : INDIA : Uttarakhand, Maharashtra, Karnataka, Orissa and West Bengal

Anthracophora dalmanni (Hope)

1831. *Cetonia dalmanni* Hope, *Gray's Zool. Miscell.*, P. 24.

1849. *Anthracophora bohemani* Westwood, *Trans Ent. Soc. Lond.*, **5** : 149, Pl. 16. fig. 7.

1910. *Anthracophora dalmanni*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 112-113.

Material examined : Nil.

Distribution : INDIA : Uttarakhand & West Bengal

Elsewhere : Nepal.

Genus ***Cetonia*** Fabricius 1775

1775. *Cetonia* Fabricius, *Syst. Ent.*, P. 52.

1894. *Eucetonia* Schoch, *Mitth. Schweiz. Ent. Ges.*, **9** : 211.

1910. *Cetonia*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 132.

Key to the species of genus *Cetonia* known from Uttarakhand

1. Ventral segments not spotted at the posterior angles, a small spot near each lateral angle of the pygidium ..... *bensoni* Westwood

- Ventral segments with lateral white spots, four spots along the base of the pygidium .... *rhododendri* Gestro

Cetonia bensoni (Westwood)

1849. *Protaetia bensoni* Westwood, *Trans. Ent. Soc. Lond.*, P. 145, Pl. 16, fig. 3.

1910. *Cetonia bensoni*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 132-133.

Material examined : 2ex.; 1ex. , Binsar (Almora Dist.) Alt. 2319 m., 18.v.1962, G.S. Roonwal Coll., 1ex., Nainital (Nainital Dist.), v-vi.1893, Lucknow Mus. Coll.

Distribution : INDIA : Uttarakhand, Punjab.

Cetonia rhododendri Gestro

1891. *Cetonia rhododendri* Gestro, *Ann. Mus. Genova*, (2)**10** : 847.

1898. *Eucetonia assamica* Schoch, *Mitth. Schweiz. Ent. Ges.*, **10** : 181.

1910. *Cetonia rhododendri*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)* **1** : 134-135.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, West Bengal, Meghalaya.

Elsewhere : Myanmar, Thailand.

Remarks : The species name was given by first describer Gestro on the basis of the specimen collected from Rhododendron flowers in Myanmar.

Genus ***Protaetia*** Burmeister 1842

1842. *Protaetia* Burmeister, *Handb. Ent.* **3** : 472.

1881. *Eumimimetica* Kraatz, *Deutsche Ent. Zeitschr*, P. 264.

1910. *Protaetia*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 136-137.

Key to the species of the genus *Protaetia* known from Uttarakhand

1. Mesosternum transverse before the coxae, elytra rugosely punctured ..... *neglecta* Hope
- Mesosternum produced narrow but dilated at the middle coxae ..... 2.
2. Body smoky-black, not metallic .... *confusa* Gory & Percheron
- Body metallic green or deep blue ....*alboguttata* Vigors

Protaetia neglecta Hope

1831. *Cetonia neglecta* Hope, *Gray's Zool. Miscellany*, p. 24.

1910. *Protaetia neglecta*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 164-166.

Material examined : 5exs; 3exs., Nainital (Nainital Dist.) v-vi.1893, Lucknow, Mus. Coll., 1ex., Klarl (Nainital Dist.), 24.v.1909, Mus. Coll., 1ex., Almora (Almora Dist.), 15.viii.1911, C. Palva Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, Manipur & West Bengal.

Elsewhere : Nepal.

Protaetia confusa (Gory & Percheron)

1833. *Cetonia confusa* Gory & Percheron, *Monogr. Cet.*, P. 266, Pl. 51, fig. 4.

1910. *Protaetia confusa*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 161-162.

Material examined : Nil.

Distribution : INDIA : Uttarakhand.

Protaetia alboguttata (Vigors)

1826. *Cetonia alboguttata* Vigors, *Zool. Journ.*, **2** : 238, Pl.9., fig. 3.

1842. *Cetonia saundersi* Bainb., *Trans. Ent. Soc. London*, P. 219.

1910. *Protaetia alboguttata*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 162-163.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Maharashtra, Karnataka & Jharkhand.

Elsewhere : Sri Lanka.

Genus ***Oxycetonia*** Arrow 1910

1842. *Gametis* Burmeister, *Handb. Ent.*, **3** : 398.

1910. *Oxycetonia* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 163-164.

Key to the species of genus *Oxycetonia* known from Uttarakhand

1. Upper surface not setose, sides of pronotum not densely strigose ....*albopunctata* (Fabricius)
- Upper surface setose, sides of pronotum densely strigose .....*jucunda* Faldermann

Oxycetonia albopunctata (Fabricius)

1798. *Cetonia albopunctata* Fabricius, *Ent. Syst. Suppl.*, P. 129.

1910. *Oxycetonia albopunctata*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 166-167.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Bihar & West Bengal.

Elsewhere : Bangladesh and Myanmar.

Oxycetonia jucunda (Faldermann)

1835. *Cetonia jucunda* Faldermann, *Mem., Pres. a l Acad. Sci. st. Petersb.* **2** : 386, Pl.4, fig. 4 & 5.

1910. *Oxycetonia jucunda*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **1** : 168-170.

Material examined : 3exs; 2exs., Bhatwari (Uttarkasi Dist), 16.v.2002, S.K. Chakraborty Coll., 1ex., Agasthamuni (Rudraprayag), 07.x.2004, P. Mukhopadhyay Coll.

Distribution : INDIA : Uttarakhand, Meghalaya, Manipur & West Bengal.

Elsewhere : China, Japan.

Remarks : First time recorded from Uttarakhand.

Genus ***Chiloloba*** Burmeister 1842

1842. *Chiloloba* Burmeister, *Handb. Ent.*, **3** : 501.

1910. *Chiloloba*, Arrow, *Fauna Brit India (Coleoptera : Lamellicornia)*, **1** : 171.

Chiloloba acuta (Wiedemann)

1823. *Cetonia acuta* Wiedemann, *Zool. Mag.*, 2(1) : 87

1910. *Chiloloba acuta*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, 1 : 172.

Material examined : 4exs; 3exs., Garur (Bageshwar Dist.), 30.viii.2005, 1ex., Goaldam (Chamoli Dist.), 01.ix.2005, S.K. Chatterjee Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, Maharashtra, Madhya Pradesh, Punjab, Karnataka & West Bengal.

Subfamily DYNASTINAE

Key to the genera of subfamily Dynastinae known from Uttarakhand

1. Basal joint of hind tarsus similar to those succeeding ..... ***Xylotrupes*** Hope

- Basal joint of hind tarsus more or less triangular ..... ***Eophileurus*** Arrow

Genus ***Xylotrupes*** Hope 1837

1837. *Xylotrupes* Hope, *Coleopterist's manual*, 1 : 19.

1910. *Xylotrupes*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, 1 : 262.

Xylotrupes gideon (Linnaeus)

1767. *Scarabaeus gideon* Linnaeus, *Syst. Nat.* 1(2) : 541.

1859. *Xylotrupes australicus* Thomson, *Arcana Nat.*, P. 18.

1910. *Xylotrupes gideon*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, 1 : 262-265.

Material examined : 2exs.; 1ex., Guptakashi (Rudraprayag Dist.) 2.vii.2004, S.K. Chakraborty Coll., 1ex., Nainital (Nainital Dist.), 6.ix.2005, S.K. Chatterjee Coll.

Distribution : INDIA : Uttarakhand, Meghalaya, Maharashtra, Tamilnadu, West Bengal.

Elsewhere : Srilanka.

Remarks : First time recorded from Uttarakhand.

Genus ***Eophileurus*** Arrow 1908

1908. *Eophileurus* Arrow, *Trans. Ent. Soc. Lond.* P. 332.

Eophileurus planatus (Wiedemann)

1823. *Geotrupes planatus* Wiedemann, *Zool. Mag.*, 2(1) : 5.

1910. *Eophileurus planatus*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, 1 : 288-289.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Manipur, Nagaland, West Bengal and Andaman & Nicobar Island.

Elsewhere : Bangladesh and Myanmar.

Subfamily RUTELINAE

Key to the genera of subfamily Rutelinae known from Uttarakhand

1. Antennae 9 jointed, elytra with membranous margins, labrum not produced downwards 2

   Antennae 10 jointed, elytra without membranous margins, labrum produced downwards ..... ***Adoretus*** Castelnau

2. Clypeus not produced into truncate rostrum 3

   Clypeus produced into truncate rostrum .... ***Rhinyptia*** Burmeister

3. Pronotum excised before the scutellum .... ***Popillia*** Serville

   Pronotum not excised before the scutellum. 4

4. Mesosternal epimera interposed between the prothorax and elytra .... ***Trichanomala*** Arrow

   Mesosternal epimera not interposed between the prothorax and elytra 5

5. Prosternum strongly elevated and bent abruptly forward ..... ***Mimela*** Kirby

   Prosternum rarely elevated and never bent abruptly forward ..... ***Anomala*** Samouelle

Genus ***Rhinyptia*** Burmeister 1844

1844. *Rhinyptia* Burmeister, *Handb. Entom.*, 4(1) : 227.

Rhinyptia meridionalis Arrow

1917. *Rhinyptia meridionalis* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, 2 : 271-272.

Material examined : 1ex., Dehra Dun (Dehra Dun Dist.), Ind. Mus. Coll.

Distribution : INDIA : Uttarakhand.

Elsewhere : Bangladesh.

Genus *Popillia* Serville 1825

1825. *Popillia* Serville, *Encycl. Meth.*, **10** : 367.

1917. *Popillia* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 58-59.

Key to the species of genus *Popillia* known from Uttarakhand

1. Pronotum without hair above 2
- Pronotum more or less hairy 4
2. Pygidium without hairs ..... *cyanea* Hope
- Pygidium decorated with pale hairs, generally in two patches 3
3. The four inner elytral striae entire, similar and equidistant ..... *laevicollis* Kraatz
- Second elytral stria more or less disrupted .. .. *cupricollis* Hope
4. Hair confined to the sides of the pronotum ..... *lucida* Newmann
- hair not confined to the sides of the pronotum 5
5. Pygidium without basal hair patches .... *sulcata* Redtenbacher

Pygidium with basal hair patches .... *pilosa* Arrow

Popillia cyanea Hope

1831. *Popillia cyanea* Hope, *Gray's Zool. Miscell.*, P. 23.

1910. *Popillia cyanea*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 62-63.

Material examined : 36exs; chalti (Champawat Dist), 16.ix.2004, 2exs., Pandar (Pithoragarh Dist), 21.ix.2004, 1ex., Barakot, Loha Ghat (Champawat Dist.), 20.ix.2004, all collected B. Mitra, exs., Almora F.R.H. (Almora Dist.), 23.viii.2005, 4ex., Binsar (Almora Dist.), 25.viii.2005, 1ex., Gananath (Almora Dist.), 27.viii.2005, 4ex., Garur (Bageshwar Dist.), 30.viii.2005, 2ex., Garur (Bageshwar Dist.), 30.viii.2005, 11ex., Goaldam (Chamoli Dist.), 2ex., Jhaltola (Pithoragarh Dist.), 03.ix.2005, 3ex., Bhimtal(Nainital Dist.) all collected S.K. Chatterjee.

Distribution : INDIA : Uttarakhand, Nagaland, Meghalaya, Kashmir, Punjab and West Bengal.

Elsewhere : Nepal.

Popillia laevicollis Kraatz

1892. *Popillia laevicollis* Kraatz, *Deutsche Ent. Zeits.*, P. 275.

1910. *Popillia laevicollis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 71.

Material examined : 1ex., pacholi (Pithoragarh Dist.), 22.ix.2004, B. Mitra Coll.

Distribution : INDIA : Uttarakhand, Meghalaya, Sikkim & West Bengal.

Elsewhere : Bhutan & Myanmar.

Remarks : First time recorded from Uttarakhand.

Popillia cupricollis Hope

1831. *Popillia cupricollis* Hope, *Gray's Zool. Miscell.*, P. 23.

1910. *Popillia cupricollis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 73-74.

Material examined : 32exs.; 8exs., Binsar (Almora Dist.), 25.viii.2005, 4exs., Garur (Bageshwar Dist.), 30.viii.2005, all collected S.K. Chatterjee, 3ex., Kousani (Bageshwar Dist.) 18-22.x.2001, R.C. Basu Coll., 1ex., Joop (Champawat Dist.), 1ex., Dhan (Champawat Dist.), 1ex., Ketchura (Champawat Dist.), 14-15.ix.2004, all collected B. Mitra, 4exs., Chauki (Champawat Dist.),16.ix.2004, 2ex., Pandar (Pithoragarh Dist.), 21.ix.2004, 1ex., Panchali (Pithoragarh Dist.),22.ix.2004, all collected B.Mitra, 4exs., Bageshwar (Bageshwar Dist.), 02.ix.2005, 2ex., Gangolihat (Pithoragarh Dist.), 05.ix.2005, 1ex., Bhimtal (Nainital Dist.)., All collected by S.K. Chatterjee

Distribution : INDIA Uttarakhand, Assam, Himachal Pradesh, Punjab, Sikkim & West Bengal.

Elsewhere : Nepal.

Popillia lucida Newmann

1838. *Popillia lucida* Newmann, *Mag. Nat. Hist.*, **2**(2) : 377.

1910. *Popillia lucida*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 81-82.

Material examined : 1ex., Goaldam (Chamoli Dist.), 01.ix.2005, S.K.Chatterjee. Coll.

Distribution : INDIA : Uttarakhand & Tamilnadu.

Remarks : First time recorded from Uttarakhand.

Popillia sulcata Redtenbacher

1848. *Popillia sulcata* Redtenbacher, *Hiigel's Kaschmir*, 4(2) : 527.

1917. *Popillia sulcata*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), **2** : 89.

Material examined : 2exs.; 1ex., Mussoorie (Dehradun Dist.),19.ix.1914, ex., Kousani (Bageshwar Dist.), 29.vii.1914, Tytler Coll.

Distribution : INDIA : Uttarakhand and Jammu & Kashmir.

Popillia pilosa Arrow

1913. *Popillia pilosa* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 90.

Material examined : 3ex., Dehradun (Dehradun Dist.), Ind. Mus. Coll.

Distribution : INDIA : Uttarakhand.

Genus ***Trichanomala*** Arrow 1917

1917. *Popillia fimbriata* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 95.

Trichanomala fimbriata (Newmann)

1841. *Popillia fimbriata* Newmann, *Trans ent Soc. Lond.*, **3** : 47.

1917. *Trichanomala fimbriata*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 95-96.

Material examined : 1ex., Dehradun (Dehradun Dist.), Ind. Mus. Coll.

Distribution : INDIA : Uttarakhand & Sikkim

Genus ***Mimela*** Kirby 1825

1825. *Mimela* Kirby, *Trans. Linn. Soc.*, **14** : 101.

1917. *Mimela*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 102-103.

Mimela horsfieldi Hope

1836. *Mimela horsfieldi* Hope, *Trans, ent. Soc. Lond.* **1** : 114.

1917. *Mimela horsfieldi*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 110-111.

Material examined : 2exs., Kousani (Bageshwar Dist.), 6075 ft., 22.vii.1914, Tytler Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, Meghalaya & West Bengal.

Genus ***Anomala*** Samouelle 1819

1819. *Anomala* Samouelle, *The Entomologist's Useful Companion*, p. 191.

1863. *Philloperthina* Motschulsky, *Bull. Soc. Ent. Mosc.*, **2** : 468.

1917. *Anomala*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 126-127.

Key to the species of genus *Anomala* known from Uttarakhand

1. Mesosternum without an intercoxal process 2

   Mesosternum produced between the middle coxae ..... *flavipes* Arrow

2. Clypeus of the male with sharp front angles, elytra of the female angularly dilated ..... *dorsalis* (Fabricius)

   Clypeus of male with rounded or obtuse front angles, elytra of female not angularly dilated 3

3. Base of pronotum completely margined 4

   - Base of the pronotum not completely margined 9

4. Non-metallic, front tibia tridentate 5

   Metallic, front tibia bidentate 8

5. Large, elongate, elytra not sulcate, not strongly punctured ..... *polita* Blanchard

   Smaller, elytra sulcate or strongly punctured 6

6. Elytra closely sculptured ..... *rugosa* Arrow

   Elytra not closely sculptured 7

7. Larger dark patches upon the pronotum coalescing before reaching the base ..... *varicolor* Gyllenthal

   - Smaller dark patches on the pronotum not coalescing before reaching the base ..... *tristis* Arrow

8. Metasternum entirely clothed with thick hair ..... *propinqua* Arrow

   Metasternum not entirely clothed with thick hair ..... *siliguria* Arrow

9. Elytra showing strongly marked striae or lines of punctures ..... *lineatopennis* Blanchard

- Elytra without strongly marked grooves or lines of punctures 10

10. Elytra densely sculptures .... *xanthoptera* Blanchard

- Elytra very smooth and shining, finely punctured 11

11. Upper surface of the body green .... *dimidiate* Hope

- Upper surface of the body dark coppery .... *rufiventris* Redtenbacher

Anomala dorsalis (Fabricius)

1775. *Melolontha dorsalis* Fabricius, *Syst. Ent.*, P. 35.

1844. *Anomala dorsalis* Burmeister, *Handb. Ent.*, 4(1) : 232.

1917. *Anomala dorsalis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 136-137.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Assam, Bihar, Punjab, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Kerala, West Bengal and Andaman Island.

Anomala polita Blanchard

1851. *Anomala polita* Blanchard, *Cat. Col. Ent. Mus. Paris*, P. 182.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Uttar Pradesh, Maharashtra, Bihar & Meghalaya.

Anomala rugosa Arrow

1899. *Anomala rugosa* Arrow, *Trans. ent. Soc. Lond.*, p. 263.

Material examined : 1ex., Bhagirathi van Gular (Tehri Garhwal Dist.), 19.v.2002, S.K. Chakraborty Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh & West Bengal.

Elsewhere : Nepal

Anomala varicolor (Gyllenthal)

1817. *Melolontha varicolor* Gyllenthal, *Schonh, Syn. Ins*, **1**(3) : 114.

1917. *Anomala varicolor*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 152-153.

Material examined : 7ex.; 5ex., Raiwalla (Dehra Dun Dist.), 20.v.2002, 2ex., Narendra Nagar (Tehri Garhwal Dist.), 21.v.2002, all collected S.K. Chakraborty.

Distribution : INDIA : Uttarakhand, Karnataka, TamilNadu, Bihar & West Bengal.

Elsewhere : Sri Lanka.

Anomala tristis Arrow

1917. *Anomala tristis* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 158-159.

Material examined : Nil.

Distribution : INDIA : Uttarakhand & West Bengal.

Anomala propinqua Arrow

1912. *Anomala propinqua* Arrow, *Ann. mag. Nat. Hist.*, (8)**9** : 77.

Material examined : 1ex., Nainital (Nainital Dist.), v-vi.1893, Lucknow Mus. Coll.

Distribution : INDIA : Uttarakhand, & West Bengal.

Elsewhere : Bangladesh.

Anomala siliguria Arrow

1917. *Anomala siliguria* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 188-189.

Material examined : Nil.

Distribution : INDIA : Uttarakhand & West Bengal.

Anomala lineatopennis Blanchard

1851(1850). *Anomala lineatopennis* Blanchard, *Cat. Coll. Ent. Mus. Paris*, P. 191.

1917. *Anomala lineatopennis*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 212-213.

Material examined : 10exs.; 4ex., Uttarkashi F.R.H. Campus (Uttarkashi Dist.), 05.v.2002, 1ex., Dharasu (Uttarkashi Dist.), 05.v.2002, 1ex., Bhagirithi van Gular (Tehri Garhwal Dist.), 19.v.2002, 4ex., Kotbangla F.R.H. Campus (Uttarkashi Dist.), 06.v.2002, all collected S.K. Chakraborty.

Distribution : INDIA : Uttarakhand, Himachal Pradesh & West Bengal.

Elsewhere : Bhutan & Nepal.

Anomala xanthoptera Blanchard

1851. *Anomala xanthoptera* Blanchard, *Cat. Coll. Ent. Mus. Paris*, P. 195.

1917. *Anomala xanthoptera*, Arrow, *Fauna Brit. India (Coleoptera: Lamellicornia)*, **2** : 224-225.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Himachal Pradesh & West Bengal

Anomala dimidiata (Hope)

1831. *Euchlora dimidiata* Hope, *Gray's Zool. Misc.*, P. 23.

1917. *Anomala dimidiata*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 232-233.

Material examined : 3exs., Nainital (Nainital Dist.), Ind. Mus. Coll.

Distribution : INDIA : Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Manipur & West Bengal.

Elsewhere : Nepal.

Anomala rufiventris Redtenbacher

1848. *Anomala rufiventris* Redtenbacher, *Hiigel's Kaschmir*, **4**(2) : 526.

1917. *Anomala rufiventris*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 236-237.

Material examined : 9exs, 4ex., Phata (Rudraprayag Dist.), 30.vi.2004, 2exs., Trijuginarayan (Rudraprayag Dist.), 10.vii.2004, 2exs., Gaurikund (Rudraprayag Dist.), 28.vi.2004, 1ex., Helong (Chamoli Dist.), 07.vii.2004, all collected S.K. Chakraborty.

Distribution : INDIA : Uttarakhand, Meghalaya, Manipur, Sikkim & West Bengal.

Elsewhere : Bhutan

Anomala stoliczkae Sharp

1873. *Anomala (Calistethus) stoliczkae* Sharp, *Journ. Roy, Asiatic Soc. Bombay*, **47**(2) : 173.

1917. *Anomala stoliczkae*, Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 243-244.

Material examined : 2exs.; 1ex., Gaurikund (Rudraprayag Dist.), 28.vi.2004, 1ex., Khaukra (Pauri Dist.), 27.vi.2004, all collected S.K. Chakraborty.

Distribution : INDIA : Uttarakhand, U.P., Punjab & West Bengal.

Elsewhere : West China, Tibet.

Remarks : First time recorded from Uttarakhand.

Anomala flavipes Arrow

1917. *Anomala flavipes* Arrow, *Fauna Brit. India (Coleoptera : Lamellicornia)*, **2** : 266-267.

Material examined : Nil.

Distribution : INDIA : Uttarakhand.

Genus *Adoretus* Castelnau

1840. *Adoretus* Castelnau, *Hist. Nat. Ins.*, **2** : 142.

1917. *Adoretus*, Arrow, *Fauna Brit. India(Coleoptera : Lamellicornia)*, **2** : 295.

Key to the species of Genus *Adoretus* known from Uttarakhand

1. Outer edge of the front tibia serrated in the basal part ..... *costopilosus* Ohaus

   Outer edge of the front tibia not serrated in the basal part 2

2. Abdomen with a continuous carina coinciding with the outer margins of elytra .... *bimarginatus* Ohaus

   Abdomen without a continuous carina coinciding with outer edge of the elytra 3

3. Upper surface shining, very thinly sprinkled with minute setae ..... *lithobius* Ohaus

   - Upper surface closely clothed and not shining above ..... *versutus* Harold

Adoretus costopilosus Ohaus

1914. *Adoretus costopilosus* Ohaus, *Deutsche Ent. Zeits.*, P. 506.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Punjab, Andaman Island & West Bengal.

Elsewhere : Bangladesh & Myanmar.

Adoretus bimarginatus Ohaus

1914. *Adoretus bimarginatus* Ohaus, *Deutsche Ent. Zeits.*, P. 480.

Material examined : 1ex., Nainital (Nainital Dist.), Mus. Coll.

Distribution : INDIA : Uttarakhand, Bihar, Orissa & West Bengal.

Adoretus lithobius Ohaus

1851. *Adoretus lithobius* Ohaus, *Deutsche Ent. Zeits.*, P. 485.

Material examined : Nil.

Distribution : INDIA : Uttarakhand.

Elsewhere : Pakistan.

Adoretus versutus Harold

1869. *Adoretus versutus* Harold, *Col. Hefte.*, **5** : 124.

1900. *Adoretus bangalorensis* Brenske, *Ind. Mus. Notes*, (5) : 38.

1917. *Adoretus versutus*, Arrow, *Fauna Brit. India (Coleoptera: Lamellicornia)*, **2** : 350-351.

Material examined : Nil.

Distribution : INDIA : Uttarakhand, Bihar, Tamil Nadu, Madhya Pradesh & West Bengal.

Elsewhere : Sri Lanka, Malaysia, Myanmar.

SUMMARY

The paper deals with 44 species under 16 genera and 3 subfamilies viz. Cetoniinae, Dynastinae and Rutelinae of Lamellicorn beetles from Uttarakhand. Only 6 species have been recorded for the first time from this state. Keys to the subfamilies, genera and species have also been provided.

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REFERENCES

Arrow, G.J. 1910. *The fauna of Brit. India.*, including *Ceylon and Burma, Coleoptera, Lamellicornia (Cetoniinae and Dynastinae)*, **1** : 1-322, Pl. ii (Taylor and Francis), London.

Arrow, G.J. 1917. *The fauna of Brit. India.*, including *Ceylon and Burma, Coleoptera, Lamellicornia (Rutelinae, Desmonycinae and Euchirinae)*, **2** : 1-387, Pl. v (Taylor and Francis), London.

Brenske, E. 1897. *Die serica Arten der Erde. Berliner Entomol. Zeitschr*, **42**(3 & 4) : 345-438.

Brenske, E. 1898. *Die serica Arten der Erde. Berliner Entomol. Zeitschr*, **43** : 205-404.

Biswas, S. and Chatterjee, S.K.1986. Silent Valley, Kerala India, *Rec. Zool. Surv. India Kolkata* : **84**(1-4) : 79-96.

Chatterjee, S.K. and Biswas, S. 1995. The Fauna of West Bengal, Coleoptera : Scarabaeidae, *Zool. Surv. India State Fauna ser.*, **3**(6a) : 363-447.

Chatterjee, S.K. 2007. The Fauna of Andhra Pradesh, Coleoptera : Scarabaeidae, *Zool. Surv. India, State Fauna Ser.*, **5**(3) : 461-478.

Miksic, R. 1976. Monographic der Cetoniinae der Palaearktischen und Orientalischen region, Coleoptera : Lamellicornia, **1** : 1-444.

Miksic, R. 1977. Monographic der Cetoniinae der Palaearktischen und Orientalischen region, Coleoptera : Lamellicornia, **2** : 1-400.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 323-334.

INSECTA : COLEOPTERA : POLYPHAGA : HYDROPHILOIDEA : HYDROPHILIDAE

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INTRODUCTION

Of the 9 families of aquatic Coleoptera belonging to the suborder Polyphaga, the members of the family Hydrophilidae: Hydrophiloidea are commonly known as "Water Scavanger beetles" and majority of which are truly aquatic. Some of them are terrestrial and found in moist places like dung, decaying moist banana sheath, vegetable garbage, under crevices of oozing trunk and such other places also.

The major workers who dealt the family Hydrophilidae are Knisch (1924), Crowson (1981), Lawrence (1982), Sharp (1890), Regimbartia (1903), Champion (1920), d' Orchymont (1928), Balfour Browne (1928) and recently Schedl (1992-95), Bameul (1993), Biswas & Mukhopadhyay (1995), Mukhopadhyay & Sengupta (2003-2004) etc.

Knisch (1924) divided the family Hydrophilidae into 8 subfamilies viz. Hydraeninae, Limnebiinae, Spercheinae, Helophorinae, Epimetopinae, Hydrochinae, Sphaeridiinae and Hydrophilinae. Prior to the study, 33 spp under 11 genera belonging to 5 subfam. viz. Hydraeninae, Limnibiinae, Apimetopinae, Sphaeridiinae and Hydrophilinae were known from Uttarakhand (which was earlier in Uttar Pradesh). Present study added 18 spp. under 11 genera belonging to the subfamilies viz. Sphaeridiinae and Hydrophilinae.

Present study is based on the collection made by different parties of Zoological Survey of India including the reported species made by earlier workers and not available with the collection to get an upto date account of Scavanger beetles (Hydrophilidae) from Uttarakhand. No keys has been provided here as keys to the subfamilies, tribes and genera have already been provided by the authors in their earlier works e.g. on the Fauna of West Bengal, Meghalaya, Tripura, Sikkim, Manipur etc.

SYSTEMATIC LIST

Family HYDROPHILIDAE
Subfamily HYDRAENINAE
Genus ***Ochthebius*** Leach, 1815
Subgenus ***Asiobates*** Thomson

1. *Ochthebius (Asiobates) kosiensis* Champ.
2. *Ochthebius (Asiobates) jagthanae* Champ.

Subgenus ***Hymenodes*** Muls

3. *Ochthebius (Hymenodes) nitidipennis* Champ.
4. *Ochthebius (Hymenodes) opacipennis* Champ.
5. *Ochthebius (Hymenodes) rivalis* Champ.
6. *Ochthebius (Hymenodes) scintillans* Champ.
7. *Ochthebius (Hymenodes) sexfoveatus* Champ.
8. *Ochthebius (Hymenodes) strigosus* Champ.
9. *Ochthebius (Hymenodes) foveolatus* Germer

Subgenus ***Bothochius*** Rey

10. *Ochthebius (Bothochius) nobilis* Villa

Genus ***Hydraena*** Kugel, 1794
Subgenus ***Hydraena*** s. str., Stierlin

11. *Hydraena (Hydraena) bihamata* Champ.
12. *Hydraena (Hydraena) cirrata* Champ.

Subgenus ***Hadrenya*** Rey

13. *Hydraena (Hydrenya) maculicollis* Champ.

Genus ***Laeliaena*** J. Sahlb., 1899-1900 (1900)

14. *Laeliaena sahlbergi* Champ

Subfamily LIMNEBIINAE
Genus ***Limnebius*** Leach, 1815

15. *Limnebius almoranus* Knisch
16. *Limnebius distinctus* Knisch
17. *Limnebius singularis* Knisch

Subfamily EPIMETOPINAE
Genus ***Epimetopus*** Lacord., 1854

18. *Epimetopus asperatus* Champ.

Subfamily SPHAERIDIINAE
Tribe SPHAERIDIINI d'Orchym
Genus ***Coelostoma*** Brulle, 1835

19. *Coelostoma horni* Regimbart.
20. *Coelostoma stultum* Walk.

Genus ***Dactylosternum*** Wollaston, 1854

21. *Dactylosternum hydrophiloides* M'Leay

Genus ***Sphaeridium*** F., 1775

22. *Sphaeridium cameroni* d'Orchymont
23. *Sphaeridium quinquemaculatum* F.
24. *Sphaeridium dimidiatum* Gory in Guer.

Tribe CERCYONINI d'Orchym, 1919
Genus ***Cercyon*** Leach,1817
Subgenus ***Cercyon*** s. str. Ganglb

25. *Cercyon (Cercyon) maindroni* Reg.
26. *Cercyon (Cercyon) uniformis* Sharp

Genus ***Oosternum*** Sharp,1882

27. *Oosternum costatum* Sharp

Genus ***Psalitrus*** d'Orchym., 1919

28. *Psalitrus championi* d'Orchym.

Tribe MEGASTERNINI d'Orchym., 1919
Genus ***Noteropagus*** d'Orchym., 1919

29. *Noteropagus politus* d'Orchym.

Subfamily HYDROPHILINAE
Tribe HYDROBIINI Lec., 1861
Subtribe HYDROBIAE d' Orchym., 1919
Genus ***Laccobius*** Er., 1837
Subgenus ***Laccobius*** s. str. Ganglb

30. *Laccobius (Laccobius) gracilis* Motsch.
31. *Laccobius (Laccobius) simulans* d'Orchym.
32. *Laccobius (Laccobius) orientalis* Knisch
33. *Laccobius (Laccobius) imperialis* Knisch
34. *Laccobius (Laccobius) patruelis* Knisch
35. *Laccobius (Laccobius) regalis* Knisch
36. *Laccobius (Laccobius) affinis* Knisch
37. *Laccobius (Laccobius) championi* Knisch
38. *Laccobius (Laccobius) hingstoni* d'Orchymont
39. *Laccobius (Laccobius) argillaceus* J. Sahlb
40. *Laccobius (Laccobius) sublaevis* J. Sahlb.

Subtribe HELOCHARAE d'Orchym.,1919
Genus ***Helochares*** Muls., 1844
Subgenus ***Hydrobaticus*** M'Leay, 1873

41. *Halochares (Hydrobaticus) lentus* Sharp
42. *Halochares kempi* d' Orchym.
43. *Halochares pauculus* Knisch
44. *Halochares (Hydrobaticus) anchoralis* Sharp

Genus ***Enochrus*** Thomson, 1859
Subgenus ***Lumetus*** Zaitz

45. *Enochrus (Lumetus) esuriens* (Walk)
46. *Enochrus (Lumetus) rubrocinctus* (Reg.)
47. *Enochrus (Lumetus) tetraspilus* (Reg.)

Tribe HYDROPHILINI Lec.,1861
Genus ***Sternolophus*** Sol., 1834
Subgenus ***Sternolophus s. str.*** Zaitz., 1908 (1909)

48. *Sternolophus (s.str.) rufipes* (Fabricius)

Genus ***Hydrous*** Leach, 1815
Subgenus ***Hydrous s.str.*** Kuw

49. *Hydrous (Hydrous s.str.) senegalensis* Percheron

Tribe BEROSINI Bedel, 1881
Genus ***Berosus*** Leach, 1817
Subgenus ***Enoplurus*** Hope, 1838

50. *Berosus (Enoplurus) indicus* Motsch

Subgenus ***Berosus*** s. str. Hope

51. *Berosus (Berosus s. str.) pulchellus* M'Leay

Genus ***Regimbartia*** Zaitz., 1908

52. *Regimbartia attenuata* F.

SYSTEMATIC ACCOUNT

Family HYDROPHILIDAE
Subfamily HYDRAENINAE
Genus ***Ochthebius*** Leach, 1815

1815. *Ochthebius* Leach *in Brewster's Edinb. Enc.*, **9** : 95.

1924. *Ochthebius* : Knisch, *Col. Cat.*, **14** (Pars 79) : 7-32.

Subgenus ***Asiobatus*** Thoms

1859. *Ochthebius (Asiobates)* Thoms., *Skand. Col.*, **1** : 15.

1. ***Ochthebius (Asiobates) jagthanae*** Champ

1921. *Ochthebius (Asiobates) jagthanae* Champ., *Ent. Monthly Mag.*, **57** : 178.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon) Bodiar : Haldwani.

2. ***Ochthebius (Asiobates) kosiensis*** Champ

1920. *Ochthebius (Asiobates) kosiensis* Champ., *Ent. Monthly Mag.*, **56** : 169.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon) W. Almora.

Subgenus ***Hymenodes*** Muls

1844. *Ochthebius (Hymenodes)* Muls., Palp., pp. 68.

3. ***Ochthebius (Hymenodes) nitidipennis*** Champ

1920. *Ochthebius (Hymenodes) nitidipennis* Champ., *Ent. Monthly Mag.*, **56** : 166.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon) W. Almora.

5. ***Ochthebius (Hymenodes) opacipennis*** Champion

1920. *Ochthebius (Hymenodes) opacipennis* Champion, *Ent. Monthly Mag.*, **56** : 167.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora).

6. ***Ochthebius (Hymenodes) rivalis*** Champ

1920. *Ochthebius (Hymenodes) rivalis* Champ., *Ent. Monthly Mag.*, **56** : 166.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon: River Sarda Gonge).

7. ***Ochthebius (Hymenodes) scintillans*** Champ.

1920. *Ochthebius (Hymenodes) scintillans* Champ., *Ent. Monthly Mag.*, **56** : 168.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora).

8. ***Ochthebius (Hymenodes) sexfoveatus*** Champ

1920. *Ochthebius (Hymenodes) sexfoveatus* Champ., *Ent. Monthly Mag.*, **56** : 165.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora, Ranikhet).

9. ***Ochthebius (Hymenodes) strigosus*** Champ

1921. *Ochthebius (Hymenodes) strigosus* Champ., *Ent. Monthly Mag.*, **57** : 177.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon Ranikhet).

10. ***Ochthebius (Hymenodes) foveolatus*** Germer

1824. *Ochthebius (Hymenodes) foveolatus* Germer, *Ins. Spec. nov.*, p. 90.

Material examined : No material available for study.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora, Ranikhet)

Elsewhere : Middle Europe, Italy, Balkan, Kaukasus

Subgenus ***Bothochius*** Rey

1885(1886). *Ochthebius (Bothochius)* Rey, *Palp. in Ann. Soc. Linn. Lyon.*, **32** : 153.

11. ***Ochthebius (Bothochius) nobilis*** Villa

1835. *Ochthebius (Bothochius) nobilis* Villa, *Col. Eur. Dupl.* (2) : 48.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora, Ranikhet, Tanakpur, River Sarda George).

Elsewhere : Italy, Alpen, Naxos, Balkan.

Genus ***Hydraena*** Kugel, 1794

1794. *Hydraena* Kugel *in Schneid Mag.*, **5** : 579.

1924. *Hydraena* : Knisch, *Col. Cat.*, **14** (part 79) : 33-51.

Subgenus ***Hydraena,*** s.str., Stierlin

1900. *Hydraena (Hydraena s.str.)* Stierlin, *Col. Helv.*, p. 230.

12. ***Hydraena (Hydraena) bihamata*** Champ

1920. *Hydraena (Hydraena) bihamata* Champ., *Ent. Monthly Mag.*, **56** : 70.

Material examined : Not seen.

Distribution : INDIA: Uttarakhand (Kumaon : W. Almora, Mussoorie).

13. ***Hydraena (Hydraena) cirrata*** Champ

1920. *Hydraena (Hydraena) cirrata* Champ., *Ent. Monthly Mag.*, **56** : 69, f.1 male.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora, Mussoorie)

Subgenus ***Hadrenya*** Rey

1885(1886). *Hydraena (Hydrenya)* Rey. *Palp in Ann. Soc. Linn. Lyon.*, **32** : 96.

14. ***Hydraena (Hadrenya) maculicollis*** Champ

1920. *Hydraena (Hadrenya) maculicollis* Champ., *Ent. Monthly Mag.*, **56** : 70.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora).

Genus ***Laeliaena*** J. Sahlb., 1899-1900 (1900)

1899-1900(1900). *Laeliaena* J. Sahlb., *Ofvers. Finsk. Vet. Soc. Forh.*, **42** : 203.

1924. *Laeliaena* : Knisch, *Col. Cat.*, **14** (Pars 79) : 51.

15. ***Laeliaena sahlbergi*** Champ

1920. *Laeliaena sahlbergi* Champ., *Ent. Monthly Mag.*, **56** : 169.

Material examined : Not seen

Distribution : INDIA : Uttarakhand (Kumaon)

Subfamily LIMNEBIINAE
Genus ***Limnebius*** Leach, 1815

1815. *Limnebius* Leach, *in Brewsters Edinb. Enc.*, **9** : 96.

1924. *Limnebius* : Knisch, *Col. Cat.*, **14** (Pars 79) : 52-61.

16. ***Limnebius almoranus*** Knisch

1924. *Limnebius almoranus* Knisch, *Wien. Ent. Zeit.* **41** : 29.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : Ranikhet, Central Almora) Bihar.

17. ***Limnebius distinctus*** Knisch

1924. *Limnebius distinctus* Knisch, *Wien. Ent. Zeit.* **7** : 31.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora).

18. ***Limnebius singularis*** Knisch

1924. *Limnebius singularis* Knisch, *Wien. Ent. Zeit.* **41** : 31.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon: W. Almora).

Subfamily EPIMETOPINAE
Genus ***Epimetopus*** Lacord, 1854

1854. *Epimetopus* Lacord., *Gen. Col.* **1** : 465, 167.

1924. *Epimetopus*, Knisch, **14** (Pars.79) : 95.

19. ***Epimetopus asperatus*** Champ

1919. *Epimetopus asperatus* Champ., *Ent. Monthly Mag.*, **55** : 237.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon)

Subfamily SPHAERIDIINAE
Tribe SPHAERIDIINI Orchym
Genus ***Coelostoma*** Brulle, 1835

1835. *Coelostoma* Brulle, *Hist. Nat.Ins.* (5)**2** : 293.

1924. *Coelostoma*, Knisch, *Col. Cat.*, **14** (pars 79) : 109-113.

Key to the species of the genus *Coelostoma* Brulle

1. Species smaller in size; Maxillary palpi yellow in colour ..... *horni* Regimbart

   Species comparatively larger in size; maxillary palpi not yellow in colour ..... *stultum* Walker

20. ***Coelostoma horni*** Regimbart

1901. *Coelostoma horni* Regimbart, *Ann. Soc.ent. Fr.*, **71** : 474. (Cyclonotum).

1921. *Coelostoma horni* : d'Orchymont, *Rec. Ind. Mus.*, **8** : 265.

1924. *Coelostoma horni*, Knisch, *Col. Cat.*, **14** (pars 79) : 111.

1925. *Coelostoma horni;* d'Orchymont, *Ann & Bull. Soc. Ent. Belg.*, **65** : 267.

2003. *Coelostoma horni*, Mukhopadhyay & Sengupta, *Zool. Surv. India,* State Fauna Series 9, Fauna of Sikkim, Part 3, pp. 37.

Material examined : 2ex., Uttarakhand : Bageshwar : Baijnath, 9.x.2001, Bank of Kosi river, P. Mukhopadhyay & party.

Distribution : INDIA : Sikkim, Andaman & Nicobar Islands, Uttarakhand.

Elsewhere : Sri Lanka, Abor Country.

Remarks : This species is recorded here for the first time from this state.

21. ***Coelostoma stultum*** Walk

1858. *Coelostoma stultum* Walk., *Ann. Mag. Nat. Hist.* (3)**2** : 209 (Hydrobius)

1919. *Coelostoma stultum* : d'Orchym, *Ann. Soc. Ent. Belg.*, **59** : 71.

1922. *Coelostoma stultum* : d'Orchym, *Rec. Ind. Mus.*, **8** : 625.

2003. *Coelostoma stultum* : Mukhopadhyay & Sengupta, *Zool. Surv. India,* State Fauna Series **9**(part-3), Fauna of Sikkim, pp. 37.

Material examined : 1 ex.,Uttarakhand : Bageshwar, Garur, 26.iii.2001, S.K. Chakraborty & party, ex. water pool.

Distribution : INDIA : Bihar, Assam, Sikkim, Uttarakhand.

Elsewhere : Sri Lanka,Myanmar, Nepal, Indochina, Cochin, China, Indonesia, Japan, Formosa

Remarks : This species recorded here for the first time from the state.

Genus ***Dactylosternum*** Wollaston. 1854

1854. *Dactylosternum* Woll., *Ins. Mader.*, p. 99, t.3, f.1.

1874. *Dactylosternum* : Redt., *Fauna Austr.*, ed. **3, 2** : 124.

1911. *Dactylosternum* : Jacobs, *Kaf. Russl.*, p. 858.

1919. *Dactylosternum* : Knisch, *Archiv. Naturg.*, **85**(A-8) : 71.

22. ***Dactylosternum hydrophiloides*** M'Leay

1825. *Dactylosternum hydrophiloides* M'Leay, *Annul. Jav.*, p. 36, ed. 2.

1914. *Dactylosternum hydrophiloides* : d'Orchym., *Ent. Mitteil.*, **3** : 122.

1924. *Dactylosternum hydrophiloides* : Knisch, *Cat. Col.*, **14**(pars 79) : 116.

2003. *Dactylosternum hydrophiloides*: Mukhopadhyay & Sengupta, *Zool. Surv. India,* State Fauna Series 9, Fauna of Sikkim (Part 3), pp. 38.

2004. *Dactylosternum hydrophiloides*: Mukhopadhyay & Sengupta, *Zool. Surv. India,* State Fauna Series 10 : Fauna of Manipur (Part 2) : 452.

Material examined : 1 ex., Uttarakhand: Hardwar; 13 ex. Rudraprayag, Kanakchauri, 1.x.2004, Dr. P. Mukhopadhyay & Party, ex. Banana sheet; 3 ex., Agasthmuni, 7.x.2004, Dr. P. Mukhopadhyay & party, ex. Cowdung; 1 ex., Almora: Binsar, 30.ix.2001, Dr. P. Mukhopadhyay & party, ex. on grass along the flowing water.

Distribution : INDIA : Sikkim, Manipur, W.B., Bihar, Assam, Meghalaya, Uttarakhand. Andhra Pradesh, H.P., Nagaland, W. India.

Elsewhere : Indochina, Tonkin, Fokien, Formosa, Sunda Is., Indonesia, Philippines, Laos, Myanmar, Annam, Singapore.

Remarks : This species is recorded here for the first time from this state.

Genus ***Sphaeridium*** F., 1775

1775. *Sphaeridium* F., *Syst- Ent.*, pp. 66.

1924. *Sphaeridium*: Knisch, *Col. Cat.*, **14** (pars 79) : 119-127.

23. ***Sphaeridium cameroni*** d'Orchymont

1926. *Sphaeridium cameroni* d'Orchymont, *Ann. & Bull. Soc. Ent. Belg.*, **66** : 202.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Garhwal: Dehradun) Siwaliks, W.B.

24. ***Sphaeridium quinquemaculatum*** F.

1758. *Sphaeridium quinquemaculatum* F., *Syst. Ent. Suppl.* p. 39.

1924. *Sphaeridium quinquemaculatum* : Knisch, *Col. Cat.*, **14**(pars 79) : 124.

2004. *Sphaeridium quinquemaculatum* : Mukhopadhyay & Sengupta, *Zool. Surv. India, Fauna of Manipur, State fauna Series,* 10 (part-2) : 451.

Material examined : 8 ex., Uttarakhand : Kumaon : Mussoorie; 4 ex., Nainital : Lalkua, 2.iv.2001, S.K. Chakraborty & party, ex. cow dung; 1 ex., Rudraprayag: Agasthyamuni, 7.x.2004, Dr. P. Mukhopadhyay & party, ex. cow dung.

Distribution : INDIA : W.B., Andhra Pradesh, Assam, Bihar, Manipur, Meghalaya.

Elsewhere : Srilanka, S. Asia, China, Formosa, Sunda Is, Pakistan, Indonesia, Philippines, Baluchistan, Indochina.

Remarks : This species is recorded here for the first time from the state.

25. ***Sphaeridium dimidiatum*** Gory in Guer

1834-1842. *Sphaeridium dimidiatum* Gory in Guer, *Icon. Regne Anim.* **7** : 73, t.20, f.15.

1913. *Sphaeridium dimidiatum*: d'Orchymont, *Suppl. Ent.*, **2** : 13,15.

Material examined : 8 ex., Uttarakhand : Almora : Kafarkhan, 2,x,2001, Dr. P. Mukhopadhyay & Party, ex. cowdung.

Distribution : INDIA : W. B., Andhra Pradesh, Uttarakhand.

Elsewhere : Srilanka, S. Asia, Formosa, Sunda Is.,China, Indonesia, Philippines.

Remarks : This species is recorded here for the first time from the state.

Tribe CERCYONINI Orchym.,1919

Genus ***Cercyon*** Leach, 1817

1816. *Cercyon* Leach, *Zool. Misc.*, **3** : 95.

1887. *Cercyon* : Fowler, *Col. Bert. Isl.*, **1** : 252, 253.

1917. *Cercyon* : Des Gozis, *Misc. Ent.*, **24** : 65.

1919. *Cercyon* : Knisch, *Aechiv. Nature*, **85**(A-8) : 71.

1924. *Cercyon* : Knisch, *Col. Cat.*, **14** (Pars 79) : 127-152.

Subgenus ***Cercyon*** s. str. Ganglb

1904. *Cercyon (Cercyon s. str.)* Ganglb., *Kaf. Mitteleur*, **14** : 274.

26. ***Cercyon (Cercyon) maindroni*** Reg

1902. *Cercyon (Cercyon) maindroni* Reg., *Ann. Soc. Ent. Fr.*, **72** : 357.

1925. *Cercyon (Cercyon) maindroni*: Knisch, *Col. Cat.*, **14** (pars 79) : 139.

Material examined : 12 ex., Uttarakhand: Almora: Gwalakot, 27.iii.2001, S.K. Chakraborty & party, ex. cowdung.

Distribution : INDIA : W.B., Tamil Nadu, Uttarakhand.

Remarks : This species is recorded here for the first time from the state.

27. ***Cercyon (Cercyon) uniformis*** Sharp

1890. *Cercyon (Cercyon) uniformis* Sharp, *Trans. Ent. Soc. Lond.*, P. 357.

1914. *Cercyon (Cercyon) uniformis* : Orchym., *Ent. Mitteil.*, **3** : 323 (? Subsp.).

1924. *Cercyon (Cercyon) uniformis* : Knisch, *Col. Cat.*, **14**(pars 79) : 149.

Material examined : 1 ex., Uttarakhand : Almora : Gwalakot, 27.iii.2001, S.K. Chakraborty & Party, Ex. cowdung.

Distribution : INDIA : Uttarakhand.

Elsewhere : Srilanka, Formosa, Sunda Isl. Seychellen.

Remarks : This species is recorded here for the first time from the state, though in Col. Cat. it is mentioned only Indian.

Genus ***Oosternum*** Sharp, 1882

1882. *Oosternum* Sharp, *Biol. Centr. Amer.* **1**(2) : 112

1911. *Oosternum* : Jakobs, *Kaf. Russl.*, p. 858.

1915. *Oosternum*: Orchym., *Ent. Mitteil.*, **3** : 324.

1919 (1921). *Oosternum* : Knisch, *Archiv. Naturg.*, **85**(A-8) : 71.

28. ***Oosternum costatum*** Sharp

1882. *Oosternum costatum* Sharp, *Biol. Centr. Amer.*, **1**(2) : 113.

1914. *Oosternum* : Orchym., *Ent. Mitteil.*, **3** : 328, f.3., p. 327.

1918. *Oosternum* : Leng & Mutschler, *Bull. Amer. Mus. Nat. Hist.*, **38** : 113.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon: Sarju Valley) Western India.

Elsewhere : Florida, Middle America.

Genus ***Psalitrus*** Orchym., 1919

1919. *Psalitrus* Orchym., *Ann. Soc. Ent. Fr.*, **88** : 123, 126.

1924. *Psalitrus* : Knisch, *Col.Cat.*, **14** (pars 79) : 154.

29. ***Psalitrus championi*** d'Orchymont

1925. *Psalitrus championi* d'Orchymont, *Ann. & Bull. Soc. Ent. Belg.*, **65** : 160.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : Haldwani) Tamil Nadu.

Tribe MEGASTERNINI Orchym., 1919
Genus ***Noteropagus*** Orchym, 1919

1919. *Noteropagus* Orchym., *Ann. Soc. Ent. Fr.*, **88** : 132.

1919(1921). *Noteropagus* : Knisch, *Archiv. Naturg.*, **85**(A-8) : 72.

30. ***Noteropagus politus*** Orchym

1919. *Noteropagus politus* Orchym., *Ann. Soc. Ent. Fr.*, **88** : 134.

1919 (1921). *Noteropagus politus.*: Knisch, *Archiv. Naturg.*, **85**(A-8) : 86.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : Haldwani).

Elsewhere : Indochina.

Subfamily HYDROPHILINAE
Tribe HYDROBIINI Lec. 1861
Subtribe HYDROBIAE Orchymont, 1919
Genus ***Laccobius*** Er., 1837

1837. *Laccobius* Erichson, *Kaf. Mark Brand.*, **1** : 202

1916. *Laccobius* : *Des Gozis, Misc. Ent.*, **23** : 14.

1924. *Laccobius* : Knisch, *Col. Cat.*, **14** (Pars 79) : 181-192.

Subgenus ***Laccobius*** S. Str. Ganglb

1904. *Laccobius (Laccobius)* Ganglb., *Kaf. Mitteleur.*, **4** : 251.

31. ***Laccobius gracilis*** Motsch

1855. *Laccobius gracilis* Motsch., *Etud. Ent.*, **4** : 84.

1924. *Laccobius* : Knisch, *Col. Cat*, **14** (Pars 79) : 186.

Material examined : 2 ex., Uttarakhand; Kathgodam, 2.v.1911, 2824/H4.

Distribution : INDIA : Uttarakhand (Kathgodam).

Elsewhere : Middle Europe, Southern Europe.

Remarks : This spacies is recorded here for the first time from India.

32. ***Laccobius (L.) simulans*** d'Orchymont

1923. *Laccobius (L.) simulans* d'Orchymont, *Mem. Dep. Agric. India*, **8** : 7.

2003. *Laccobius (L.) simulans* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 9, Fauna of Sikkim* (Part-3) : 40.

Material examined : 13 ex., Uttarakhand : Kumaon lake, viii. 1920. (NZC); 2ex., Kumaon : Bhimtal, 10.v.1911, 2194/H4, Dr. S.W. kemp; 1 ex., (Cotype, Kumaon: Bhimtal, 29.iv.1910, 2195/H4, E.A d' Abreu.

Distribution : INDIA : W.B., Bihar, Sikkim, Meghalaya, Uttar Pradesh Uttarakhand.

Elsewhere : Yunan.

Remarks : This species is recorded here for the first time from Uttarakhand.

33. ***Laccobius (Laccobius) orientalis*** Knisch

1924. *Laccobius (Laccobius) orientalis* Knisch, *Wien. Ent. Zeit.*, **41** : 33.

2003. *Laccobius (Laccobius) orientalis*: Mukhopadhyay & Sengupta, *Zool. Surv.India, State Fauna Series, 9, Fauna of Sikkim* (Part3) : 40.

Material examined : 3 ex., Uttarakhand : Kumaon : Bageshwar : Garur, 26.iii.2001, S.K. Chakraborty & Party ex. Waterpool. 2 ex., Almora : Binsar, 30.x.2001, Dr. P. Mukhopadhyay & Party, ex. on grass along the side of the flowing water.

Distribution : INDIA : Uttar Pradesh, Sikkim, Uttarakhand (Bageshwar, Binsar).

34. ***Laccobius (Laccobius) imperialis*** Knisch

1924. *Laccobius (L.) imperialis* Knisch, *Wien. Ent. Zeit.*, **41** : 35.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (W. Almora, Kumaon, Ranikhet) Dehradun (Garhwal).

35. ***Laccobius (Laccobius) patruelis*** Knisch

1924. *Laccobius (L.) patruelis* Knisch, *Wien. Ent. Zeit.*, **41** : 36.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon, Bodiar, W. Almora) Haldwani, Punjab, Himachal Pradesh.

35. ***Laccobius (Laccobius) regalis*** Knisch

1924. *Laccobius (L.) regalis* Knisch, *Wien. Ent. Zeit.*, **41** : 34.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora, Sudar dange) Garhwal (Chakrata, Kedarkund) Himachal Pradesh, Punjab.

36. ***Laccobius (Laccobius) affinis*** Knisch

1927. *Laccobius (Laccobius) affinis* Knisch, *Spolia Zeylan, Colombo*, **14** : 132.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon), Gorivalley.

37. ***Laccobius (Laccobius) championi*** Knisch

1927. *Laccobius (Laccobius) championi* Knisch, *Spolia Zeylan, Colombo*, **14** : 132.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon), Shelshel.

38. ***Laccobius (Laccobius) hingstoni*** d'Orchym

1926. *Laccobius (Laccobius) hingstoni* d'Orchym., *Ann. & Bull. Soc. Ent. Belg.*, **66** :

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon); Shelshel.

Elsewhere : Tibet.

39. ***Laccobius (Laccobius s. str.) argillaceus*** J. Sahlb

1899-1900(1900). *Laccobius (Laccobius s. str.) argillaceus* J. Sahlb., *Ofvers. Finsk. Vet. Soc. Forh.*, **42** : 188.

Material examined : not seen.

Distribution : INDIA : Uttarakhand (Garhwal : Hardwar).

Elsewhere : Turkestan.

40. ***Laccobius (Laccobius s.str.) sublaevis*** J. Sahlb

1899-1900(1900). *Laccobius (Laccobius s. str.) sublaevis* J. Sahlb., *Ofvers Finsk. Vet. Soc.Forh.*, **42** : 189.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon : W. Almora; Garhwal : Mussorie, Dehradun) H.P., Punjab.

Elsewhere : Turkestan.

Subtribe HELOCHARAE Orchym., 1919

Genus ***Helochares*** Muls., 1844

1844. *Helochares* Mulsant, *Palpi*, P. 197.

1920. *Helochares* : Tullgren & Wahlgren, *Svenska Ins.* (2) : 234-235.

Subgenus ***Hydrobaticus*** W. M'leay, 1873

1873. *Helochares (Hydrobaticus)* W. M'leay, *Trans. Ent. Soc. N.S. Wales*, **2** : 131.

1919. *Helochares (Hydrobaticus)* : Orchymont., *Ann. Soc. Ent. Fr.*, **88** : 149.

41. ***Helochares (Hydrobaticus) lentus*** Sharp

1890. *Helochares (Hydrobaticus) lentus* Sharp, *Trans. Ent. Soc. Lond.*, P. 352.

1902. *Helochares (Hydrobaticus)* : *Reg., Ann. Soc. ent. Fr.*, **71** : 473; 72, 1903, P. 55.

1913. *Helochares (Hydrobaticus)* : Orchym., *Suppl. Ent. Sr.* 2, P. 5.

2003. *Helochares (Hydrobaticus)* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part 3), PP. 40-41.

2004. *Helochares (Hydrobaticus)* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 10, Fauna of Manipur* (Part-2), pp. 454.

Material examined : 1 ex., Uttarakhand : Kumaon, 10.v.1911, 2222/H4, Dr. S.W. Kemp; 4 ex., Kumaon, 2.x.1911, 2223-2224/H4, Dr. S.W. Kemp.

Distribution : INDIA : W.B., Bihar, Assam, Sikkim, Uttarakhand, Manipur.

Elsewhere : Sri Lanka, Indochina, Formosa, Sunda Is.

Remarks : This species is recorded here for the first time from Uttarakhand.

42. ***Helochares (Hydrobaticus) anchoralis*** Sharp

1890. *Helochares (Hydrobaticus) anchoralis* Sharp., *Trans. Ent. Soc. London*, P. 352.

1903. *Helochares (Hydrobaticus) anchoralis* : Reg. *Ann. Soc. Ent. Fr.*, **72** : 54.

1924. *Helochares (Hydrobaticus) anchoralis* : Knisch, *Col. Cat.*, **14** (Pars 79) : 193.

2004. *Helochares (Hydrobaticus) anchoralis* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 10, Fauna of Manipur* (Part-2), pp. 453-454.

Material examined : 1 ex., Uttarakhand : Bageshwar : Kausani, 23.iii.2001, S.K. Chakraborty & Party, ex. water pool; 2 ex., Garur, 26.iii.2001, S.K. Chakraborty & party, ex. water pool.

Distribution : INDIA : W.B., Bihar, Manipur, Uttarakhand.

Elsewhere : Srilanka, Indochina, Indonesia, Philippines, F.M.S., Laos, Tonkin, Cambodia, China, Annam.

Remarks : This species is recorded here for the first time from this state.

43. *Helochares (Agraphydrus) kempi* d'Orchymont, 1922

1922. *Helochares (Agraphydrus) kempi* d'Orchymont *Rec. Ind. Mus.*, **8** : 626.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Garhwal : Dehradun).

44. *Helochares (Agraphydrus) pauculus* Knisch, 1924

1924. *Helochares (Agraphydrus) pauculus* Knisch, *Wien. Ent. Zeit.*, **41** : 36.

Material examined : Not seen.

Distribution : INDIA : Uttarakhand (Kumaon: W. Almora).

Genus *Enochrus* Thoms., 1859

1859. *Enochrus* Thoms., *Skand Col.*, **1** : 18.

1920. *Enochrus :* Orchym., *Ann. Soc. Ent. Fr.*, **88** : 154.

1924. *Enochrus :* Knisch, *Col. Cat.*, **14** (pars 79) : 200-219.

Subgenus *Lumetus* Zaitz

1908. *Enochrus (Lumetus)* Zaitz., *Horae Soc. Ent. Ross.*, **38** : 385 (Catal.).

45. *Enochrus (Lumetus) esuriens* (Walker)

1858. *Philiphydrus esuriens* Walker, *Ann. Mag. nat. Hist.*, (3)**2** : 209.

1924. *Enochrus (L.) esuriens* (Walker) : Knisch, *Col. Cat.*, **14** (Pars 79) : 208.

2005. *Enochrus (L.) esuriens* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Seires, 10, Fauna of Manipur* (Part 2), pp. 454-455.

2003. *Enochrus (L.) esuriens* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 9, Fauna of Sikkim* (Part 3) : 41.

Material examined : 1 ex., Uttarakhand : Bageshwar : Kausani, 23.iii.2001 S.K. Chakraborty & Party, ex. Water pool; 1 ex., Garur, 26.iii.2001, S.K. Chakraborty & Party, ex. Water pool; 2 ex., Almora : Binsar 30.ix.2001, Dr P. Mukhopadhyay & Party, ex. on grass along the side of flowing water; 18 ex., Baijnath : Bageshwar, 9.x.2001, Dr. P. Mukhopadhyay & Party, ex. Bank of Kosi river.

Distribution : INDIA : W.B., Manipur, Nicobar Is., Sikkim, Uttarakhand (Kausani, Binsar) Andhra Pradesh, Orissa.

Elsewhere : SriLanka, Indochina, Sunda Is., Annam, Australia, Philippines, Indochina, F.M.S., Siam, Annam, Tonkin, China, Vietnam.

Remarks : This species is recorded here for the first time from the state.

46. *Enochrus (Lumetus) rubrocinctus* (Regimbart)

1903. *Philhydrus rubrocinctus* Regimbart, *Ann. Soc. ent. Fr.*, **72** : 56.

1924. *Enochrus (L.) rudrocinctus* (Regimbart) : *Knisch, Col. Cat.*, **14** (Pars 79) : 214.

1995. *Enochrus (L.) rubrocinctus*: Biswas & Mukhopadhyay, *Zool. Surv. India, State Fauna Series, 3, Fauna of West Bengal,* Part **6**(A) : 143-168.

2004. *Enochrus (L.) rubrocinctus* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 3, Fauna of Manipur* (Part-2) : pp. 455.

Material examined : 3 ex., Uttarakhand : Bageshwar : Kausani, 23.iii.2001 S.K. Chakraborty & Party, ex. water pool; 3 ex., Almora : Binsar, 30.ix.2001, Dr. P. Mukhopadhyay & Party, ex. on grass along the side of flowing water.

Distribution : INDIA : W.B., Manipur, Uttarakhand.

Elsewhere : South Asia, Indonesia, Cochinchina, Indochina, Myanmar.

Remarks : This species is recorded here for the first time from the state.

47. ***Enochrus (Lumetus) tetraspilus*** (Regimbart)

1903. *Enochrus tetraspilus* Regimbart, *Ann. Soc. Ent Fr.*, **72** : 335.

1924. *Enochrus (L umetus) tetraspilus* (Regimbart) : *Knisch, Col. Cat.*, **1**· (Pars 79) : 216.

Material examined : 2 ex., Uttarakhand : Garhwal : Dehra Dun, 19.xii.1960.

Distribution : INDIA : Uttarakhand (Dehra Dun), Ostindien.

Remarks : This species is recorded here for the first time from Uttarakhand, though Knisch (1924) mentioned the locality as Ostindien.

Tribe HYDROPHILINI
Genus ***Sternolophus*** Sol., 1834

1834. *Sternolophus* Solier, *Ann. Soc. Ent. Fr.*, **3** : 302, 310.

1924. *Sternolophus* : Knisch, *Col. Cat.*, **14** (Pars 79) : 226-228.

Subgenus ***Sternolophus*** s. str. Zaitz, 1908 (1909)

1908 (1909). *Sternolophus* (s. str.) Zaitz, *Rev. Russe d'Ent.*, P. 229.

48. ***Sternolophus (s.str.) rufipes*** (Fabricius)

1792. *Hydrophilus rufipes* F., *Entom. Syst.*, **1** : 183.

1840. *Sternolophus rufipes* : Laporte, *Castelnau Hist. Nat. Ins.*, **1** : 54.

1995. *Sternolophus rufipes*, Biswas & Mukhopadhyay, *Zool. Surv. India, State Fauna Series, 3, Fauna of West Bengal Part* **6**(A) : 159.

2004. *Sternolophus rufipes*, Mukhopadhyay & Sengupta, *Zool. Surv. India, state Fauna Series, 10, Fauna of Manipur*, Part-2, pp. 455.

Material examined : 6 ex., Uttarakhand : Kumaon : Bhimtal, 10.v.1911, 563-568/H4, Dr. S. W. Kemp, 3 ex., Garhwal : Dehra Dun, 12.viii. 1960; 1 ex., Tehri Garhwal, 9.xi.2002, Dr. P. Mukhopadhyay & Party, ex. under stone along river side; 1 ex., Bageshwar : Garur, 26.iii.2001, S.K. Chakraborty & Party, ex. water pool; 2 ex., Pauri : Srinagar, 26.vi.2004, S.K. Chakraborty & Party; 1 ex., Baijnath : Bageshwar, 9.x.2001, ex. Bank of Kosi river, Dr. P. Mukhopadhyay & Party.

Distribution : INDIA : W.B. Bihar, Manipur, Maharashtra, Punjab, Kashmir, South India Andhra Pradesh, Nagaland, Sikkim, Uttarakhand.

Elsewhere : SriLanka, Trop. Asia, Sunda Is., Myanmar, Philippines, Japan, Indonesia, Formosa, F.M.S., Indochina, China.

Remarks : This species is recorded here for the first time from this state.

Genus ***Hydrous*** Leach, 1815

1815. *Hydrous* Leach *in Brewsters Edinb. Enc.*, **9** : 96.

1924. *Hydrous* : Knisch., *Col. Cat.*, **14** (Pars 79) : 242-259.

1920. *Hydrous* : Tullgren &Wahlgren, *Svenska Ins.*, (2) : 234.

Subgenus ***Hydrous S. Str.*** Kuw.

1889(1890). *Hydrous (Hydrous s. str.)* Kuw, *Verh. Naturf. Ver. Brunn*, **28** : 16, 24.

49. ***Hydrous (Hydrous s. str.) senegalensis*** Percher

1835. *Hydrous (Hydrous s.str.) senegalensis* Percher., *Gen. Ins.* **3** (nr. 5) : t. 9, f.1 (Hydrophilus).

1924. *Hydrous (Hydrous s. str.) senegalensis* : Knisch, *Col. Cat.*, **14** (Pars 79) : 257.

Material examined : 3 ex., Uttarakhand : Garhwal : Dehra Dun Soil Conservation Scientist Hostel Campus, 25.x.2000, Dr. P. Mukhopadhyay & Party, ex. at light; 7 ex., Kumaon : Bhimtal, 2-10.v.1911; 1 ex., Garhwal : Mussooie, 1.i.1965.

Distribution : INDIA : North India, Uttarakhand.

Elsewhere : Trop, Africa.

Remarks : This species is recorded here for the first time from Uttarakhand.

Tribe BEROSINI Bedel
Genus ***Berosus*** Leach, 1817.

1817. *Berosus* Leach, *Zool. Misc.*, **3** : 92.

1924. *Berosus* : Knisch, *Col. Cat.*, **14** (Pars 79) : 261-275.

Subgenus ***Enoplurus*** Hope, 1838

1838. *Berosus (Enoplurus)* Hope, *Col. Man* (2), P. 128.

50. ***Berosus (Enoplurus) indicus*** Motsch

1861. *Berosus (Enoplurus) indicus* Mots., *Bull. Soc. Imp. Nat. Moscou*, **34**(1) : 110.

1995. *Berosus (E.) indicus* : Biswas & Mukhopadhyay, *Zool. Surv. India, State Fauna Series 3, Fauna of W.B.* Part **6**(A) : 163.

2004. *Berosus (E.) indicus* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 10, Fauna of Manipur* Part-2, : 457.

Material examined : 1 ex., Uttarakhand : Tehri Garhwal, 9.xi.2002, Dr. P. Mukhopadhyay & Party, ex. under stone along river side.

Distribution : INDIA : W.B., Bihar, Punjab, Manipur, Rajasthan, U.P., Karnataka, Goa, Kerala, Pondicherry, Tamil Nadu, Andhra Pradesh, Assam, Uttarakhand.

Elsewhere : Pakistan, Nepal, Bangladesh, Sri Lanka, Myanmar, S. Asia, Sunda Is., China, Formosa, Indochina, Philippines, Indochina, F.M.S., Cambodia, Laos, Annam, Tonkin, Siam.

Remarks : This species is recorded here for the first time from Uttarakhand.

Subgenus ***Berosus*** S. str. Hope

1838. *Berosus (Berosus s. str.)* Hope, *Col. Man.* (2), P. 128.

51. ***Berosus (Berosus s.str.) pulchellus*** Macleay.

1825. *Berosus (Berosus s. str.) pulchellus* Macleay, *Annul. Jav.*, P. 35.

1995. *Berosus (Berosus s. str.) pulchellus* : Biswas & Mukhopadhyay, *Zool. Surv. India, State Fauna Series 3, Fauna of West Bengal*, Part **6**(A) : 163.

2004. *Berosus (Berosus s. str.) pulchellus* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series 10, Fauna of Manipur*, Part- 2, pp. 457.

Material examined : 1 ex., Uttarakhand: Tehri Garhwal, 9.xi.2002, Dr. P. Mukhopadhyay & Party, ex. under stone along river side.

Distribution : INDIA : W.B., Bihar, Manipur, Maharashtra, Delhi, U.P., Haryana, Karnataka, Kerala, Tamil Nadu, Pondicherry, Uttarakhand, Sikkim.

Elsewhere : Nepal, Bangladesh, China, Myanmar, Thailand, Indonesia, Australia, Philippines, Sri Lanka, Indochina, Annam, Formosa, Tonkin, Iran, Laos, Vietnam, Japan, Honkong, Taiwan, Malayasia, Indonesia.

Remarks : This species is recorded here for the first time from Uttarakhand.

Genus ***Regimbartia*** Zaitz., 1908

1908. *Regimbartia* Zaitz., *Horae Soc. Ent. Ross*, **38** : 362 (Catal.)

1924. *Regimbartia* Zaitz. : Knisch, *Col. Cat.*, **14** (Pars 79) : 276-277.

52. ***Regimbartia attenuata*** F.

1801. *Regimbartia attenuata* F., *Syst. Eleuth.*, **1** : 235 (Hydrophilus).

1995. *Regimbartia attenuata* : Biswas & Mukhopadhyay, *Zool. Surv. India, State Fauna Series 3, Fauna of West Bengal* Part **6**(A) : 163.

2003. *Regimbartia attenuata* : Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim*, Part-3, PP. 43.

2004. *Regimbartia attenuata*: Mukhopadhyay & Sengupta, *Zool. Surv. India, State Fauna Series, 10, Fauna of Manipur*, (Part-2) : 457-458.

Material examined : 2 ex., Uttarakhand : Bageshwar : Garur, 26.iii. 2001, S.K. Chakraborty & Party, ex., Water pool; 1 ex., Baijnath : Bageshwar, 9.x.2001, Dr. P. Mukhopadhyay & Party, ex. Bank of Kosi river.

Distribution : India : W.B., Bihar Manipur, Andhra Pradesh, Sikkim, Uttarakhand.

Elsewhere : Srilanka, South Asia, Philippines, Sunda Is., Australia, Japan, Formosa, Indonesia, Cambodia, Cochinchina, Indochina, Annam.

Remarks : This species is recorded here for the first time from Uttarakhand.

SUMMARY

The present paper deals with 52 species under 19 genera belonging to 5 subfamilies viz.

Hydraeninae, Limnebiinae, Epimetopinae, Sphaeridiinae and Hydrophilinae Of which 19 species under 11 Genera of the families like Sphaeridiinae and Hydrophilinae are recorded for the first time from this state. No keys has been provided here as Keys to the subfamilies, tribes and genera have already been provided in the Fauna of West Bengal, Meghalaya, Tripura, Sikkim,Manipur etc. Distributional data of each species has been given from the published records and actual study of the specimens. Selected synonymies, collection data of each species has also given.

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REFERENCES

Balfour-Browne, J. 1948. A revision of the genus Psalitrus d'Orchymont (Col.: Palpicornia: Sphaeridiinae). *Ann. Mag. nat. Hist. London,* **12**(1) **6** : 377-391.

Biswas, S. & Mukhopadhyay, P. 1995. Insecta : Coleoptera : Hydrophilidae, *Zool. Surv. India, State Fauna of West Bengal Fauna Series 3,* Part **6**(A) : 143-168.

Crowson, R.A. 1981. The Biology of Coleoptera, Academic press, London, pp. 220.

D'Orchymont, A. 1928. Catalogue of Indian Insects, Part **14** : 1-146. Govt. of India Publication, Hydrophilidae : Coleoptera.

Knisch, A. 1924. Coleopterorum Catalogus, (Schenkling edited) **14** (Pars 79), PP. 306.

Mukhopadhyay, P and Sengupta, S. 2003. Insecta : Polyphaga : Coleoptera : Hydrophilidae, of Sikkim. Zool. Surv India, *Fauna of Sikkim, State Fauna Series* **9**(Part-3) : 35-44.

Mukhopadhyay, P. & Sengupta, S. 2004. Insecta: Col.: Polyphaga: Hydrophiloidea: Hydrophilidae. *Fauna of Manipur, State Fauna Series,* **10**(Part-2) PP. 449-458. *Zool. Surv. India,*

Schodl, S.1993. Revision der Gattung Berosus Leach 3. Tiel : Die pallaarktiechen and Orientalischen Arten der Untergattung Berosus s.str. (Col.: Hydrophilidae) **63** : 189-233.

Sharp, D. 1890. Some aquatic Coleoptera from Ceylon. *Trans. Ent. Soc. Lond.* (2) : 339-359.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 335-359.

INSECTA : COLEOPTERA : STAPHYLINOIDEA : STAPHYLINIDAE : PAEDARINAE

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INTRODUCTION

The members of the family Staphylinidae are commonly known as Rove beetle and is one of the largest family of the super family Staphylinoidea. It includes about 30,000 species from the world. Of which more than 2000 species so far have been recorded from India. This family is divided into 14 subfamilies. Of which members of the subfamily Paederinae can be easily distinguished by its head being more or less constricted behind; antennae filiform, 11-segmented and inserted under the front angles of the frons; mandibles falciform and usually toothed, maxillary palpi – 4 jointed and the 4th joint small and sabulate, labial palpi 3 jointed, scutellum visible, pronotum well developed, front coxae conical, prominent tarsi 5-jointed. Major workers who dealt the group are Motschulsky (1858), Kraatz (1859), Fauvel (1895), Bernhauer (1915) etc. prior to Cameron's work on the fauna of India series (1930-1939).

Cameron in his Fauna of British India (1931) including Srilanka and Myanmar dealt the subfamily Paederinae and included 90 species under 23 genera from Uttarakhand.

The present study is based on the collection w.s.r. to the subfamily Paederinae brought from different districts of Uttarakhand by various survey parties of Zoological Survey of India and other old collections, Z.S.I., Kolkata present in the National Zoological Collection and recorded further 16 species under 4 genera viz. *Paederus*, *Stilicopsis*, *Stilicus* and *Cryptobium* for the first time from Uttarakhand and three species viz. *Paederus sharpi* Cam, *P. coxalis* Fauv and *Cryptobium ceylanense* Kr. for the first time from India. The species belonging to the subfamily Paederinae are usually found in the habitat like damp vegetable, debries, trunks of decaying trees, damp leaves, amongst fallen leaves, in the paddy fields, wild bushes, on sandy river bed, under stones, debries associated with ants, near streams, vegetable detritus, broken comb of *Hodotermis obesus*, near running water, fungus, in stream mosses, decaying log, in shingle of running streams, bank of river and marshes, scraping fern, under banana leaves, leaf of litter of Pine etc.

SYSTEMATIC LIST

Family STAPHYLINIDAE
Subfamily PAEDERINAE
Tribe **Pinophilini**
Genus ***Pinophilus*** Grav., 1802

1. *P. melanomerus* Kr. 1895
2. *P. bomfordi* Epp. 1890

Genus ***Procirrus*** Latr., 1829

3. *P. feae* Fauvel, 1895

Genus ***Oedechirus*** Er. 1839-40

4. *O. dimidiatus* Epp. 1890

Tribe **Paederini**
Genus ***Paederus*** Fab. 1775

*5. *P. sondaicus* Fauv. 1895
**6. *P. sharpi* Cam. 1914
7. *P. himalayicus* Bernh., 1914
*8. *P. melampus* Erichson 1839-40
*9. *P. fuscipes* Curtis, 1823-40
*10. *P. extraneus* Wied. 1818
*11. *P. tamulus* Er. 1839-40
*12. *P. nigricornis* Bernh, 1911
13. *P. almorensis* Cameron 1931
14. *P. basalis* Berh, 1914
15. *P. nigripennis* Cam, 1924
*16. *P. kuluensis* Bernh, 1914

*17. *P. birmanus* Faur. 1895
*18. *P. distinctus* Cameron, 1931
*19. *P. pilifer* Motsch, 1859
*20. *P. conicollis* Motsch, 1859
*21. *P. coxalis* Fauv., 1895
22. *P. alternans* Walk, 1858

Genus ***Dibelonetes*** Sahlb, 1844

23. *D. bengalensis* Biswas & Sengupta, 1980

Genus ***Astenus*** Steph, 1832

24. *A. gratus* Cameron, 1931
25. *A. gratellus* (Fauv.) 1931
26. *A. leptocerus* (Epp.) 1931
27. *A. pulchripennis* Cameron, 1931
28. *A. marginalis* Cameron, 1931
29. *A. varians* Cameron, 1931
30. *A. flavipennis* Cameron, 1931
31. *A. gracilentus* Fauv., 1879-80
32. *A. melanurus* (Küst) 1931
33. *A. semibrunneus* Cameron, 1931

Genus ***Stilicopsis*** Sachse 1852

34. *S. flavipennis* Cameron, 1931
35. *S. dorsolineata* Cameron, 1924
36. *S. indica* Cameron, 1931
37. *S. pallida* Cameron, 1931
*38. *S. trinotata* (Kr), 1931

Genus ***Stilicus*** Latr., 1825

39. *S. velutinus* Fauv., 1895
40. *S. ceylanensis* Kr., 1859
41. *S. simlaensis* Cameron, 1931
42. *S. plagiatus* Cameron, 1924
43. *S. rufescens* Sharp, 1874
*44. *S. pygmaeus* Kr., 1859
*45. *S. sericeus* Motsch., 1858
46. *S. parvus* Cameron, 1931

Genus ***Stilicoderus*** Sharp, 1889

47. *S. feae* Fauv., 1895
48. *S. fenestratus* Fauv., 1895

Genus ***Psilotrachelus*** Kraatz, 1859

49. *P. Sculptipennis* Kr. 1859

Genus ***Thinocharis*** Kraatz, 1859

50. *T. nigrescens* Cameron, 1931
51. *T. ruficollis* Cameron, 1931
52. *T. pygmaea* Kr., 1859

Genus ***Loboctulus*** Bernh., 1918

53. *L. fortepunctatus* (Cam.), 1931
54. *L. granulicollis* (Cam.), 1931
55. *L. frater* (Cam.) 1931

Genus ***Acanthoglossa*** Kr., 1859

56. *A. testaceipennis* Kr., 1859

Genus ***Medon*** Steph., 1932

57. *M. fauveli* Beah, 1912
58. *M. dolorosus* Cam., 1924
59. *M. siwalikensis* Cam., 1931
60. *M. exasperatus*, Cam., 1924
61. *M. rufoferrugineus* Cam., 1924
62. *M. cinnamopterus* (Kr.), 1931
63. *M. parkeri* Cam., 1924
64. *M. niger* Cam., 1924
65. *M. umbilicatus* Cam., 1924
66. *M. stilicinus* n.n. Cam., 1931
67. *M. (Hypomedon) vimmsi* Bernh., 1914
68. *M. (Hypomedon) debilicornis* (Woll.) 1931

Genus ***Lithocharis*** Boisol., 1835

69. *L. uvida* Kr., 1859
70. *L. nigriceps* Kr., 1859
71. *L. penicillata* Cam., 1928
72. *L. sorocula* Kr., 1859

Genus ***Scopaeus*** Er. 1839-40

73. *S. puberulus* Kr., 1859
74. *S. testaceus* Motsch, 1858
75. *S. nitiduloides* Cam., 1931
76. *S. limbatus* Kr., 1859
77. *S. velutinus* Motsch., 1858
78. *S. fulvus* Cameron, 1931
79. *S. germanus* Cameron, 1931
80. *S. pallidulus* Kr., 1859
81. *S. Monticola* Cameron, 1931
82. *S. lucidus* Cameron, 1931
83. *S. beesoni* Cameron, 1931
84. *S. humilis* Cameron, 1931

Genus ***Medome*** Cameron, 1931

85. *M. bicolor* Cameron, 1931

Genus ***Ennalagium*** Bernh, 1915

86. *E. indicum* Cameron, 1931

Genus ***Domene*** Fauv, 1872

87. *D. aeneipennis* Cameron, 1924

Genus ***Lathrobium*** Cam., 1872

88. *L. nigerrimum* Cameron, 1924
89. *L. semicaeruteum* Cameron, 1921
90. *L. cylindricolle* Cameron, 1924
91. *L. badium* Cameron, 1924
92. *L. cafrum* Boh, 1848

Genus ***Pseudobium*** Mulset Rey, 1877

93. *P. laeviventre* Champ., 1922
94. *P.* assimile Cam., 1924
95. *P. semiflavum* Cam., 1924

Genus ***Dolicaon*** Cast, 1835

96. *D. indicus* Kr., 1859

Genus ***Cryptobium*** Mannerh, 1830

97. *C. ocypoides* Champ, 1921
98. *C. cylindroderum* Champ, 1925
*99. *C. capitale* Cam., 1924
*100. *C. spectabile* Kr.,1859
101. *C. bernhaueri* Cam., 1924
102. *C. marginatum* Motsch, 1858
103. *C. humerale* Cam., 1924
104. *C. fluviatile* Champ., 1921
**105. *C. ceylanense* Kr., 1859
*106. *C. paricolor* Epp., 1895
107. *C. sharpi* Fauv., 1895
108. *C. sanguinolentum* Motsch., 1858
109. *C. kumaonense* Champ., 1921
110. *C. rosti* Schub, 1908

SYSTEMATIC ACCOUNT

Key to the Tribes

1. 4th joint of the maxillary Palpi large and more or less fusiform or Securiform..... ..... PINOPHILINI

   4th joint of the maxillary palpi small, subulate or Popillose ..... PAEDERINI

Tribe PINOPHILINI

Genus ***Pinophilus*** Grav. 1802

1802. *Pinophilus* Grav. *Col. Micr. Brunsv.*, p. 201.

1931. *Pinophilus* Cameron, *The Fauna of British India, including Ceylon and Burma and Burma, coleoptera :* Staphylinidae, **2** : 2-18.

1. ***Pinophilus melanomerus*** Kr 1895

1895. *Pinophilus melanomerus* Kr., *Arch Naturg* **25**(i) : 160.

1931. *Pinophilus melanomerus* : Cameron, *The Fauna of British India includin Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 16–17.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun.

Elsewhere : Java.

2. ***Pinophilus bomfordi*** Epp. 1890

1890. *Pinophilus bomfordi* Epp., *W.E.Z.* **9** : 279.

1931. *Pinophilus bomfordi* : Cameron, *The Fauna of British India including Ceylong and Burma (Coleoptera : Staphylinidae)*, **2** : 17-18.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, Maharashtra, Siwaliks.

Genus ***Procirrus*** Latr., 1829

1829. *Procirrus* Latr., *Regne Anim.*, **5** : 436.

1931. *Procirrus* Cameron., *The Fauna of British India, including, Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 18-20.

3. ***Procirrus feae*** Fauvel 1895

1895. *Procirrus feae* Fauv., *Rev. d'Ent.* **14** : 215.

1931. *Procirrus feae* : Cameron, *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 19.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun.

Elsewhere : Myanmar.

Genus **Oedichirus** Er. 1839-40

1939-40. *Oedichirus* Er. *Gen. Spec.* Staph, p. 684.

1931. *Oedichirus* Cameron, *The Fn. Brit. India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 25-31.

4. ***Oedichirus dimidiatus*** Epp. 1890

1890. *O. dimidiatus* Epp. *W.E.Z.* **9** : 280.

1931. *O. dimidiatus* Cameron, *The Fn. Brit. India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 27-28.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie Dist. (Arni Gad), Tamil Nadu, Madha Pradesh

Tribe PAEDERINI

This tribe is distinguished by the small and inconspicuous 4th joint of the maxillary palpi, which may be wart-like and closely applied to the 3rd joint or subulate.

Genus ***Paederus*** F., 1775

1775. *Paederus* Fab., *Syst. Ent.*, p. 268.

1931. *Paederus* Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 33-63.

Key to the Species of the genus *Paederus F.*

1. Last three segments of the abdomen black ..... *distinctus* Cam
– Last two segments of the abdomen black. 2
2. Head entirely red; elytra black ..... *nigripennis* Cam
– Head entirely black or blue black in color. 3
3. Legs including coxae dark 5
– Legs including at least in part of the coxae dark 4
4. Head orbicular; 1st segment of abdomen red ..... *extraneus* Wied
– Head elongate; temples obliquely converging behind; 1st segment of abdomen black ..... *nigricornis* Bernh
5. Coxae and extreme base of femora testaceous ..... *alternans* Walk
– Coxae and femora either entirely or greater part testaceous 6
6. Anterior femora entirely testaceous 7
– Anterior femora dark at apex 8
7. Species larger (9mm); last joint of antennae testaceous ..... *sondaicus* Fauv
– Species smaller (6.5 mm); last joint of antennae concolorous ..... *fuscipes* Curt
8. Prothorax closely and distinctly punctured. ..... *sharpi* Cam
– Prothorax sparsely & finely punctured 9
9. Head orbicular ..... *himalayicus* Bernh
– Head transverse 10
10. Species larger (9.5 mm) 11
– Species smallr (5.2 to 8.25 mm) 13
11. Head orbiculate; elytra quadrate and puncturation on it unequal ..... *basalis* Bernh
– Head narrowed behind; elytra longer than broad, puncturation fine and equal ..... *kuluensis* Bernh
12. Base of the first abdominal segment blackish ..... *birmanus* Fauv
– Base of the first abdominal segment concolorous 13
13. Scutellum black 14
– Scutellum reddish 16
14. Elytra steel blue ..... *melampus* Er
– Dlytra dark blue 15
15. Head and prothorax narrowed behind ..... *almorensis* Cam
– Head orbicular, prothorax less narrowed behind ..... *tamulus* Er
16. Species smaller (5.5 mm); Elytra less closely punctured and pubescent ..... *conicollis* Motsch
– Species larger (6-8 mm) 17
17. Puncturation on elytra very coarse and rugose ..... *pilifer* Motsch
– Puncturation on elytra normal ..... *coxalis* Fauv

5. ***Paederus sondaicus*** Fauv. 1895

1895. *Paederus sondaicus* Fauv; *Rev. d'Ent.* **14** : 232.

1859. *Paederus* javanus Er. *Gen. Spec. Staph.*, p. 654.

1931. *Paederus sondaicus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 37-38.

2000. *Paederus Sondaicus* Biswas and Biswas, *Zool. Surv. India, State Fauna Series, 4; Fauna of Meghalaya*, Part 5 : 137.

Material examined : 3 exs., INDIA : Uttarakhand : Chamoli dist., Tangarii, alt 1550m, 2 exs., 5.xi.2002, Dr. P. Mukhopadhyay & party coll., ex. "Leaf litter". Nainital dist., Kainchi, 1 ex., 11.x.2001, Dr. P. Mukhopadhyay coll. Ex. "Beating bushes". Almora dist., Artola, 2 ex., 29.ix.2001, Dr. P. Mukhopadhyay & Party. Coll. Ex. Scraping Farm.

Distribution : INDIA : Uttarakhand : [Chamoli dist (Tangarii), Nainital dist. (Kainchi), Almora Dist. (Artola)] Meghalaya, Tamil Nadu and Maharashtra.

Elsewhere : Sri Lanka, Myanmar, Indonesia and Tonkin

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

6. ***Paederus sharpi*** Cam. 1914

1914. *Paederus sharpi* Cam., *Trans. Ent. Soc. Lond.*, p. 539.

1931. *Paederus sharpi* Cameron : *The fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 38.

Material examined : 10exs., INDIA : Uttarakhand : Uttarkashi dist., Dharasu, 5exs., 5.v.2002, S.K. Chakraborty and party coll, ex. "On the river bed of Ganga". Nainital dist., Kherna, 1ex., 12.xi.2000, S.K. Mondal & party. Parui dist., Khankra, 1ex., 27.vi.2004, S.K. Chakraborty & party coll., ex. "On sand". Parui dist., Dugada, 2exs., 26.1.2004, S.K. Chakraborty and party coll. ex. "On sand" Rudraprayag dist., Rudraprayog, alt 800m, 1ex., 6.xi.2002, Dr. P. Mukhopadhyay & party coll., ex. " Under stone by the side of Alakananda river".

Distribution : INDIA : Uttarakhand : Uttarkashi (Dharasu), Nainital (Kherna), Parui (Khankra, Dugada) Rudraprayag.

Elsewhere : Bangladesh.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

7. ***Paederus himalayicus*** Bernh. 1914

1914. *Paederus himalayicus* Benhauer, *W.Z.B.*, pp. 64-98.

1911. *Paederus indicus* Bernhauer, *Ent. Blatt.*, **7** : 61

1931. *Paederus himalayicus* : Cameron, *The Fauna of British India, including Ceylon and Burma, (Coleoptera : Staphylinidae)*, **2** : 39-40

1995. *Paederus himalayicus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series, 3 : Fauna of West Bengal*, Part **6**(A) : 273.

Material examined : 2ex., INDIA : Uttarakhand : Almora dist., Arlola, 2ex., 29.ix.2001, Dr. P. Mukhopadhya coll., ex. Scraping fern.

Distribution : INDIA ; Uttarakhand : Almora (Dwarahat alt 5000ft., Kali valley, alt 9000 H) Sikkim, Chakrata, West Bengal, Himachal Pradesh.

8. ***Paederus melampus*** Erichson 1839-40

1939-40. *Paederus melampus* Er., *Gen. spec. staph.* p. 660.

1859. *Paederus melampus* Kr., *Arch. Naturg.* **25**(i) : 153.

1931. *Paederus melampus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 43.

1995. *Paederus melampus*, Biswas and Biswas, *Zoological Survey of India State Fauna Series*, 3 : *Fauna of West Bengal*, Part **6**(A) : 275.

Material examined : 9 exs., INDIA : Uttarakhand : Tehri Garhwal dist. Nainbag, 8exs, 20.xi.2003, S.K. Chakraborty & party coll. Tehri Garhwal dist., Arakot, 1 ex., 25.i.2003. S.K. Chakraborty & party coll.

Distribution : INDIA : Uttarakhand : Dist. Tehri Garhwal (Nainbag), Arakot.

Elsewhere : Bangladesh.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

9. ***Paederus fuscipes*** Curtis 1823-40

1823-40. *Paederus fuscipes* Curtis, *Ent. Brit.*, **3** : 108.

1939-40. *Paederus aestuams* Erichson, *Gen. spec. staph.*, p. 655.

1843. *Paederus angolensis* Erichson, *Arch. Naturgesh.* **9**(1) : 222.

1861. *Paederus corsicus* Gant., *Ann. Soc. Ent. Fr.*, **4**(1) : 393.

1867. *Paederus erichsoni* Woll., *Col. Hesperid.*, p. 247.

1931. *Paederus fuscipes* : Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 40-41.

1995. *Paederus fuscipes* : Biswas and Biswas, *Zool. Surv. India, State Fauna* Series 3 : Fauna of West Bengal Part **6**(A) : 274-275.

2000. *Paederus fuscipes* : Biswas and Biswas, *Zool. Surv. India, State Fauna Series*, 4 : Fauna of Meghalaya, Part 5; 137.

2000. *Paederus fuscipes* : Biswas and Biswas, *Zool. Surv. India, State Fauna Series*, 7 : Fauna of Tripura, Part **3** : 74-75.

2003. *Paederus fuscipes*, Biswas, *Zool. Surv. India*, State Fauna series 9, Fauna of Sikkim (Part-3) : 259.

Material examined : 2exs. INDIA : Uttarakhand : Rudraprayag dist.; Nagrasu, alt 950m, 2exs., 7.xi.2002, Dr. P. Mukhopadhyay coll., ex. "Dusting on wild bushes"

Distribution : INDIA : Uttarakhand : [Rudraprayag (Nagrasu)] Bihar, Karnataka, Madhya Pradesh, West Bengal, Meghalaya and Tripura.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

10. ***Paederus extraneus*** Wied 1818

1818. *Paederus extraneus* Wied., *Zool. Mag.* **2**(i) : 133, 200

1839-40. *Paederus extraneus*, Er. *Gen. Spec. staph.* p. 661

1859. *Paederus extraneus*, Kr., *Arch. Naturg.* **25**(i) : 152

1931. *Paederus extraneus*, Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 41.

Material examined : 1ex., INDIA : Uttarakhand : Garhwal dist. Rambur, Alt 2000ft. 1ex., 28. iv.1988, B.S. Lamba coll.

Distribution : INDIA : Uttarakhand : Garhwal dist. (Rambur), Bengal

11. ***Paederus tamulus*** Er. 1839-40.

1839-40. *Paederus tamulus* Er., *Gen. spec. staph.*, p. 661.

1859. *Paederus tamulus* Kraatz, *Arch. Naturg.* **25**(i) : 153.

1859. *Paederus dubius* Kr. *Arch. Naturg.* **25**(i) : 151.

1874. *Paederus mixtus* Shp. *Trans. Ent. Soc. Lond.* p. 75.

1859. *Paederus rugipennis* Motsch., *Et. Ent.* **8** : 74.

1931. *Paederus tamulus* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 43-44.

1995. *Paederus tamulus*, Biswas and Biswas, *Zool. Zool. Surv. India, State Fauna Series, 3, Fauna of West Bengal* (Part 6A) : 275-276.

Material examined : 1ex., INDIA : Uttarakhand : Kumaon Alt-4000 ft. BHIM, 1ex., 19-22.ix.1906.

Distribution : INDIA : Uttarakhand : Kumaon, West Bengal.

Elsewhere : Sri Lanka, Myanmar, Singapore, Tonkin, China, Southern Japan.

12. ***Paederus nigricornis*** Bernh. 1911

1911. *Paederus nigricarnis* Bernh., *Ent. Blatt.* **7** : 61.

1931. *Paederus nigricornis*, Cameron : *The Fauna of British India, including Ceylon* and *Burma*, **2** : 47-48.

1995. *Paederus nigricornis*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 273.

2003. *Paederus nigricornis*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part-3) : 259.

Material examined : 8exs.; INDIA : Uttarakhand : Garhwal dist., Binahi, Alt. 7000ft., 5exs., 6.vii.1958, B.S. Lamba coll.; Rudra Prayag dist., Agasthamuni alt. 750 mt. 1ex., 7.x.2004, P. Mukhopadhyay col., ex "Garbage with dump" Karnaprayag dist., Chamoli, Alt. 940m., 2ex, 29.x.2002, P. Mukhopadhyay coll., ex. "On sand"

Distribution : INDIA : Uttarakhand : Garhwal dist. (Binahi), Rudraprayag dist.(Agasthamuni), Karnaprayag dist. (Chamoli), Sikkim, Himachal Pradesh, Uttar Pradesh and West Bengal.

Elsewhere : Nepal.

13. ***Paederus almorensis*** Cameron, 1931

1931. *Paederus almorensis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 49.

Material examined : 1x., INDIA : Uttarakhand : Tehri Garhwal dist., Nainbugh, 1ex, 20.xi.2005, S.K. Chakraborty coll.

Distribution : INDIA : Uttarakhand : Garhwal.

14. ***Paederus basalis*** Bernh 1914

1914. *Paederus basalis* Bernh., *W.Z.B.* **64** : 98.

1931. *Paederus basalis,* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 54.

2000. *Paederus basalis,* Biswas and Biswas, *Zool. Surv. India. State Fauna Series, 4 : Fauna of Meghalaya,* Part (5) : 137.

Material examined : 14exs.; INDIA : Uttarakhand : Garhwal dist. Rampur, Alt-7000ft., 4exs., 29.iv.1958 and 16.viii.1958; Dehra Dun dist, Rajaji Sanctuary, 4exs., 18. xi.1962, R.P. Ghosh coll; Dehra Dun, 1ex., 27.ii.1921, M. Cameron coll; Nainital dist. Kherna, 2exs., 12.XI. 2000, Pauri dist. Khankra, 1ex., 27. VI. 2004, S.K. Chakraborty coll.; ex "On sand" Pauri dist., Dugada, 1ex., 26.i.2004, S.K. Chakraborty coll., ex. "On sand"; Uttarkashi dist., Dehrasu, 1ex., 5.v.2002, ex. "river bed of Ganga"

Distribution : INDIA : Uttarakhand : Garhwal dist.(Rambur), Dehra Dun dist.(Rajaji sanctuary), Nainital dist. (Kherna), Pauri dist. (Khankra, Dugada), Uttarkashi dist.(Dharasu). Meghalaya, Uttar Pradesh.

15. ***Paederus nigripennis*** Cameron 1924

1924. *Paederus nigripennis* Cam., *Trans. Ent. Soc. Lond.* p. 180.

1931. *Paederus nigripennis,* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Stephylinidae),* **2** : 57-58.

1995. *Paederus nigripennis,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part **6**(A) : 273.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Siwaliks (Kheri Rau) West Bengal, Uttar Pradesh.

16. ***Paederus Kuluensis*** Bernh 1914

1914. *Paederus Kuluensis* Bernh., *W.Z.B.* **64** : 99

1931. *Paederus Kuluensis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 55.

Material examined : 1ex., INDIA : Uttarakhand : Kumaon, Malwa Tal, 2500 ft., 1ex., S. kemp.

Distribution : INDIA : Uttarakhand : Kumaon (Malwa Tal).

17. ***Paederus birmanus*** Fauv. 1895

1895. *Paederus birmanus* Fauv., *Rev. d'Ent.* **14** : 233.

1931. *Paederus birmanus,* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 46-47.

Material examined : 9ex., INDIA : Uttarakhand : Tehri Garhwal dist., Nainbag, 7exs, 20.xi.2003, S.K. Chakraborty & Party Coll. Arakot, 2exs, 25.1.2003, S.K. Chakraborty & Party Coll.

Distribution : INDIA : Uttarakhand (Tehri Garhwal, Nainbug, Arakot), Nagaland.

Elsewhere : Myanmar.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

18. ***Paederus distinctus*** Cameron, 1931

1931. *Paederus distinctus* Cameron : *The Fauna of British India, including Ceylon and Burma. (Coleoptera : Staphylinidae),* **2** : 57.

Material examined : 1ex., INDIA : Uttarakhand : Tehri Garhwal dist., Suakhali, 22.xi.2003, S.K. Chakraborty Coll.

Distribution : INDIA : Uttarakhand (Tehri Garhwal dist., Suakhali), W.B.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

19. ***Paederus pilifer*** Motsch.

1859. *Paederus pilifer* Motsch. *Etud. Ent.* **8** : 74.

1931. *Paederus pilifer* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 44.

Material examined : 1ex, INDIA : Uttarakhand : Dugada, Parui, 1ex, 26.i.2004, S.K. Chakraborty Coll. Ex. "Sand"

Distribution : INDIA : Uttarakhand : Pauri (Dugada). Tranquebar.

Remarks : In the present study this species is recorded for the first time from Uttarakhand.

20. ***Paederus conicollis*** Motsch, 1859

1859. Pa*ederus conicollis* Motsch., *Et. Ent.* **8** : 73.

1931. Paederus conicollis Cameron : *The Fauna of British India, including Ceylon & Burma (Coleoptera : Staphylinidae)* **2** : 51-52.

Material examined : 1ex, INDIA : Uttarakhand : Tehri Garhwal, Nainbugh, 1ex, 20.xi.2005, S.K. Chakraborty Coll.

Distribution : INDIA : Uttarakhand : Tehri Garhwal (Nainbagh), Tamil Nadu, Maharastra, Pondichery, Genji.

21. *Paederus coxalis* Fauv., 1895

1895. *Paederus coxalis* Fauv., *Rev. d'Ent.* **14** : 232.

1931. *Paederus coxalis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 42-43.

Material examined : 3exs., INDIA : Uttarakhand : Nainital dist., 3exs, 21.xii.2003, B.G. Kundu Coll.

Distribution : INDIA : Uttarakhand : Nainital dist., (Nainital).

Elsewhere : Myanmar (Senmigion; Vyonk-Myonig, Mandalay; Teinzo; Rangoon; Bhamo; Schwego-myo; Myeen-Kyan (L. Fea).

Remarks : In the present study this species is recorded for the first time from India and first time in Uttarakhand.

22. *Paederus alternans* Walk 1858

1858. *Paederus alternans* Walk., *Ann. Mag. Nat. Hist.* (3) ii, p. 205.

1859. *Paederus ruficoxis* Kr., *Arch. Naturg.* **25**(i) : 151.

1931. *Paederus alternans* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 41-42.

Material examined : Not available.

Distribution : INDIA : Ullaran Tamil Nadu, Himalayas.

Elsewhere : Srilanka, Myanmar, Annam, Tonkin.

Genus *Dibelonetes* Sahlb., 1844

1844. *Dibelonetes* Sahlb., *Act. Soc. Fenn.* **2** : 791.

1882-87. *Dibelonetes*, Sharp, *B.C.A.I*, **2** : 601.

(1886).

1905. *Dibelonetes*, Casey, *Trans. AC St. Louis*, **15** : 235.

1858. Sunides Motsch., *Bull. Mosc.* **31**(ii), p. 638, tab. I, fig. C.

1839-40. Sunius (Spurii) Er., *Gen. Spee.. Staph.* p. 645 (ex Parte).

1931. *Dibelonetes* Cameron : *The Fauna of British India, including Ceylon & Burma (Coleoptera : Slaphylinidae)*, **2** : 63-64.

Key to the species of Dibelonetes Sahlberg

1. Elytra bicolour .... *bengalensis* Biswas & Sengupta

   Elytra unicolour .... *bhaumiki* Biswas & Sengupta

23. *Dibelonetes bengalensis* Biswas and Sengupta, 1980

1980. *Dibelonetes bengalensis* Biswas & Sengupta. *Oriental Insects*, **14** (2) : 253-262.

Matereials examined : 2exs : INDIA : Uttarakhand : Dehra Dun; Mussorie, 1ex, 19.xi.2003, Dr. S.K. Chakraborty Coll. Hardwar; Kansrao forest range, 1ex, 9.xi.2000, Dr. P. Mukhopadhya Coll, ex. "Under dry banana leaves"

Distribution : INDIA : Uttarakhand (Dehra Dun, Mussorie, Hardwar), Meghalaya, Uttar Pradesh, West Bengal, Manipur.

Remarks : First time from Uttarakhand.

Genus *Astenus* Steph, 1832

1832. *Astenus* Steph., I ll. *Brit. Ent. Mand.* **5**, P. 275.

1931. *Astenus* Cameron, *The Fauna of British India, including Ceylon & Burma (Coleoptera : Staphylinidae)*, **2** : 64-91.

Key to the species of the genus *Astenus* Steph

1. Species either entirely or greater part black or brown 2

– Species either entirely or greater part reddish *testaceous* 7

2. Abdomen with first four segments red and rest black; elytra black; prothorax with fine longitudinal rugae ..... *gratus* Cameron

– Abdomen black or brown and its posterior margin more or less rupfescent 3

3. Species larger (5mm); Elytra each with a round spot with variable size, sometimes extending upto epipleura; elytral suture narrowly black ..... *marginalis* Cameorn

– Species smaller (4-4.75 mm) 4

4. Legs testaceous, the apex of the femora blackish; antennae short, anterior abdominal segments more or less finely punctured ..... *gratellus* Fauv

– Legs entirely testaceous 5

5. Elytra with posterior margin only reddish testaceous; prothorax with fine longitudinal rugae ..... *varians* Cameron

– Elytra with posterior margin not reddish testaceous 6

6. Elytra and abdomen shining; elytra with lrge sinuate yellow mark at the posterior region from the middle of the suture to posterior external angle ..... *leptocerus* Epp

– Elytra scarcely shining, each elytra with a rounded spot of variable size and sometimes extending to epipleura ..... *marginalis* Cameron

7. Abdomen entirely reddish testaceous or brown 8

– Abdomen entirely brown ..... *semibrunneus* Cameron

8. Species smaller 3.25 to 3.5 mm. in length, sides of prothorax with two long black setae ..... *melanurus* Kiist

– Species larger (4-4.5 mm in length) 9

9. Sixth ventral segment in male with small subtriangular excision, the apex rounded; 5th broadly and slightly emarginated and furnishd with rather long black spines ..... *flavipennis* Cameron

– 6th ventral segment in male with acute triangular emargination; 5th broadly emarginated, and furnished with numerous long closely arranged species ..... *gracilentus* Fauv

24. *Astenus gratus* Cameron

1931. *Astenus gratus* Cameron, *The Fauna of British India, including Ceylon and Burma, (Coleoptera : Staphylinidae)*, **2** : 72.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun).

25. *Astenus gratellus* (Fauvel)

1879-80. *Sunius gratellus* Fauv., *Ann. Mus. Civ. Gen.* **15** : 83.

1895. *Sunius gratellus* id., *Rev. d'Ent.* **14** : 222.

1859. *Sunius pulchcllus* Kr., *Arch. Naturg.* **25**(I) : 149 (Pracocc.).

1931. *Astenus gratellus* (Fauv.) : Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 72-73.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, Nilgiri Hills; Bombay.

Elsewhere : Myanmar (Tenasserim) Sri Lanka-(Colombo; Kandy) Sumatra, Java, Annam and Tonkin.

26. *Astenus leptocerus* (Epp.)

1895. *Sunius leptocerus* Epp., *W.E.Z.* **14** : 64.

1931. *Astenus leptocerus* : Cameron, *The fauna of British India, including Ceylon and Burma (Coleoptera : staphylinidae)*, **2** : 75 – 76.

1995. *Astenus leptocerus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series : Fauna of West Bengal*, Part 6(A) : 269.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun, Mussoorie), West Bengal, Madhya Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka, Rodriguez Islands.

27. *Astenus pulchripennis* Cameron

1931. *Astenus pulchripennis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 76-77.

Material examined : 4exs., INDIA : Uttarakhand : Chakrata dist., Konain, 8000 ft., 1ex., 24–30.v.22, Dr. Cameron coll., Chakrata dist., Manjgaon, 1ex., 18.v.22, S.N. Chatterjee coll., Chakrata dist., Chulli Khud, 6500ft. 20.v.22. Dr. Cameron coll. Almora dist., Pathlibagal, 1ex, 7.x.2001, Dr. P. Mukhopadhya Coll, ex. "Moist fern with grass"

Distribution : INDIA : Uttarakhand : Chakrata and Musscorie district.

Remarks : This species was recorded from damp debris near streams.

28. *Astenus marginalis* Cameron

1931. *Astenus marginalis* : Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 77-78.

Material examined : Fauna 2exs, INDIA : Uttarakhand; Almora, Dwarahat N. of Ranikhet, 2exs, 22.iii.2001, S.K. Chakraborty Coll, ex "Left litter of Pine"

Distribution : INDIA : Uttarakhand : Mussoorie district : (Kemti Falls, Dhobi Ghat). Chekrata district (Manjgaon, alt. 6,500 ft.). Almora (Dwarahat, N of Ranikhet).

29. *Astenus varians* Cameron

1931. *Astenus varians* : Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 78 – 79.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun. Siwaliks : (Kheri Rau, Nakraunda); Mussoorie district : (Arni Gad, Kolhu Khet Gad).

30. *Astenus flavipennis* Cemeron

1931. *Astenus flaripennis* : Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 80.

1995. *Astenus flavipennis*, Biswas and Biswas, *State Fauna Series 3 : Fauna of West Bengal.* Part **6**(A) : 270.

Material examained : 1ex, INDIA : Uttarakhand; Rudraprayag, Nagrasu, alt 950 m., 1ex, 7.xi.2002, Dr. P. Mukhopadhya Coll, ex "Dusting on wild bushes"

Distribution : INDIA : Uttarakhand : Dehra Dun (nim Nadi), Kumaon (Haldwani) Siwaliks (Nakraunda), H.P.

31. *Astenus gracilentus* Fauv.

1859. *Sunius gracilis* Kr., *Arch. Naturg.*, **25**(i), p. 147 (Pracoce).

1879-80. *Astenus gracilentus* Fauv. *Ann. Mus. Civ. Gen.*, **15** : 83.

1931. *Astenus gracilentus* : Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 84-85.

1995. *Astenus gracilentus*, Biswas and Biswas, *Zoll. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part **6**(A) : 270.

2000. *Astenus gracilentus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part **5** : 131.

2000. *Astenus gracilentus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 71.

2003. *Astenus gracilentus*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim*, Part-**3** : 260.

Material examined : 4exs; INDIA : Uttarakhand; Dehra Dun dist., Herbertpur, 3exs., 30.x.2000, P. Mukhopadhyay coll., ex. Leaf Litter under bark "Rudraprayag dist., Nagrasu, alt 950m, 1ex., 7.11.2002, P. Mukhopadhyay c oll., ex. Dusting on wild bushes" Nainital dist. Dhikala, 1ex., 10.x.1976, T. Sengupta coll.

Distribution : INDIA : Uttarakhand : Dehra Dun (Herbertpur); Rudraprayag (Nagrasu). Meghalaya, Tamil Nadu, Uttar Pradesh, West Bengal and Tripura.

Elsewhere : Bangladesh and Singapore.

32. *Astenus melanurus* (Küst)

1853. *Sunius melanurus Kust. Kaf. Eur.*, **24** : 76.

1858. *Sunius melanurus* Kraatz, *Berl. Ent. Zeit.*, **2** : 67.

1870. *Sunius amulus* Rottbg., *Berl Ent. Zeit.*, **14** : 33.

1860. *Sunius apicalis* Motsch., *Bull. Mosc.*, **33**(2) : 560.

1904. *Astenus apicalis* var. subnotatus Fauv., *Rev. d"Ent.*, **23** : 51.

1931. *Astenus melanurus* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 86-87.

1995. *Astonus melanurus* var. subnotatus : Biswas and Biswas, *Zool. Surv. India, State Fauna series 3 : Fauna aof West Bengal*, Part **6**(A) : 271-272.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun. West Bengal, Maharashtra.

Elsewhere : Mediterranean, Canary Islands, South Africa and Java.

33. *Astenus semibrunneus* Cameron

1931. *Astenus semibrunneus* : Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 87-88.

1995. *Astenus semibrunneus*; Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 271.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, W.B.

Genus *Stilicopsis* Saches. 1852

1852. *Stilicopsis Saches*, Stett. *Ent. Zeit.*, **22** : 144.

1931. *Stilicopsis Cameron., The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 91-98.

34. *Stilicopsis flavipennis* Comeron

1931. *Stilicopis flavipennis* Cameron : *The Fauna of British India, including Celon and Burma (Coleoptera : Staphylinidae)*, **2** : 96-97.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Chakrata district (Sijla Gad, Mohna, Bimal Gad, alt. 3500 to 5000 feet). Mussoorie district (Arni Gad, alt 5000 to 6000 feet.).

35. *Stilicopsis dorsolineata* Cameron

1924. *Stilicopsis dorsolineata* Cam. *Trans. Ent. Soc. Lond.*, p. 181.

1931. *Stilicopsis dorsolineata* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 97-98.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, Mussoorie dist. (Arni Gad).

36. *Stilicopsis indica* Cameron

1931. *Stilicopes indica* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidade)*, **2** : 98.

1995. *Stilicopsis indica* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 278-279.

2000 *Stilicopsis indica* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 75-76.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, West Bengal, Tripura.

37. *Stilicopsis pallida* Cameron

1931. *Stilicopsis pallida* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 98.

1995. *Stilicopsis pallida*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 278.

2000. *Stilicopsis pallida*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 75.

2003. *Stilicopsis pallida*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part-3) : 262.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, West Bengal, Tripura, Sikkim.

38. *Stilicopsis trinotata* (Kr.)

1859. Sunius trinotatus Kr., *Arch. Naturg*, **15** : 149.

1931. *Stilicopsis trinotata* (Kr.) : Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 95-96.

2000. *Stilicopsis trinotata*, Biswas and Biswas; *Zool. Surv., India, State Fauna Series 7 : Fauna of Tripura*, Part 3, p. 76.

2003. *Stilicopsis trinotata*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part 3) : 262.

Material examined : 1ex : INDIA : Uttarakhand : Rudraprayag, Nagrasu, alt 950 m, 1ex, 7.xi.2002. Dr. P. Mukhopadhya, Coll., ex. "Dusting on wild bushes".

Distribution : INDIA : Uttarakhand : Rudraprayag (Nagrasu). Tripura, Sikkim, T.N., Bihar.

Elsewhere : Sri Lanka.

Genus *Stilicus* Latr. 1825

1825. *Stilicus* Latr., *Encyc. Meth.* **10** : 495

1931. *Stilicus* Cameron, *The Fauna of British India, incl., Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 101-110.

Key to the species of the genus *Stilicus* Latr

1. Species smaller (2.4-3mm) 2

– Species larger (3.5-5.75mm) 4

2. Elytra brownish yellow, shiny; antenna and legs testaceous ..... *rufescens* Sharp

– Greater part of elytra dark 3

3. Head subquadrate, nearly as broad as elytra, posterior angles rounded, densely coriaceous ..... *pygmaeus* Kr.

– Head suborbicular, narrower than elytra, posterior angle more broadly rounded, uniformly coriaceous ..... *parvus* Cameron

4. Elytra unicolorous, finely and closely punctured & pubescent ..... *sericeus* Motsch

– Elytra bicolorous 5

5. Most of the part of elytra yellowish 6

– Elytra dark, posterior margin reddish yellow 7

6. Penultimate segment of antennae as long as broad, sericeous species ..... *velutinus* Fauv.

– Penultimate segment of antennae transverse, species not sericeous ..... *ceylanensis* Kr.

7. Antennae more longer, 7th & 8th segments transverse, 10th segment as long as broad; elytra with an obscure blackish mark at the postero-internal angle ..... *simlaensis* Cam.

– Antennae with 3rd segment longer than second, 4th to 8th longer than broad, 9th and 10th as long as broad; the base, shoulder and greater part of elytral disc testaceous ..... *plagiatus* Cam.

39. *Stilicus velutinus* Fauv.

1895. *Stilicus velutinus* Fauv. *Rev. d'Ent.* **14** : 226.

1931. *Stilicus velutinus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 103-104.

1995. *Stilicus velutinus*, Biswas and Biswas, *Zool. Surv. India, State fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 290.

2000. *Stilicus velutinus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 72.

Material examined : 2ex, INDIA : Uttarakhand : Chakrata dist., Manjgaon, 6500 ft., 1ex., 5.v. 22, Dr. Cameron coll., Dist. Bageswar, Garur, 1ex., 30.viii.2005, S.K. Chatterjee coll.

Distribution : INDIA : Uttarakhand : Dehra Dun : Mussoorie, Chakrata dist (Manjgaon), Bageswar (Garur), West Bengal, Tripura.

Elsewhere : Myanmar.

40. *Stilicus ceylanensis* Kraatz

1859. *Stilicus ceylanensis* Kr. *Arch. Naturg.* **25**(i) : 126.

1931. *Stilicus ceylanensis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 105-106.

2003. *Stilicus ceylanensis*, Biswas, *Zool. Surv. India, State fauna Series 9, Fauna of Sikkim*, Part 3 : 262.

Material examined : INDIA : Uttarakhand : Dehra Dun dist. Herbertpur 1 ex., 30.x.2000, Dr. P. Mukhopadhyay coll., ex. "Leaf Litter" Rudraprayag dist., Nagrasu, alt 950m, 2 exs., 7.11.02, Dr. P. Mukhopadhyay coll. Ex. "Dustin on wild bushes".

Distribution : INDIA : Uttarakhand: Dehra Dun; Siwaliks, Dehra Dun dist. (Herbertpur), Rudraprayag (Nagrasu), Sikkim.

Elsewhere : Sri Lanka.

41. *Stilicus simlaensis* Cameron

1931. *Stilicus simlaensis* : Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 106.

Material examined : 4exs. INDIA : Uttarakhand : Chakrata & Mussoorie districts alt 6000 to 7000 feet. Hardwar dist., Kansrao Forest range, 2ex., 9.xi.2000, Dr. P. Mukhopadhayay coll. Ex. "Under bark". Dehra Dun dist. alt. 2500 Laacchiwala Forest; 1ex., 28.x.2000, Dr. P. Mukhopadhyay & party coll. Ex. "Under bark" Almora Dist., Pathlibagal, 1ex., 7.10.2001, Dr. P. Mukhopadhyay & party coll. ex. " Moist Fern & grass"

Distribution : INDIA : Uttarakhand : Chakrata and Mussoorie districts. Hardwar dist. (Kansrao forest range). Dehra Dun district (Lacchiwala Forest). Almora dist. (Pathlibagal).

42. *Stilicus plagiatus* Cameron

1924. *Stilicus plagiatus* Cam., *Trans. Ent. Soc. Lond.*, p. 181.

1931. *Stilicus plagiatus* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 107.

Material examined : 1ex., INDIA : Uttarakhand : Rudraprayag dist., Nagrasu, alt. 950m. 1ex., 7.xi.2002, Dr. P. Mukhopadhyay and party coll., ex. "Dusting on wild bushes"

Distribution : INDIA : Uttarakhand : Rudraprayag dist.(Nagrasu).

Remarks : This species is recorded for the habitat like excavating nest of *Hodotermes obesus.*

43. *Stilicus rufescens* Shp.

1874. *Stilicus rufescens* shp., *Trans. Ent. Soc. Lond.*, p. 61.

1885. *Stilicus rubellus* Epp., *D.E.Z.*, p. 121.

1914. *Stilicus rufescens* var indicus Cam., *Trans. Ent. Soc. Lond.* p. 542.

1931. *Stilicus rufescens* : Cameron : *The Fauna of british India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 108-109.

2000. *Stilicus rufescens,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : fauna of Tripura,* Part **3** : 73.

2000. *Stilicus rufescens,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya,* Part **5** : 133.

2003. *Stilicus rufescens,* Biswas, *Zool. Surv. India, State Fauna Series 9, fauna of Sikkim* Part **3** : 262.

Material examined : INDIA : Uttarakhand : Bageswar dist., Garur, 1ex., 30.viii.2005, S.K. Chatterjee coll.

Distribution : INDIA : Uttarakhand : Mussoorie Bageswar dist. (Garur), Tamil Nadu, Meghalaya, Tripura.

Elsewhere : Sri Lanka, Myanmar, Oriental region to Japan also on the west and east coast of Africa.

44. *Stilicus pygmaeus* Kr.

1859. *Stilicus pygmacus* Kr., *Arch Naturg.* **25**(i), p. 126.

1931. *Stilicus pygmacus* Cameron : *The Fauna of British India, inclusing Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 109.

1995. *Stilicus pygmacus,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part **6**(A) : 289-290.

2000. *Stilicus pygmacus,* Biswas and Biswas, *Zool. Surv.India, State Fauna Series 7 : Fauna of Tripura,* Part **3** : 72.

2000. *Stilicus pygmacus,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya,* Part **5** : 138.

Material examined : 2exs., INDIA : Uttarakhand : Hardwar dist., Kansrao Range Forest 2exs., 9.xi.2000, Dr. P. Mukhopadhyay & party coll. ex. " Under bark of Log" Pauri-Garhwal dist., Deoprayag, Alt. 2781, 1ex, 4.xi.2000, Dr. P. Mukhopadhya Coll, Ex. "under bark"

Distribution : INDIA : Uttarakhand : Hardwar dist. (Kansrao range forest), Pauri Garwal dist., West Bengal, Tripura, Meghalaya.

Elsewhere : Sri Lanka, Malay states, Saigon and Timor.

Remarks : First time from Uttarakhand.

45. *Stilicus sericeus* Motsch

1858. *Stilicus scriceus* Motsch., *Bull. Mosc.* **31**(ii) : 640.

1931. *Stilicus scriceus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 104.

Material examined : 7exs : INDIA : Uttarakhand : Hardwar dist., Kansarao forest range, 4exs, 9.xi.2000, Dr. P. Mukhopadhya Coll, ex. "Under banana leaves" and "Under nark" Nainital, Bhimtal Alt 1450 m, 1ex, 19.iii.2001, S.K. Chakraborty & Party Coll, ex. 'Haystack' Dehra Dun, Nepali farm, 1ex, 29.x.2000, Dr. P. Mukhopadhya, Coll., Pithoragarh, Gangoli hat, 1 ex, 5.ix.2005, S.K. Chatterjee Coll.

Distribution : INDIA : Uttarakhand; Hardwar dist. (Kansarao forest range), Nainital (Bhimtal), Dehra Dun (Nepali farm), Pithoragarh (Gangoli hat).

Remarks : First time from Uttarakhand.

46. *Stilicus parvus* Cameron

1931. *Stilicus parvus* Cameron : *The Fauna of British Ibndia, including Ceylon and Burma (Coleoptera : Staphylidae)*, **2** : 109-110.

1995. *Stilicus parvus,* Biswas and Biswas, *Zool. Surv. India, Dtate fauna Series 3 : Fauna of West Bengal,* Part **6**(A) : 290.

2003. *Stilicus parvus,* Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part 3).

Material examined : 1exs., INDIA : Uttarakhand : Hardwar dist. Kansrao range forest, 4exs. 9.xi.2000, Dr. P. Mukhopadhyay & party coll. ex. " Under bark of log and Banana leaves" Rudraprayag, Mastura, 1ex, 10.x.2004, O. Mukhopadhya Coll, ex. "Bealing habs"

Distribution : INDIA : Uttarakhand : Rudraprayag Dehra Dun.

Genus ***Stilicoderus*** Sharp

1889. *Stilicoderus sharp, Ann. Mag. Nat. Hist.* (6) iii, p. 320

1931. *Stilicoderus* Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 110 -114.

47. ***Stilicoderus feae*** Fauv.

1895. *Stilicoderus feae Fauv., Rev. d'Ent.*, **14** : 224

1931. *Stilicoderus feae* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 110-112.

1985. *Stiliderus feae* Rougemont, *Revue Suisse Zool.*, **92**(1) : 221.

1986. *Stiliderus feae* Rougemont, *Ent. Abh. Mus. Tierk.Dresden*, **49**(8) : 177.

1995. *Stilicoderus feae* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 295.

2000. *Stilicoerus feae* Biswas and Biswas, *Zool. Surv. India, State Fauna series 4 : Fauna of Meghalaya*, Part **5** : 140.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie district, alt 6000 to 7000 feet. Meghalaya, Tamil Nadu and West Bengal.

Elsewhere : Myanmar, Nepal, Thailand.

48. ***Stilicoderus fenestratus*** Fauvel

1895. *Stilicoderus fenestratus* Fauv. *Rev. d'Ent.* **14** : 225

1931. *Stilicoderus fenestratus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 112-114.

1986. *Stiliderus fenestratus* Rougemont : *Ent. Abh. Mus. Tierk. Dresden* **49**(8) : 169-170.

2000. *Stilicoderus fenestratus* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part **5** : 139.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie and Chakrata district alt. 6000 to 7000 feet. Assam, Meghalaya, Nagaland.

Elsewhere : Myanmar, Thailand, Nepal, Malay Peninsula.

Genus ***Psilotrachelus*** Kraatz 1859

1859. *Psilotrachelus* Kraatz, *Arch. Naturg.* **25**(i) : 124.

1931. *Psilotrachelus* Cameron., *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 114-117.

49. ***Psilotrachelus sculptipennis*** Kr.

1859. *Psilotrachelus sculptipennis* Kr., *Arch. Naturg*, **25**(i), p. 125

1931. *Psilotrachelus sculptipennis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Sataphylinidae)*, **2** : 117.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, Siwaliks, Mussoorie district.

Genus ***Thinocharis*** Kraatz 1859

1859. *Thinocharis* kraatz, *Arch. Naturg.* **15**(i), p. 142.

1931. *Thinocharis* Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 117-120.

50. ***Thinocharis nigrescens*** Cameron

1931. *Thinocharis nigrescens* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 119.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun, Mussoorie dist. (Arni Gad), Siwaliks : (Kheri Rau, Mohan Rau).

51. ***Thinocharis ruficollis*** Cameron

1931. *Thinocharis ruficollis* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : staphylinidae)*, **2** : 120.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie district (Arni Gad, Kemti Falls.)

52. *Thinocharis pygmoea* Kr.

1859. *Thinocharis pygmoea* Kr., *Arch. Naturg.* **25**(i) : 143.

1931. *Thinocharis pygmaea* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 120.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun. Siwaliks.

Elsewhere : Sri Lanka, Penang, Singapore, Southern China.

Genus *Lobochilus* Bernh. 1918

1918. *Lobochilus* Bernh., *Arch. Naturg*, **84**(A) : 179.

1931. *Lobochilus* Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 123-126.

53. *Lobochilus fortepunctatus* (Cam)

1924. *Neosclerus fortepunctatus* Cam., *Trans Ent. Soc. Lond.*, p. 189.

1931. *Lobochilus fortepunctatus* Cam. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 124.

1995. *Lobochilus fortepuncatatus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 284.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie district (Arni Gad, Kempti Falls), Chakrata district : (Khedar Khud, in stream moss), Assam, West Bengal.

Remarks : This species was recorded from stream moss.

54. *Lobochilus granulicollis* (Cam)

1924. *Neosclerus granulicollis* Cam., *Trans. Ent. Soc. Lond.* p. 190.

1931. *Lobochilus granulicollis* Cam. : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 125.

1995. *Lobochilus granulicollis*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 283.

Material examined : 1ex. Uttarakhand : Someshwar, Almora, 1ex, 25.3.2001, S.K. Chakraborty and Party Coll., ex "Cowdung"

Distribution : INDIA : Uttarakhand : Mussoorie district (Kaligad), West Bengal.

Remarks : This species is recorded from stream moss.

55. *Lobochilus frater* (Cam)

1924. *Neosclerus frater* Cam., *Trans Ent. Soc. Lond.*, p. 190.

1931. *Lobochilus frater* Cam. : *The Fauna of British India, including Ceylon and Burma (Coleoptera ; Statphylinidae)*, **2** : 125-126.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Mussoorie district : (Kaligad).

Remarks : This species is recorded from stream moss.

Genus *Acanthoglossa* Kr 1859

1859. *Acanthoglossa* Kr., *Arch. Naturg.*, **25**(i), p. 144.

1931. *Acanthoglossa* Cameron, *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 120-122.

56. *Acanthoglossa testaceipennis* Kr.

1859. *Acanthoglossa testaceipennis* Kr. *Arch Naturg.*, **25**(i), p. 145.

1931. *Acanthoglossa testaceipennis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 121-122.

1995. *Acanthoglossa testaceipennis*, Biswas and Biswas, *Zool. Surv. India, State fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 277.

2000. *Acanthoglossa testaceipennis*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 71.

2000. *Acanthoglossa testaceipennis*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part **5** : 133-134.

2003. *Acanthoglossa testaceipennis*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part 3) : 263.

Material examined : INDIA : Uttarakhand

Distribution : INDIA : Uttarakhand : Dehra Dun, Tamil Nadu, West Bengal, Tripura, Meghalaya, Sikkim.

Genus *Medon* Steph., 1832

1832. *Medon* Steph., Ill. *Brit. Ent. Mand.*, **5** : 273.

1931. *Medon* : Cameron, *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 129-155.

57. *Medon fauveli* Bernh.

1912. *Medon fauveli* Bernh., *Cat. Col.* xi, p. 234 (nom. Nov.).

1895. *Medon luctuosus* Fauv., *Rev. d'Ent.* Xiv, p. 229 (Praeocc).

1931. *Medon fauveli* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 133-134.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun and Mussoorie districts).

Elsewhere : Myanmar.

58. *Medon dolorosus* Cam.

1924. *Medon dolorosus* Ca, *Trans. Ent. Soc. Lond.*, p. 187.

1931. *Medon dolorosus* Cameron : *The Fauna of british India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 135.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district : Kaligad).

59. *Medon siwalikensis* Cameron

1931. *Medon siwalikensis* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 136.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun, Mussoorie district : Arni Gad, Siwaliks).

60. *Medon exasperatus* Cam.

1924. *Medon exasperatus* Cam., *Trans. Ent. Soc. Lond.*, p. 187.

1931. *Medon exasperatus* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 136-137.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district : Arni Gad, Chakrata district : Mohna).

61. *Medon rufoferrugineus* Cam.

1924. *Medon rufoferrugineus* Cam., *Trans. Ent. Soc. Lond.* p. 186.

1931. *Medon rufoferrugineus* Cameron, *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 137-138.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district : Arni Gad; Kemti falls).

62. *Medon cinnamopterus* (Kr.)

1859. *Lithocharis cinnamoptera* Kr., *Arch. Naturg.* **25**(i) : 141.

1920. *Medon orientalis* Cam., *Trans. Ent. Soc. Lond.*, p. 281.

1931. *Medon cinnamopterus* (Kr), Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 138.

1995. *Medon cinnamopterus* (Kr), Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 298.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun, Mussoorie district : Arni Gad, Kemti Falls). West Bengal.

Elsewhere : Malay Peninsula, Indonesia.

63. *Medon parkeri* Cam.

1924. *Medon parkeri* Cam., *Trans. Ent. Soc. Lond.*, p. 183.

1931. *Medon parkeri* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 141.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Almora : Zodh).

64. *Medon niger* Cam.

1924. *Medon niger* Cam., *Trans. Ent. Soc. Lond.*, p. 185.

1931. *Medon niger* Cameron : *The Fauna of British India,including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 145-146.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : (Mussoorie, Chakrata districts), Himachal Pradesh.

65. *Medon umbilicatus* Cam.

1924. *Medon umbilicatus Cam., Trans. Ent. Soc. Lond.*, p. 184.

1931. *Medon umbilicatus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 146-147.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : (Mussoorie, Chakrata districts), Himachal Pradesh.

66. *Medon stilicinus* (Cam.)

1924. *Stilicus lithocharoides* Cam. *Trans. Ent. Soc. Lond.*, p. 183

1931. *Medon stilicinus* Cameron : *The Fauna of british India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 149-150.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district, Arni Gad), Sikkim.

67. *Medon* (Hypomedon) immsi Berh.

1914. *Medon* immi Bernh., *W.Z.B. Ixiv*, p. 99

1818. *Medon* rubicundus Cam., *Trans. Ent. Soc. Lond.* p. 73.

1931. *Medon* (Hypomedon) immsi Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 152-153.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun).

Elsewhere : Singapore.

Remarks : This species was recorded from decaying log.

68. *Medon (Hypomedon) debilicornis* (Woll.)

1857. *Lithocharis debilicornis* Woll., *Cat. Mad. Col.*, p.194

1872. *Lithocharis debilicornis* Fauv. *Faun. Gallo-Rhem.*, **3** : 322. t. 4, Fig. 8.

1878. *Lithocharis debilicornis* id., *Ann. Mus. Civ. Gen.*, **13** : 515

1877. *Lithocharis debilicornis* Muls. *Et. Rey, Ann. Soc. Linn. Lyon*, **25** : 164.

1895. *Lithocharis debilicornis* Ganglb, *Kaf. Mitt. Eur.* **2** : 523.

1908. *Lithocharis debilicornis* Sharp, *Faun. Haw.* **3**(v) : 545 (chloccharis).

1858. *Lithocharis aegyptiacus* Motsch., *Bull. Mosc.* **31**(ii) : 644.

1857. *Lithocharis brevicornis* Allard, *Ann. Soc. Ent. Fr.* **3**(v) : 747, t. 14, f. 11.

1876. *Lithocharis occultus* Waterh., *Ann. Mag. Nat. Hist.* (4)xviii, p. 108.

1879. *Lithocharis occultus* id., Phil. *Trans. Roy. Soc. Lond.* Elxviii, p. 515.

1884. *Lithocharis rufulus* Lynch, *Bol. Ac. Cordoba*, **7** : 259

1888. *Lithocharis rufulus* Fauv., *Rev. d'Ent.* **7** : 25.

1931. *Medon* (Hypomedon) *debilicornis* (Woll.) Cameron : *The Fauna of British India, including Ceylon and Burma(Coleoptera : Staphylinidae),* **2** : 154.

Material examined : 2ex., INDIA : Uttarakhand ; Dehra Dun, 2ex., 17.2. 1921, S.N. Chatterjee coll.

Distribution : INDIA : Uttarakhand (Dehra Dun).

Remarks : Cosmopolitan in distribution.

Genus *Lithocharis* Boisd, 1835

1835. *Lithocharis* Boisd. Et Lacord., *Faun. Ent. Par.* i, p. 431.

1931. *Lithocharis* Cameron., *The Fauna of British India, incl. Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 155-163.

69. *Lithocharis uvida* Kr.

1859. *Lithocharis uvida* Kr., *Arch. Naturg.* **25**(i) : 138.

1931. *Lithocharis uvida* Cameron : *The Fauna of british India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 157.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), Tamil Nadu.

Elsewhere : Sri Lanka, Singapore, Myanmar, Indonesia, S. China, Formosa.

70. *Lithocharis nigriceps* Kr.

1859. *Lithocharis nigriceps* Kr., *Arch. Naturg.* **25**(i) : 139.

1928. *Lithocharis nigriceps* Cam. *E.M.M. Ixiv*, p. 246, 247, fig. 7.

1874. *Lithocharis parviceps*, Shp. *Trans. Ent. Soc. Lond.* P. 66.

1931. *Lithocharis nigriceps* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 159.

1995. *Lithocharis nigriceps,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part 6(A) : 300.

2000 *Lithocharis nigriceps,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura,* Part 3 : 77

2003. *Lithocharis nigriceps,* Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part-3) : 264.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), Bihar, Himachal Pradesh, West Bengal and Tripura, Sikkim.

Elsewhere : Sri Lanka, Singapore, Sumatra, South China and Japan.

71. ***Lithocharis penicillata*** Cam.

1928. *Lithocharis penicillata* cam., *E.M.M.* **114**, pp. 244, 247, fig. 2.

1931. *Lithocharis penicillata* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 161-162.

1995. *Lithocharis penicillata,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part **6**(A) : 299-300.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), West Bengal.

Elsewhere : Malay Peninsula, Singapore and South China.

72. ***Lithocharis sororcula*** Kr.

1859. *Lithocharis sororcula* Kr., *Arch. Naturg.* **25**(i) : 140.

1928. *Lithocharis sororcula* cam., *E.M.M.* **64**, pp. 245, 247, fig. 5.

1931. *Lithocharis sororcula* Cameron : *The Fauna of british India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 162.

1995. *Lithocharis sororcula,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal,* Part **6**(A0); 300.

Material examined : 1ex, INDIA : Uttarakhand : Dehra Dun, Nepali farm, 1ex, 22.x.2000, Dr. P. Mukhopadhya Coll., ex "Heap of grass"

Distribution : INDIA : Uttarakhand (Dehra Dun, Siwaliks), West Bengal.

Elsewhere : Sri Lanka, Singapore and West Indies.

Genus ***Scopaeus*** Er., 1839-40

1939-40. *Scopaeus* Er. *Gen. Spec. staph.* p. 604.

1931. *Scopaeus* Cameron., *The Fauna of British India, incl. Ceylon & Burma (Coleoptera : Staphylinidae),* **2** : 169-188.

73. ***Scopaeus puberulus*** Kr.

1859. *Scopaeus puberulus* Kr., *Arch. Naturg.* **25**(i) : 128.

1931. *Scopaeus puberulus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 172-173.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun, Siwaliks), Tamil Nadu.

Elsewhere : Malay Peninsula.

74. ***Scopaeus testaceus*** Motsch

1858. *Scopaeus testaceus* Motsch., *Bull Mosc.* **31**(ii) : 642.

1859. *Scopaeus rubrotestaceus* Kr., *Arch. Naturg.* **25**(i) : 128.

1859. *Scopaeus semifuscus* Kr., *Arch. Naturg.* **25**(i) : 128.

1931. *Scopaeus testaceus* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 173.

1995. *Scopaeus testaceus,* Biswas and Biswas, *Zool. Surv. India, State Fauna Series* **3** : *Fauna of West Bengal,* Part **6**(A) : 281.

2000. *Scopaeus testaceus,* Biswas and Biswas, *Zool. Surv. India, State fauna* Series 7 : Fauna of Tripura, part **3** : 76.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), West Bengal, Tripura.

Elsewhere : Sri Lanka, Singapore, New Guinea.

75. ***Scopaeus nitiduloides*** Cameron

1931. *Scopaeus nitiduloides* Cameron. *The fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 175.

Distribution : INDIA : Uttarakhand (Dehra Dun, Mussoorie), Bihar, Andaman Islands.

76. *Scopaeus limbatus* Kr.

1859. *Scopaeus limbatus* Kr., *Arch. Naturg.*, **25**(i) : 130.

1931. *Scopaeus limbatus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 177-178.

1995. *Scopaeus limbatus*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 280.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun. Mussoorie, Siwalik), West Bengal, Tripura, Karnataka and Bihar.

Elsewhere : Sri Lanka, Malay Peninsula, Singapore, Penang etc.

77. *Scopaeus velutinus* Motsch.

1858. *Scopaeus velutinus* Motsch., *Bull. Mosc.* **31**(ii) : 642

1859. *Scopaeus decipiens* Kr. *Arch. Naturg.* **25**(i) : 131

1931. *Scopaeus velutinus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 178-179.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun).

Elsewhere : Sri Lanka, Myanmar, Indo-China and Borneo.

78. *Scopaeus fulvus* Cameron

1931. *Scopaeus fulvus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 179.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun).

79. *Scopaeus germanus* Cameron

1931. Scopaeus germanus Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 179-180.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun, Siwaliks), Mussoorie (Kolhu Khet Gad).

80. *Scopaeus pallidulus* Kr.

1859. *Scopaeus pallidulus* Kr., *Arch. Naturg.*, **25**(i) : 131.

1931. *Scopaeus pallidulus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 180-181.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun).

Elsewhere : Sri Lanka, Singapore.

81. *Scopaeus monticola* Cameron

1931. *Scoopaeus monticola* Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 184-185.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : (Mussoorie and Chakrata district).

82. *Scopaeus lucidus* Cameron

1931. *Scopaeus lucidus* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 185.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun (Nun Nadi).

83. *Scopaeus beesoni* Cameron

1931. *Scopaeus beesoni*, Cameron. *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** :185-186.

1995. *Scopaeus beesoni*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 280-281.

2000. *Scopaeus beesoni*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 7 : Fauna of Tripura*, Part **3** : 77.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie and Chakrata district upto 6500 feet), Siwaliks (Kheri Rau, Mohan Rau, Malhan Range, Song river). West Bengal, Tripura.

84. *Scopaeus humilis* Cameron

1931. *Scopaeus humilis* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera Staphylinidae)*, **2** : 186-187.

2003. *Scopaeus humilis*, Biswas, *Zool. Surv. India, State Fauna Series 9, Fauna of Sikkim* (Part-3) : 266.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand [Dehra Dun (Song river, Nim Nadi)], Lachiwala, Mussoorie district (Anni Gad), Sikkim.

Elsewhere : Malay Peninsula.

Genus ***Medome*** Cameron 1931

1931. *Medome* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 188-189.

85. ***Medome bicolor*** Cameron

1931. *Medome bicolor* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 189-190.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand [Mussoorie district (Arni gad), Chakrata district t : (Mohna, alt. 5000 to 6500 feet)].

Remarks : The species was collected from near stream.

Genus ***Ennalagium*** Bernh. 1915

1915. *Ennalagium* Bernhauer, *W.Z.B.* **65** : 139.

1931. *Ennalagium* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 190.

Key to the species *Ennalagium*

1. Entirely black; legs pitchy; antennae dark 2

   Head and thorax black, elytra and abodomen brown, the fermer infuscate behind Legs reddish-yellow; antennae reddish ..... *castancipenne* Cam.

2. Thorax uniformly punctured ..... *assamense* cam.

   Thorax much more strongly punctured on the disc, much more finely towards the sides .... *indicum* cam.

86. ***Ennalagium indicum*** Cam.

1924. *Domene (Ennalogium) indicum* Cam., *Trans. Ent. Soc. Lond.* p. 191.

1931. *Ennalagium indicum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 191-192.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie districts : Kaligad).

Genus ***Domene*** Fauv. 1872

1872. *Domene* Fauv., Faun. *Gallo-Rhe'n.* **3** : 305.

1931. *Domene* Cameron: *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 194.

87. ***Domene aeneipennis*** Cam.

1924. *Domene* aeneipennis Cam., *Trans. Ent. Soc. Lond.* p. 191.

1931. *Domene aeneipennis* Cameron : *The fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 194.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district : Kaligad).

Genus ***Lathrobium*** Grav.

1802. *Lathrobium* Grav., *Col. Mier. Brunsv.*, p. 51.

1931. *Lathrobium* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 196-210.

88. ***Lathrobium nigerrimum*** Cam.

1924. *Lathrobium* (Lobrathium) *nigerrimum* Cam. *Trans. Ent. Soc. Lond.* p. 192.

1931. *Lathrobium nigerrimum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 198-199.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district : Arni Gad, Kaligad).

89. ***Lathrobium semicaeruleum*** Cam.

1921. *Lathrobium semicaeruleum* Cam., *E.M.M.* 107 vii, p. 271.

1922. *Lathrobium semicaeruleum* var ochreonotatum Cham p., *E.M.M.* 108 viii, p. 34.

1931. Lathrobium semicaeruleum : Cameron, *The Fauna of British India including Ceylon & Burma (Coleoptera : Staphylinidae)*, **2** : 204-205.

Material examined : 2ex., INDIA : Uttarakhand : Dehra Dun, 1ex., 27.xi.1921 Dr. Cameron coll., Tehri Garhwal, 1ex., 28.III.1921 Dr. Cameron coll.

Distribution : INDIA : Uttarakhand [Dehra Dun, Mussoorie, Kumaon (West Bhatkot, alt. 4000 feet), and West Almora, Tehri Garhwal], Sikkim.

90. ***Lathrobium cylindricolle*** Cam.

1924. *Lathrobium* (Lobrathium) *Cylindricolle* Cam., *Trans. Ent. Soc. Lond.*, p. 194.

1931. *Lathrobium cylindricolle* Cameron : *The fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 206-207.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun district : Nun Nadi).

91. ***Lathrobium badium*** Cam.

1924. *Lathrobium* (Lobrathium) *badium* Cam., *Trans. Rnt. Soc. Lond.* p. 193.

1931. *Lathrobium badium* Cameron : *The Fauna of India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 207-208.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand [Dehra Dun district (Nim Nadi; Song river), Mussoorie district (Dhobi Ghat, Keyarkuli, 6000 feet above the sea)].

92. ***Lathrobium cafrum*** Boh.

1848. *Lathrobium cafrum* Boh., *Ins. Caffr.* i,. p. 285

1859. *Lathrobium pulchellum* Kr., *Arch. Naturg.* **25**(i), p. 116.

1903. *Lathrobium pulchellum* Fauv., *Rev. d'Rnt.* **22** : 154.

1931. *Lathrobium cafrum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 209-210.

1995. *Lathrobium, cafrum* Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal*, Part **6**(A) : 289.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), Kerala.

Elsewhere : Sri Lanka, Myanmar, East and West Africa. Widely distributed in the oriental region.

Genus ***Pseudobium*** Muls. Et. Rey 1877

1877. *Pseudobium* Muls. et. Rey, *Ann. Soc. Linn. Lyon*, **24** : 104.

1931. *Pseudobium* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 210.

93. ***Pseudobium laeviventre*** Champ

1922. *Pseudobium laeviventre* Champ., *E.M.M.* 1 viii, p. 34.

1931. *Pseudobium laeviventre* Cameron : *The fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 210-211.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand [Dehra Dun (Song River, Nim Nadi, Saiya). Kumaon Almora; Swal River Division, Ranikhet].

94. ***Pseudobium assimile*** Cam.

1924. *Pseudobium assimile* Cam., *Trans. Ent. Soc. Lond.*, p. 195.

1931. *Pseudobium assimile* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 212.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun district : Mothronwala.

95. ***Pseudobium semiflavum*** Cam.

1924. *Pseudobium semiflavum* Cam., *Trans. Ent. Soc. Lond.* p. 195.

1931. *Pseudobium semiflavum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 211-212.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand : Dehra Dun : Song river.

Genus ***Dolicaon*** Cast, 1835

1835. *Dolicaon* cast., Etud. *Ent. I*, p. 119.

1931. *Dolicaon* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 216-219.

96. ***Dolicaon indicus*** Kr.

1859. *Dolicaon indicus* Kr., *Arch. Naturg.* **25**(i) : 118.

1881. *Dolicaon angolensis* Qued., *Berl. Ent. Zeit.* **25** : 294.

1885. *Dolicaon castaneus* Epp., *D.E.Z.* p. 114.

1859. *Dolicaon vicinus* Kr., *Arch. Naturg.* **25**(i) : 118

1931. *Dolicaon indicus* Cameron : *The Fauna of British, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 218.

1995. *Dolicaon indicus,* Biswas and Biswas, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series, 3 :* Part **6**(A) : 297.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), West Bengal.

Elsewhere : Sri Lanka, China, East and West Africa.

Genus ***Cryptobium*** Mannerh, 1830

1830. *Cryptobium* Mannerh., *Brach.*, p. 38.

1931. *Cryptobium* Cameron, *The Fauna of British India, ind. Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 225-250.

Key to the species of the genus *Cryptobium* Mannerh

1. Species entirely black 2
– Species not entirely black 6
2. Head more or less dilated behind, species larger (16mm); elytra as long as prothorax ..... *ocypoides* Champ
– Head oval or oblong, not dilated behind 3
3. Head with large and small punctures ..... *rosti* Schub
–Head uniformly punctured 4
4. Puncturation on head distinctly coriaceous .. .. *sharpi* Fauv
– Puncturation on head more or less umbilicate 5
5. Species larger (14mm); prothorax narrow ... . *cylindroderum* Champ
– Species comparatively smaller (12mm); prothorax broader ..... *spectablie* Kr
6. Elytra red, base black; 5th abdominal segment black ..... *bernhaueri* Cam
– Elytra otherwise 7
7. Posterior 3rd or more of te elytra sharply red; coxae reddish brown ..... *paricolor* Epp
– One third of elytra narrowly red behind 8
8. Species comparatively larger; abdomen with the posterior margin of last two segments reddish ..... *cylanense* Kr
– Species smaller (8mm) 9
9. Head with large and small punctures; front coxae yellowish red .... *sanguinolentum* Motsch
– Head densely and uniformly punctured 10
10. Posterior margin of elytra narrowly, indeterminately reddish; coxae yellowish red ..... *fluviatile* Champ
– Posterior margin of elytra narrowly, sharply red or reddish yellow 11
11. Humeral angle of elytra distinctly reddish yellow ..... *humerale* Cam
– Humeral angle of elytra con-colorous 12
12. Head scarcely widened behind, finely punctured; elytra more broadly reddish-yellow behind ..... *capitale* Cam
– Head distinctly widened behind, less finely punctured 13
13. Species black; head broader; puncturation on head and prothorax coarse .... *marginatum* Motsch
– Spcies pitchy red; head narrower; head and prothorax finely punctured .... *kumaonense* Champ

97. ***Cryptobium ocypoides*** Champ

1921. *Cryptobium ocypoides* Champ., *E.M.M.* **107** : 180.

1931. *Cryptobium ocypoides* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae),* **2** : 228-229.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Kumaon : River Sarda Gorge).

98. ***Cryptobium cylinidroderum*** Champ.

1925. *Cryptobium cylindroderum* champ., *E.M.M.* **111** : 107.

1931. *Cryptobium cylindroderum* Cameron : *The fauna of British India, including Ceylon and Burma, (Coleoptera : Staphylinidae)*, **2** : 234.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Kumaon : Ranikhet).

99. *Cryptobium capiatale* Cam.

1924. *Cryptobium capitalis* cam., *Trans. Ent. Soc. Lond.*, p. 196.

1931. *Crypotobium capitale* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 237-238.

Material examined : 3exs. INDIA : Uttarakhand : Dehra Dun dist., 3exs., 24.x.1962 and 27.xi.1964, T.D. Soota coll.

Distribution : India : Bihar, Uttarakhand Siwaliks.

Remarks : In the present study, this species recorded for the first time from Uttarakhand.

100. *Cryptobium spectabile* Kr.

1859. *Cryptobium spectabile* Kr., *Arch. Naturg.* **25**(1) : 118

1931. *Cryptobium spectabile* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 233.

Material examined : 1ex., INDIA : Uttarakhand, Dehra Dun, Jamwala, Sorath, 1ex. 14.xii.1962.

Distribution : India : Bihar, Uttarakhand Northern India.

Remarks : In the present study, this species recorded for the first time from Uttarakhand.

101. *Cryptobium bernhaueri* Cam.

1924. *Cryptobium bernhaueri* Cam., *Trans. Ent. Soc. Lond.* p. 196.

1924. *Cryptobium bernhaueri* var. distinctum Cam., *Trans. Ent. Soc. Lond*, p. 197.

1931. *Cryptobium bernhaueri* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 239-240.

2000. *Cryptobium bernhaueri*, Biswas and Biswas, *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, **7**, Part 3, p. 74.

2003. *Cryptobium bernhaueri*, Biswas, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part 3) : 267

Material examined : 11exs., INDIA : Uttarakhand : Dehra Dun Dist. Anarori Range, 1ex, 26. III 1965, T.D. Soota Coll; Dehra Dun dist., Dehra Dun forest Division, Motichoor forest range, Donda forest block, 1ex. 20.v. 1965, T.D. Soota coll. Uttarkashi dist., Bhatwari, 2exs., 6.v. 2002, S.K. Chakraborty coll., ex "Under Stone"; Dehra Dun dist., Rajaji National Park, 2exs., 27.x.2000, Dr. P. Mukhopadhyay & party, ex. " Leaf Litter" Dehra Dun dist., Rajaji National Park, 3ex, 27.x.2000, Dr. P. Mukhopadhya Coll., ex "Leaf Litter" Tanakpur, bank of Sarda river, 2ex, 27.ii.1990, Dr. S. Biswas & Dr. K.V. Surya Rao

Distribution : INDIA : Uttarakhand [Uttarkashi (Bhatwari), Dehra Dun (Rajaji National Park, Anarori range, Motichoor forest range, Donda forest Block)], Sikkim, Uttar Pradesh, Tripura, Siwalik.

102. *Cryptobium marginatum* Motschulsky

1858. *Cryptobium marginatum* Motsch., *Bull. Mosc.* **31**(ii) : 652.

1859. *Cryptobium limbatum* Kr., *Arch. Naturg.* **25**(i) : 121.

1931. *Cryptobium marginatum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 240-241.

1995. *Cryptobium marginatum* Biswas and Biswas, *Zool. Surv. India, Fauna of West Bengal, State Fauna Series* **3** : (Part 6–A) : 293.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Dehra Dun), West Bengal, Tamil Nadu, Uttar Pradesh.

Elsewhere : Sri Lanka.

103. *Cryptobium humerale* Cam.

1924. *Cryptobium humerale* Cam., *Trans. Ent. Soc. Lond.* p. 197.

1931. *Cryptobium humerale* Cameron : *The Fauna of British India, including Ceylon and Burma(Coleoptera : Staphylinidae)*, **2** : 241-243.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie dist. : Aglar river; Kaligad; Keyarkuli.

104. *Cryptobium fluviatile* Champ.

1921. *Cryptobium fluviatile* champ, *E.M.M.* 1vii, p. 181.

1931. *Cryptobium fluviatile* Cameron: *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 244.

1995. *Cryptobium fluviatile*, Biswas and Biswas, *Zool. Surv. India, State Fauna Series 3 : Fauna of west Bengal*, Part **6**(A) : 294.

Material examined : 1ex., INDIA :Uttarakhand : Uttarkashi dist., Bhatwari, 1ex., 6.v.2002, S.K. Chakraborty coll. ex "under stone"

Distribution : INDIA : Uttarakhand (Uttarkashi : Bhatwari), West Bengal, Uttar Pradesh.

105. *Cryptobium ceylanense* Kr.

1859. *Cryptobium ceylanense* Kr., *Arch. Naturg.* **25**(i), p. 119.

1895. *Cryptobium ceylanense* EOO., *D.E.Z.*, p. 401.

1931. *Cryptobium ceylanense* : Cameron, *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 247.

Material examined : 1exs : INDIA : Uttarakhand : Kumaon Hills, 1ex, 22-27. xi. 62. Coll, Dwan Hill.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Sri Lanka.

Remarks : In the present study, this species is recorded for the first time in India and also first time from Uttarakhand.

106. *Cryptobium paricolor* Epp.

1895. *Cryptobium paricolor* Epp., *D.E.Z.* p. 401.

1931. *Cryptobium paricolor* : Cameron, *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 247.

Material examined : 2exs., INDIA : Uttarakhand : Uttarkashi dist., Bhatwari, 2exs., 6.v.2002, 5.k. Chakraborty coll., ex. "under moss and stone."

Distribution : INDIA : Uttarakhand : Uttarkashi(Bhaatwari), West Bengal, Jharkhand, Siwaliks (Lachiwala).

Remarks : In the present study, this species is recorded for the first time from Uttarakhand.

107. *Cryptobium sharpi* Fauv.

1895. *Cryptobium sharpi* Fauv., *Rev. d'Ent.* **14** : 238.

1914. *Cryptobium brunnipes* Cam., *Trans. Ent. Soc. Lond.*, p. 543.

1931. *Cryptobium sharpi* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 233.

Material examined : 6exs. INDIA : Uttarakhand : Dehra Dun dist., Masandhanwala, 1ex., 28.i.1961, S. Lal coll.; Srinagar, Garhwal dist. Alt. 1900 ft., 1ex., 26.iv.1958, B.S. Lamba coll.; Dehra Dun dist., Jamwala, Sorath, 4exs., 14.xii.1962, B. Biswas coll.

Distribution : India : Uttarakhand (Dehra Dun, Srinagar), Bihar.

Elsewhere : Myanmar, Bangladesh.

108. *Cryptobium sanguinolentum* Motsch

1858. *Cryptobium sanguinolentum* Motsch., *Bull. Mosc.* **31**(ii) : 650.

1931. *Cryptobium sanguinolentum* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)* **2** : 247-248.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand (Mussoorie district, Almora : Dwarkat), Tamil Nadu.

Elsewhere : Myanmar.

109. *Cryptobium kumaonense* Champ

1921. *Cryptobium kumaonense* Champ., *E.M.M.* **57** : 181.

1931. *Cryptobium kumaonense* Cameron : *The Fauna of British India, including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 246-247.

Material examined : Not available for study.

Distribution : INDIA : Uttarakhand [Dehra Dun (Song river; Mothronwalla), W. Almora; Kumaon, Siwaliks (Kheri Rau; Mohan Rau)].

110. *Cryptobium rosti* Schub.

1908. *Cryptobium rosti* Schub., *D.E.Z.*, p. 622.

1931. *Cryptobium rosti* Cameron : *The Fauna of British India including Ceylon and Burma (Coleoptera : Staphylinidae)*, **2** : 249-250.

Material examined : 3exs. INDIA : Uttarakhand : Uttarkashi, Bhatwari, 1ex., 6.v.2002, S.K. Chakraborty coll., ex. "Under moss" Tehri Garhwal, 2ex., 16.iv.1922, Dr. Cameron coll.

Distribution : INDIA : Uttarakhand : Uttarkashi (Bhatwari). Mussoorie districts, (alt. 5000 to 7500 feet) Chakrata, Almora (Dwarkat), Tehri Garhwal; Himachal Pradesh.

SUMMARY

The present paper deals with 270 examples comprising of 110 species under 23 genera belonging to the subfamily Paederinae : Staphylinidae. Of which three species viz. *Paederus sharpi* Cameron, *P. coxalis* Fauv. and *Cryptobium ceylanense* Kr. are recorded for the first time from India and 16 species under 5 genera are recorded for the first time from the state. Key to the species of few genera has also been provided. Besides this relevant collection data synonymus and distributional data of each species have also been provided.

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REFERENCES

Bernhauer, M. 1915. Zur Staphyliniden fauna des Indo Malayischen Ge bietes, insbedonders des Himalaya. *Coleopterologische Rundschau,* **4** : 49-60.

Biswas, D.N. and Sengupta, T. 1983. Four new species of *Astenus* Stephens (Col : Staphylinidae : Paederinae) from eastern India. *Bull. zool. Surv. India,* **5**(1) : 1-9, figs. 1-31.

Biswas, D.N. and Sengupta, T. 1995. Insecta : Coleoptera. Staphylinidae. *Zool. Surv. India, Fauna of West Bengal, State Fauna Series,* **3**(Part 6A) : 201-361.

Biswas, D.N. and Biswas, S. 2000. Insecta : Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series,* **4**(Part 5) : 115-160.

Biswas, D.N. 2003. Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9**(Part 3) : 237-281.

Biswas, D.N. and Mukhopadhyay, P. 2004. Insecta : Coleoptera : Staphylinidae. *Zool. Surv. India, Fauna of Manipur, State Fauna Series,* **10** (Part 2) : 385-399.

Cameron, M. 1931. *The Fauna of British India including Ceylon and Burma*, Coleoptera : Staphylinidae, No. I-II, London, iii+257 pp., 2pP.

Fauvel, A. 1895. Staphylinides nouveaux de l'Inde et de la Malaisie. *Rev. d'Ent. Caen,* **14** : 180-286.

Kraatz, G. 1858. Staphylinen-Fauna von Ostindien, insbesondere der insel Ceylon. *Archiv. Fur Naturgeschichte,* **25** : 1-193, 3 pl., Sep. Berlin, 196 pp. 3 pP.

Motschulskey, V. 1858. Enumeration desnouvelles especes de Coleopteres rapports de ses voyages (Continuation). *Bull. de Societe* Imperiale des naturalists de Moscou, **31**(2) : 634-670.

Rougemont, G. de 1986. Revision of the genus *Stiliderus* Mots., 1858, Part II. The species with bilobed IVth tarsomeres (Coleoptera : Staphylinidae : Paederinae). *Ent. Abh. Mus. Tierk.*, Dresden, **50**(2) : 33-58.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 361-411.

INSECTA : DIPTERA

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INTRODUCTION

The Diptera are commonly known as (true) flies and include many familiar insects such as mosquitoes, black flies, midges, fruit flies, blow flies and house flies. The earliest fossil flies are known from the Upper Triassic of the Mesozoic geological period, some 225 million years ago (Evenhuis, 1994). Since that time they have diversified to become one of the largest groups of organisms.

The flies are small to moderate-sized insects and the major morphological feature which distinguishes flies from other insects is their reduced hind wings, termed halteres. A few species are completely wingless, usually in association with parasitic habits. Eyes are usually large, occupying much of the head. Antennae variable, sometimes long and thread-like or plumose, but more often fairly short and bulbous, with the terminal segments more or less fused to form a spur or bristle.The mouthparts of flies are also characteristically suctorial and many have large fleshy pads with drainage canals termed pseudotracheae for efficient liquid uptake. Some predatory flies have mouthparts modified for stabbing and piercing other insects (Family Asilidae and Empididae). Blood-sucking flies are found in many families (Culicidae, Tabanidae, Ceratopogonidae, and Simuliidae) and they carry several dangerous diseases, including malaria, sleeping sickness, yellow fever and elephantiasis. Veterinary pests include a number of species whose maggots eat away or burrow into the flesh of domestic sheep and cattle, causing the condition known as myiasis. Many flies cause economic damage to plants (Cecidomyiidae, Tephritidae, and Agromyzidae) or animals (Calliphoridae, Oestridae) through direct feeding by their larvae. However, the most unappreciated role of flies may be as pollinators of flowering plants (Syrphidae, Bombyliidae, Nemestrinidae, Acroceridae, Conopidae, and Stratiomyidae). The dipteran larvae are typically small, pale and soft-bodied. Pupae have non-functional mandibles (adecticous), and may have the appendages free from the body (exarate), or glued to the body (obtect). If exarate, the pupa is concealed inside the hardened skin (puparium) of the last larval instar.

The newly formed state of Uttarakhand (known as Uttaranchal from 2000 2006 became the 27th state of Republic of India separated on 9th November 2002 from the Uttar Pradesh) comprises of 9.62 percent of the Himalayan region and lying in between 29° 5'- 31° 25' N latitudes and 77° 45'- 81° E longitudes, spreading over an area of 53, 483 sq kms (2001census). It is divided into 13 districts, namely Udham Singh Nagar, Nainital, Almora, Champawat, Bageshwar, Pithoragarh, Chamoli, Rudra Prayag, Uttarkashi, Tehri Garhwal, Pauri Garhwal, Haridwar, and Dehradun, spread over two of the five traditional divisions of the Himalayas, Kurmachala and Kedara representing Kumaon and Garhwal respectively.

Diptera section (under the leadership of Bulganin Mitra) of Zoological survey of India, Kolkata was conducted several collecting trips in all the districts of the state of Uttarakhand after its separation from the state of Uttar Pradesh, (in between 2003-2006). Families like Asilidae (28 species, 14 genera), Bombyliidae (26 species, 11 genera), Syrphidae (52 species, 35 genera), Tephritidae (20 species, 16 genera), Muscidae (22 species, 10 genera), Calliphoridae (11 species, 7 genera), Sarcophagidae (22 species, 10 genera), Tachinidae (19 species, 19 genera) are dealt separately. This present communication is reported 363 species under 133 genera of 35 families from the state of Uttarakhand. Altogether 563 species under 235 genera of 43 families of Diptera are reported from the state of Uttarakhand. This report

is as such the first consolidated report of the order Diptera from the state of Uttarakhand after its separation from the state of erstwhile Uttar Pradesh.

MATERIALS AND METHODS

The methods described by Datta *et al.* (1977) were employed here for collecting, killing and preserving adult flies.

MORPHOLOGY AND TERMINOLOGY

Morphology and Terminology is already stated in Fauna of West Bengal by Datta (1997).

SYSTEMATIC TAXA

Suborder NEMATOCERA
Infraorder TIPULOMORPHA
Family TRICHOCERIDAE

1. *Trichocera (Trichocera) bisignata* Alexander
2. *Trichocera (Trichocera) tenuicercus* Alexander
3. *Trichocera (Trichocera) variata* Alexander

Family TIPULIDAE

4. *Dolichopeza (Nesopeza) aphotisma* Alexander
5. *Dolicopeza (Nesopeza) extrudens* Alexander
6. *Dolicopeza (Nesopeza) scotoptera* Alexander

Genus ***Holorusia*** Loew

7. *Holorusia cressida* (Alexander)
8. *Holorusia fulvolateralis* (Brunetti)
9. *Nephrotoma altigalea* Alexander
10. *Nephrotoma consimilis* (Brunett)
11. *Nephrotoma muktesarensis* Alexander
12. *Tipula (Acutipula) robusta* Brunetti
13. *Tipula (Emodotipula) stylostena* Alexander
14. *Tipula (Indotipula) gupta* Alexander
15. *Tipula (Indotipula) peusiana* Alexander
16. *Tipula (Indotipula) sudra* Alexander
17. *Tipula (Nippotipula) pulcherrima* Brunetti
18. *Tipula (Pterelachisus) brunnicosta* Brunetti
19. *Tipula (Pterelachisus) ranee* Alexander
20. *Tipula (Schummelia) continuata* Brunetti
21. *Tipula (Schummelia) penicillaris* Alexander
22. *Tipula (Schummelia) xanthopleura* Edwards
23. *Tipula (Sinotipula) brunnettiana* Alexander
24. *Tipula (Sinotipula) griseipennis* Brunetti
25. *Tipula (Sinotipula) macquartina* Alexander
26. *Tipula (Sinotipula) tesselatipennis* Brunetti
27. *Tipula (Vestiplex) himalayensis* Brunetti
28. *Tipula (Vestiplex) kumaonensis* Alexander
29. *Tipula (Vestiplex) ravana* Alexander
30. *Tipula (Vestiplex) subtincta* Brunetti
31. *Tipula (Vestiplex) wahlgrenana* Alexander
32. *Tipula* (Uncertain) *perelegans* Alexander

Family LIMONIIDAE

33. *Antocha (Antocha) aegina* Alexander
34. *Antocha (Antocha) arjuna* Alexander
35. *Antocha (Antocha) indica* Brunetti
36. *Antocha (Antocha) scapularis* Alexander
37. *Antocha (Antocha) unilineata* Brunetti
38. *Antocha (Orimargula) almorae* Alexander
39. *Helius (Helius) catreus* Alexander
40. *Helius (Helius) serenus* Alexander
41. *Limonia (Achyrolimonia) immerens* Alexander
42. *Limonia (Atypophthalmus) kurma* Alexander
43. *Limonia (Dicranomyia) chandra* Alexander
44. *Limonia (Dicranomyia) cinerascens* (Brunetti)
45. *Limonia (Dicranomyia) fraterna* (Brunetti)
46. *Limonia (Dicranomyia) kubera* Alexander
47. *Limonia (Dicranomyia) malina* Alexender
48. *Limonia (Dicranomyia) microentmema* Alexender
49. *Limonia (Dicranomyia) neabjuncta* Alexender
50. *Limonia (Dicranomyia) pentadactyla* Alexander
51. *Limonia (Dicranomyia) pulchripennis* (Brunetti)
52. *Limonia (Dicranomyia) rixosa* Alexander

53. *Limonia (Dicranomyia) sordida* (Brunetti)
54. *Limonia (Dicranomyia) tyrranica* Alexender
55. *Limonia (Dicranomyia) umbonis* Alexander
56. *Limonia (Dicranomyia) yaksha* Alaxander
57. *Limonia (Melanolimonia) priapula* Alexander
58. *Limonia (Rhipidia) antennata* (Brunetti)
59. *Limonia (Rhipidia) crassirostris* Alexander
60. *Limonia (Rhipidia) josephi* Alexander
61. *Limonia (Rhipidia) ugra* Alexander
62. *Limonia (Sivalimnobia) rahula* Alexander
63. *Limonia (Uncertain) luteitarsis* Alexander
64. *Orimarga (Orimarga) fuscicosta* Alexander
65. *Orimarga (Orimarga) platystyla* Alexander
66. *Orimarga (Orimarga) resupina* Alexander
67. *Orimarga (Orimarga) varuna* Alexander
68. *Dicranota (Dicranota) strepens* Alexander
69. *Dicranota (Rhaphidolabina) trichoneura* Alexander
70. *Dicranota (Rhaphidolabis) balarama* Alexander
71. *Dicranota (Rhaphidolabis) indra* Alexander
72. *Dicranota (Rhaphidolabis) khumyarae* Alexander
73. *Dicranota (Rhaphidolabis) lacteipennis* Alexander
74. *Dicranota (Rhaphidolabis) shushna* Alexander
75. *Dicranota (Rhaphidolabis) vajra* Alexander
76. *Dicranota (Rhaphidolabis) vritra* Alexander
77. *Pedicia (Tricyphona) glabripennis* (Brunetti)
78. *Hexatoma (Eriocera) furtiva* Alexander
79. *Hexatoma (Eriocera) prolixa* Alexander
80. *Limnophila (Afrolimnophila) pusan* Alexander
81. *Limnophila (Dicranophragma) karma* Alexander
82. *Limnophila (Eloeophila) ornata* (Brunetti)
83. *Paradelphomyia (Oxyrhiza) angustistyla* Alexander
84. *Paradelphomyia (Oxyrhiza) flavescens* (Brunetti)
85. *Paradelphomyia (Oxyrhiza) tritumula* Alexander
86. *Phyllolabis beesoni* Alexander
87. *Phyllolabis brunettii* Alexander
88. *Phyllolabis mannheimsi* Alexander
89. *Phyllolabis seniorwhitei* Alexander
90. *Pseudolimnophila honesta* (Brunetti)
91. *Pseudolimnophila monomelania* Alexander
92. *Pseudolimnophila spatiosa* Alexander
93. *Taiwanomyia sicula* Alexander
94. *Baeoura coloneura* Alexander
95. *Baeoura dihybosa* Alexander
96. *Baeoura schmidiana* Alexander
97. *Crypteria (Crypteria) basistylata* Alexander
98. *Crypteria (Crypteria) haploa* Alexander
99. *Erioptera (Meterioptera) halterata* Brunetti
100. *Gonomyia (Gonomyia) brachyura* Alexander
101. *Gonomyia (Gonomyia) ishana* Alexander
102. *Gonomyia (Gonomyia) periploca* Alexander
103. *Gonomyia (Gonomyia) ravana* Alexander
104. *Gonomyia (Gonomyia) yama* Alexander
105. *Gonomyia (Idiocera) maharaja* Alexander
106. *Gonomyia (Lipophleps) curvistyla* Alexander
107. *Gonomyia (Lipophleps) kama* Alexander
108. *Gonomyia (Lipophleps) pentacantha* Alexander
109. *Gonomyia (Lipophleps) varsha* Alexander
110. *Gonomyia (Protogonomyia) aitholodes* Alexander
111. *Molophilus (Molophilus) genitalis* (Brunetti)
112. *Molophilus (Molophilus) gurkha* Alexander
113. *Molophilus (Promolophilus) grishma* Alexander
114. *Molophilus (Promolophilus) munkar* Alexander
115. *Neolimnophila bifusca* Alexander
116. *Neolimnophila genitalis* (Brunetti)
117. *Ormosia (Oreophila) licina* Alexander
118. *Ormosia (Oreophila) stenostyla* Alexander
119. *Ormosia (Ormosia) grahami* Alexander
120. *Ormosia (Ormosia) harsha* Alexander

121. *Ormosia (Ormosia) moghalensis* Alexander
122. *Ormosia (Ormosia) pulcher* (Brunetti)
123. *Ormosia (Parormosia) perdiffusa* Alexander
124. *Rhabdomastix (Rhabdomastix) himalayensis* Alexander
125. *Rhabdomastix (Sacandaga) almorae* Alexander
126. *Rhabdomastix (Sacandaga) teriensis* Alexander
127. *Styringomyia mitra* Alexander
128. *Trentepohlia (Mongoma) argopoda* Alexander
129. *Trentepohlia (Mongoma) varipes* Alexander

Infraorder PSYCHOMORPHA
Family PSYCHODIDAE
Subfamily PSYCHODINAE

130. *Pericoma margininotata* Brunetti
131. *Pericoma metatarsalis* Brunetti
132. *Psychoda alternata* Say

Subfamily PHLEBOTOMINAE

133. *Sergentomyia (Parrotomyia) himalayensis* (Annandale)

Infraorder PTYCHOPTEROMORPHA
Family PTYCHOPTERIDAE

134. *Ptychoptera garhwalensis* Alexander

Family TANYDERIDAE

135. *Protanyderus schmidi* Alexander

Infraorder CULICOMORPHA
Family CERATOPOGONIDAE
Subfamily LEPTOCONOPINAE

136. *Forcipomyia (Forcipomyia) lignicola* (Brunetti)

Family CULICIDAE
Subfamily CULICINAE

137. *Aedes (Finlaya) var. doonii* Wattal, Bhatia and Kalra
138. *Aedes (Finlaya) pseudotaeniatus* (Giles)
139. *Aedes (Finlaya) pulchriventer* (Giles)
140. *Culex (Culiciomyia) ramakrishnii* Wattal and Kalra
141. *Culex (Culiciomyia) viridiventer* Giles
142. *Culiseta (Culiseta) niveitaeniata* (Theobald)

Family DIXIDAE

143. *Dixa amabilis* Alexander

Family THAUMALEIDAE

144. *Thaumalea dirghakantaka* Schmid
145. *Thaumalea nanarupa* Schmid
146. *Thaumalea tchakrarupa* Schmid
147. *Thaumalea vartula* Schmid

Family CHIRONOMIDAE
Subfamily CHIRONOMINAE

148. *Chironomus macrogaster* Kieffer
149. *Paratendipes digraphis* (Kieffer)

Family SIMULIIDAE

150. *Simulium (Simulium) griseifrons* Brunetti
151. *Simulium (Simulium) novolineatum* Puri

Infraorder BIBINOMORPHA
Family MYCETOPHILIDAE
Subfamily MYCETOPHILINAE

152. *Mycetophila curvilinea* Brunetti

Family BIBIONIDAE

153. *Bibio brunettii* Hardy
154. *Bibio collaripes* Brunetti
155. *Bibio fuscitibia* Brunetti
156. *Penthetria brunettii* Hardy
157. *Penthetria carbonaria* (Brunetti)
158. *Penthetria japonica* Wiedemann
159. *Penthetria melanaspis* Wiedemann
160. *Penthetria obscura* (Brunetti)
161. *Plecia impostor* Brunetti
162. *Plecia tecta* Hardy

Family SCIARIDAE

163. *Sciara fratercula* Brunetti
164. *Sciara nitidithorax* Brunetti
165. *Sciara segmenticornis* Brunetti

Family CECIDOMYIIDAE

166. *Kamptodiplosis ramanathi* Mani
167. *Odinadiplosis odinae* Mani
168. *Procontarinia echinogalliperda* (Mani)
169. *Sissudiplosis chatterjeei* Mani

The following are unplaced species of the family Cecidomyiidae

170. *Liebeliola dehradunensis* Rao
171. *Pseudohormomyia orientalis* Rao
172. *Karschomyia visvanathi* (Rao)

173. *Meinertomyia aequipalpis* Mani

Suborder BRACHYCERA
Infraorder STRATIOMYOMORPHA
Family XYLOMYIDAE

174. *Solva (Solva) intermedia* (Brunetti)

Family STRATIOMYIDAE
Subfamily BERIDAE

175. *Beris geniculata* Curtis

176. *Chorisops tibialis* (Meigen)

Subfamily SARGINAE

177. *Ptecticus aurifer* (Walker)

178. *Odontomyia kashmirensis* Brunetti

Subfamily CLITELLARIINAE

179. *Adoxomyia bistriata* (Brunetti)

180. *Lasiopa himalayensis* Brunetti

Infraorder TABANOMORPHA
Family TABANIDAE

181. *Philoliche longirostris* (Hardwicke)

182. *Chrysops designatus* Ricardo

183. *Chrysops flavocinctus* Ricardo

184. *Silvius (Silvius) indianus* Ricardo

185. *Atylotus agrestis* (Wiedemann)

186. *Atylotus cryptotaxis* Burton

187. *Atylotus nemocallosus* (Ricardo)

188. *Atylotus virgo* (Wiedemann)

189. *Hybomitra hirta* (Walker)

190. *Hybomitra subcallosa* (Ricardo)

191. *Hybomitra wyvillei* (Ricardo)

192. *Tabanus (Pseudobolbodimyia) albocostatus* (Bigot)

193. *Tabanus (Pseudobolbodimyia) auristriatus* Ricardo

194. *Tabanus (Pseudobolbodimyia) biannularis* Philip

195. *Tabanus (Tabanus) excelsus* Ricardo

196. *Tabanus (Tabanus) orientis* Walker

197. *Tabanus (Tabanus) oxyceratus* (Bigot)

198. *Haematopota albofasciatipennis* Brunetti

199. *Haematopota crossi* Stone and Philip

200. *Haematopota dissimilis* Ricardo

201. *Haematopota javana* Wiedemann

202. *Haematopota lata* Ricardo

203. *Haematopota mukteswarensis* Kapoor

204. *Hippocentrodes striatipennis* (Brunetti)

Unplaced species of the family Tabanidae

205. *Diachlorus fulvescens* Brunetti

Family RHAGIONIDAE

206. *Chrysopilus flavopilosus* Brunetti

207. *Chrysopilus sordidus* Brunetti

Superfamily NEMESTRINIODEA
Family NEMESTRINIDAE
Subfamily HIRMONEURINAE

208. *Hirmoneura annandalei* Lichtwardt

209. *Hirmoneura opaca* Lichtwardt

Family THEREVIDAE

210. *Phycus argentiventris* Brunetti

Superfamily EMPIDOIDEA
Family EMPIDIDAE
Subfamily HYBOTINAE

211. *Hybos (Pseudosyneches) insignis* (Brunetti)

212. *Syndyas vitripennis* (Brunetti)

213. *Syneches (Syneches) fratellus* Brunetti

Subfamily OCYDROMINAE

214. *Ocydromia unifasciata* (Brunetti)

Subfamily EMPIDINAE

215. *Empis (Empis) centralis* Brunetti

216. *Empis (Empis) elegans* Brunetti

217. *Empis (Empis) griseonigra* Brunetti

218. *Empis (Empis) subcilipes* Brunetti

219. *Rhamphomyia (Rhamphomyia) griseonigra* Brunetti

Subfamily CLINOCERINAE

220. *Acanthoclinocera glaucescens* (Brunetti)

221. *Clinocera fluviatilis* Brunetti

Subfamily TACHYDROMIINAE

222. *Platypalpus brunettii* Melander

Family DOLICHOPODIDAE
Subfamily SCIAPODINAE

223. *Chrysosoma oculatum* Becker

224. *Condylostylus conspectus* Becker

Subfamily HYDROPHORINAE

225. *Phalacrosoma imperfectum* Becker

Subfamily DIAPHORINAE

226. *Chrysotus discretus* Becker

Division ASCHIZA
Family PHORIDAE
Subfamily METOPININAE

227. *Puliciphora termitum* Schmitz

Family DIOPSIDAE

227a. *Diopsidae indica* Westwood

227b. *Teleopsis quadriguttata* (Walker)

227c. *Sphracephala hearsiana* (Westwood)

ACALYPTRATE
Superfamily NERIOIDEA
Family DIOPSIDAE
Superfamily CARNOIDEA
Family CHLOROPIDAE
Subfamily OSCINELLINAE

228. *Dactylothyrea indica* Cherian

229. *Elachiptera (Melanochaeta) indistincta* (Becker)

230. *Rhodesiella manii* Cherian

Subfamily CHLOROPINAE

231. *Mepachymerus (Steleocerellus) crucifer* (de Meijere)

232. *Thaumatomyia notata* (Meigen)

Superfamily EPHYDROIDEA
Family DROSOPHILIDAE

233. *Amiota (Phortica) bandes* Singh & Negi,

234. *Amiota (Phortica) pseudotau* Toda & Peng

235. *Amiota biprotrusa* Chen & Toda

236. *Gitona distigma* Meigen

237. *Leucophenga (Leucophenga) albiceps* (de Meijere)

238. *Leucophenga (Leucophenga) angulata* Singh, Dash and Fartyal

239. *Leucophenga (Leucophenga) angusta* Okada

240. *Leucophenga (Leucophenga) bellula* (Bergroth)

241. *Leucophenga (Leucophenga) champawatensis* Fartyal and Singh

242. *Leucophenga (Leucophenga) chaubattiaensis* Fartyal and Toda

243. *Leucophenga (Leucophenga) clubiata* Singh, Dash and Fartyal

244. *Leucophenga (Leucophenga) kumaonensis* Fartyal and Singh

245. *Leucophenga (Leucophenga) maculata*

246. *Leucophenga (Leucophenga) mutabilis*

247. *Leucophenga (Leucophenga) nainae* Fartyal and Singh

248. *Leucophenga (Leucophenga) neointerrupta* Fartyal and Toda

249. *Leucophenga (Leucophenga) neolacteusa* Singh and Bhatt

249a. *Lencophenga (Lencophenga)* or Nata Wheeler

250. *Leucophenga (Leucophenga) okhalkandensis* Singh, Dash and Fartyal

250a. *Leneophenga (Lencophanga) regina* Malloch

251. *Leucophenga (Leucophenga) ornata* Wheeler

251a. *Leneophenga (Lencophenga) subpollinosa* (de Meijere)

252. *Leucophenga (Leucophenga) proxima*

253. *Leucophenga (Leucophenga) quadripunctata* (de Meijere)

254. *Leucophenga (Leucophenga) regina* Malloch

255. *Leucophenga (Leucophenga) singhi* Fartyal and Singh

256. *Leucophenga (Leucophenga) subpollinosa* (de Meijere)

257. *Leucophenga (Paraleucophenga) lissocephala*

258. *Leucophenga (Paraleucophenga) neojavanaii* Singh & Negi

259. *Leucophenga (Paraleucophenga) parasiatica*

260. *Leucophenga (Paraleucophenga) todai* Fartyal and Singh

261. *Stegana (Steganina) nainitalensis* Singh and Fartyal

262. *Dettopsomyia nigrovittata* Malloch

263. *Drosophila (Dorsilopha) busckii* Coquillett

264. *Drosophila (Drosophila) annalspinai* Singh & Negi

265. *Drosophila (Drosophila) bageshwarensis* Singh, Dash and Fartyal

266. *Drosophila (Drosophila) bishti* Singh & Negi
267. *Drosophila (Drosophila) bizonata* Kikkawa and Peng
268. *Drosophila (Drosophila) elongata* Singh, Dash and Fartyal
269. *Drosophila (Drosophila) hexaspina* Singh, Dash and Fartyal
270. *Drosophila (Drosophila) immigrans* Sturtevant
271. *Drosophila (Drosophila) khansuensis* Singh, Dash and Fartyal
272. *Drosophila (Drosophila) lacertosa* Okada
272a. *A.Drosophila (Drosophila) parazonata* Dwivedi & Gupta
273. *Drosophila (Drosophila) mukteshwarensis* Joshi, Fartyal and Singh
274. *Drosophila (Drosophila) nainitalensis* Singh & Bhatt
275. *Drosophila (Drosophila) nasuta* Lamb
276. *Drosophila (Drosophila) notostriata* Okada
277. *Drosophila (Drosophila) paharpaniensis* Singh, Dash and Fartyal
278. *Drosophila (Drosophila) painii* Singh & Negi
279. *Drosophila (Drosophila) paramarginata* Singh, Dash and Fartyal
280. *Drosophila (Drosophila) parazonata* Dwivedi and Gupta
281. *Drosophila (Drosophila) paunai* Singh & Negi
282. *Drosophila (Drosophila) repleta* Wollaston
283. *Drosophila (Drosophila) serrata* Singh, Dash and Fartyal
284. *Drosophila (Drosophila) sulfurigaster* Duda
285. *Drosophila (Drosophila) surangensis* Singh, Dash and Fartyal
286. *Drosophila (Drosophila) trizonata* Okada
287. *Drosophila (Hirtodrosophila) hexaspina* Fartyal & Singh
288. *Drosophila (Hirtodrosophila) quadrivittata* Okada
289. *Drosophila (Scaptodrosophila) actinia* Okada
290. *Drosophila (Scaptodrosophila) chandraprabhiana* Gupta and Ray-Chaudhuri
291. *Drosophila (Scaptodrosophila) coracina* Kikkawa and Peng
292. *Drosophila (Scaptodrosophila) hirsuata* Singh and Dash
293. *Drosophila (Sophophora) bifasciata* Pomini
294. *Drosophila (Sophophora) hubeiensis* Sperlich and Watabe
295. *Drosophila (Sophophora) jambulina* Parshad & Paika
296. *Drosophila (Sophophora) kikkawai* Burla
297. *Drosophila (Sophophora) malerkotliana* Parshad & Paika
298. *Drosophila (Sophophora) melanogaster* Meigen
299. *Drosophila (Sophophora) neobaimaii* Singh & Dash
300. *Drosophila (Sophophora) neokhaoyana* Singh & Dash
301. *Drosophila (Sophophora) nepalensis* Okada
302. *Drosophila (Sophophora) punjabiensis* Parshad & Paika
303. *Drosophila (Sophophora) saraswati* Singh & Dash
304. *Drosophila (Sophophora) sargakhetensis* Joshi, Fartyal and Singh
305. *Drosophila (Sophophora) suzukii indica* Parshad & Paika
306. *Drosophila (Sophophora) takahashii* Sturtevant
307. *Lissocephala parasiatica* Takada and Momma
308. *Scaptomyza (Parascaptomyza) elmoi*Takada
309. *Scaptomyza (Parascaptomyza) himalayana* Takada
310. *Scaptomyza quadruangulata* Singh & Dash
311. *Zaprionus indianus* Gupta

Superfamily CONOPOIDEA
Family CONOPIDAE
Subfamily CONOPINAE

312. *Physocephala bicolorata* Brunetti

Subfamily MYOPINAE

313. *Myopa nigriventris* Brunetti

314. *Zodion griseum* Brunetti

Superfamily TEPHRITOIDEA
Family PYRGOTIDAE
Subfamily PYRGOTINAE

315. *Adapsilia angustifrons* Bezzi

316. *Adapsilia nocturna* Bezzi

317. *Tylotrypes immsi* Bezzi

Superfamily SCIOMYZOIDEA
Family DRYOMYZIDAE

318. *Dryomyza formosa* (Wiedemann)

Family SEPSIDAE
Subfamily SEPSINAE

319. *Sepsis albopunctata* Lamb

Superfamily OPOMYZOIDAE
Family AGROMYZIDAE
Subfamily AGROMYZINAE

320. *Melanagromyza conspicua* Spencer

321. *Melanagromyza ranibaghae* Garg

322. *Ophiomyia berii* Garg

Subfamily PHYTOMYZINAE

323. *Cerodontha (Cerodontha) denticornis* (Panzer)

324. *Cerodontha (Cerodontha) intermedia* Garg

325. *Cerodontha (Cerodontha) mussooriensis* Garg

326. *Cerodontha (Cerodontha) versicolor* Ipe

327. *Cerodontha (Dizygomyza) morosa* (Meigen)

328. *Cerodontha (Poemyza) pygmella* (Hendel)

329. *Chromatomyia alysicarpi* (Singh and Ipe)

330. *Chromatomyia horticola* (Goureau)

331. *Chromatomyia nigra* (Meigen)

332. *Liriomyza brassicae* (Riley)

333. *Liriomyza congesta* (Becker)

334. *Liriomyza himalayana* Garg

335. *Liriomyza kumaonensis* Garg

336. *Phytoliriomyza dimidiatipennis* (Garg)

336a. *Phytonmtyza alysicarpi* Singh & Ipe

1968. *Phytomyza alysicarpi* Singh & Ipe, Orient. Insects., 2(1) : 89-96 T.L. Vally of flower.

Distribution : India : Uttarakhand (Chamoli).

337. *Phytomyza cheilanthus* Garg

338. *Phytomyza fumariacea* Garg

339. *Phytomyza kumaonensis* Singh and Ipe

340. *Phytomyza thalictricola* Hendel

341. *Pseudonapomyza alternantherae* (Seguy) Calyptrate

Family HIPPOBOSCIDAE
Subfamily ORNITHOMYINAE

342. *Ornithoica (Ornithoica) stipituri bistativa* Maa

343. *Ornithomya biloba* Dufour

344. *Ornithophila metallica* (Schiner)

345. *Pseudolynchia canariensis* (Macquart)

Subfamily HIPPOBOSCINAE

346. *Hippobosca longipennis* Fabricius

347. *Hippobosca variegata* Megerle von Muhlfeld

Subfamily LIPOPTENINAE

348. *Lipoptena capreoli* Rondani

349. *Melophagus ovinus ovinus* (Linnaeus)

Subfamily CYCLOPODIINAE

350. *Cyclopodia sykesii* (Westwood)

351. *Eucampsipoda sundaica* Theodor

352. *Leptocyclopodia (Leptocyclopodia) ferrarii ferrarii* (Rondani)

353. *Leptocyclopodia (Leptocyclopodia) thaii* Maa

Subfamily NYCTERIBIINAE

354. *Basilia (Paracyclopodia) roylii* (Westwood)

355. *Nycteribia latreillii kumaonica*

Subfamily NYCTERIBOSCINAE

356. *Brachyotheca molossa* (Giglioli)

357. *Brachytarsina (Brachytarsina) modesta* (Jobling)

Family ANTHOMYIDAE

358. *Delia bracata* (Rondani)

359. *Delia platura* (Meigen)

360. *Emmesomyia socia* (Fallen)

Family FANNIIDAE

361. *Fannia carbonaria* (Meigen)

362. *Fannia leucosticta* (Meigen)

363. *Fannia prisca* Stein

SYSTEMATIC ACCOUNT

Suborder NEMATOCERA

The Nematocera (oldest group) includes small, delicate insects (mosquitoes, crane-flies, midges and their relatives) with antennae consist of scape, pedicel, and flagellum with numerous similar segments; maxillary palpi with more than 3 segments, often pendulous; anal cell of wing open; larvae usually with well-defined head, mandibles horizontally opposed.

Infraorder TIPULOMORPHA

Family TRICHOCERIDAE

The Trichocerid are commonly called as "Winter Crane Flies" or "Winter Gnats" and confined usually to temperate and cool climates. They are easily confused with the true crane flies tipulids but their legs are not deciduous and ocelli are present. Adults swarm during the monsoon in tropical climates. They are often found in dark places like tree-holes, caverns, mine shafts, cellars, etc. Larvae are scavengers and found in decaying leaves and vegetables, manure, fungi, roots, tubers and rodent burrows. The family includes 20 species under 2 genera in India but only 3 species being reported under the lone genus *Trichocera* from Uttarakhand.

Genus ***Trichocera*** Meigen, 1803.

1. ***Trichocera (Trichocera) bisignata*** Alexander

1959. *Trichocera bisignata* Alexander, *Bull. Brooklyn ent. Soc.*, **54** : 130.

Type-locality : Rata, Almora.

Distribution : India : Uttarakhand (Almora).

Elsewhere : Nil.

2. ***Trichocera (Trichocera) tenuicercus*** Alexander

1959. *Trichocera tenuicercus* Alexander, *Bull. Brooklyn ent. Soc.*, **54** : 134.

Type-locality : Manghu Chatti, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal).

Elsewhere : Nil.

3. ***Trichocera (Trichocera) variata*** Alexander

1961. *Trichocera variata* Alexander, *Bull. Brooklyn ent. Soc.*, **56** : 125.

Type-locality : Kulara, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal).

Elsewhere : Nil.

Family TIPULIDAE

The Tipulidae, commonly known as "crane flies" are found worldwide. The family has been splited in recent times and the subfamilies are became upgraded to the family level. Adult tipulids are slow elongate fliers with very long wings and fragile brittle legs (hence the name daddy long legs). Larvae are semiaquatic and terrestrial, living in moist soils, leaf litter, moss, rotting logs, mud and sand banks of rivers and streams. The family includes 366 species under 98 genera from India of which 29 species under 4 genera reported from Uttarakhand.

Genus ***Dolichopeza*** Curtis, 1825

4. ***Dolichopeza (Nesopeza) aphotisma*** Alexander

1963. *Dolichopeza aphotisma* Alexander, *Philipp. J. Sci.*, **92** : 207.

Type-locality : Trijugi, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

5. ***Dolicopeza (Nesopeza) extrudens*** Alexander

1963. *Dolichopeza extrudens* Alexander, *Philipp. J. Sci.*, **92** : 210.

Type-locality : Khati, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

6. ***Dolicopeza (Nesopeza) scotoptera*** Alexander

1963. *Dolicopeza scotoptera* Alexander, *Philipp. J. Sci.*, **92** : 215.

Type-locality : Trijugi, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Holorusia*** Loew, 1863

7. ***Holorusia cressida*** (Alexander)

1952. *Tipula cressida* Alexander, *Rec. Indian Mus.*, **50** : 325

Type-locality : Nainital, W. Himalayas.

Distribution : India : Uttarakhand (Nainital), Kashmir, Punjab.

Elsewhere : Nepal, W. Pakistan.

8. ***Holorusia fulvolateralis*** (Brunetti)

1911. *Tipula fulvolateralis* Brunetti, *Rec. Indian Mus.*, **6** : 249.

Type-locality : Bhim Tal, Kumaon

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Myanmar, Nepal.

Genus ***Nephrotoma*** Meigen, 1803

9. ***Nephrotoma altigalea*** Alexander

1965. *Nephrotoma altigalea* Alexander, *Philipp. J. Sci.*, 94 : 543.

Type-locality : Tarak Tal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

10. ***Nephrotoma consimilis*** (Brunetti)

1911. *Pachyrina consimilis* Brunetti, *Rec. Indian Mus.*, 6 : 266.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nepal.

11. ***Nephrotoma muktesarensis*** Alexander

1952. *Nephrotoma muktesarensis* Alexander, *Ann. Mag. nat. Hist.*, (12)**5** : 1095.

Type-locality : Muktesar, Kumaon.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

Genus ***Tipula*** Linnaeus, 1758

12. ***Tipula (Acutipula) robusta*** Brunetti

1911. *Tipula robusta* Brunetti, *Rec.Indian Mus.*, **6** : 254.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Mussoorie).

Elsewhere : Nil.

13. ***Tipula (Emodotipula) stylostena*** Alexander

1961. *Tipula stylostena* Alexander, *Philipp. J. Sci.*, 90 : 439.

Type-locality : Ukhal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Pakistan.

14. ***Tipula (Indotipula) gupta*** Alexander

1961. *Tipula gupta* Alexander, *Philipp. J. Sci.*, 90 : 128.

Type-locality : Tungnath, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

15. ***Tipula (Indotipula) peusiana*** Alexander

1965. *Tipula peusiana* Alexander, *Philipp. J. Sci.*, **94** : 276.

Type-locality : Khumyara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

16. ***Tipula (Indotipula) sudra*** Alexander

1961. *Tipula sudra* Alexander, *Philipp. J. Sci.*, **90** : 134.

Type-locality : Pau Kal, Tehri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Tehri Garhwal, Kumaon).

Elsewhere : Nil.

17. ***Tipula (Nippotipula) pulcherrima*** Brunetti

1912. *Tipula pulcherrima* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 310.

Type-locality : nr. Bhowali, Kumaon.

Distribution : India : Uttarakhand (Bhowali, Kumaon).

Elsewhere : Nil.

18. ***Tipula (Pterelachisus) brunnicosta*** Brunetti

1912. *Tipula brunnicosta* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 332.

Type-locality : Simla.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : Nil.

19. ***Tipula (Pterelachisus) ranee*** Alexander

1961. Tipula ranee Alexander, *Philipp. J. Sci.*, **90** : 146.

Type-locality : Kulara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

20. ***Tipula (Schummelia) continuata*** Brunetti

1912. *Tipula continuata* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 328.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

21. ***Tipula (Schummelia) penicillaris*** Alexander

1961. *Tipula penicillaris* Alexander, *Philipp. J. Sci.*, **90** : 114.

Type-locality : Dakwani, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

22. ***Tipula (Schummelia) xanthopleura*** Edwards

1928. *Tipula xanthopleura* Edwards, *Ann. Mag. nat. Hist.*, (10)**1** : 698.

Type-locality : Muktesar, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Tibet.

23. ***Tipula (Sinotipula) brunnettiana*** Alexander

1920. *Tipula brunnettiana* Alexander, *Bull. Am. Mus. nat. Hist.*, **43** : 15.

Type-locality : Badrinath, Garhwal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

24. ***Tipula (Sinotipula) griseipennis*** Brunetti

1912. *Tipula griseipennis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 321.

Type-locality : Badrinath, Garhwal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nepal; Tibet.

25. ***Tipula (Sinotipula) macquartina*** Alexander

1965. *Tipula macquartina* Alexander, *Philipp. J. Sci.*, **94** : 242.

Type-locality : Ukhal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

26. ***Tipula (Sinotipula) tesselatipennis*** Brunetti

1912. *Tipula tesselatipennis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 317.

Type-locality : Naini Tal, Kumaon.

Distribution : India : Uttarakhand (Naini Tal, Kumaon), Jammu & Kashmir.

Elsewhere : Pakistan.

27. ***Tipula (Vestiplex) himalayensis*** Brunetti

1911. *Tipula himalayensis* Brunetti, *Rec. Indian Mus.*, **6** : 252.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Indochina; Tibet.

28. ***Tipula (Vestiplex) kumaonensis*** Alexander

1961. *Tipula kumaonensis* Alexander, *Philipp. J. Sci.*, **90** : 429.

Type-locality : Gangrea, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

29. ***Tipula (Vestiplex) ravana*** Alexander

1952. *Tipula ravana* Alexander, *Rec. Indian Mus.*, **50** : 342.

Type-locality : Jabharket, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nepal.

30. ***Tipula (Vestiplex) subtincta*** Brunetti

1912. *Tipula subtincta* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 326.

Type-locality : Kurseong.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

31. ***Tipula (Vestiplex) wahlgrenana*** Alexander

1966. *Tipula wahlgrenana* Alexander, *Philipp. J. Sci.*, **95** : 371.

Type-locality : Khumyara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

32. ***Tipula (Uncertain) perelegans*** Alexander

1921. *Tipula perelegans* Alexander, *Insecutor Inscit. menst.*, **9** : 180.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Mussoorie).

Elsewhere : Nil.

Family LIMONIIDAE

The Limoniidae are smaller in size than the Tipulidae but share several characters with the tipulids. The family had been as a subfamily of the family Tipulidae, separated recent times and given the status of the family. Adults swarm like the tipulids. Larvae are aquatic or semiaquatic, feeds on decaying plant parts, fungi and algae. 929 species under 50 genera have been reported from India with 93 species under 20 genera reported from Uttarakhand.

Genus ***Antocha*** Osten Sacken, 1859

33. ***Antocha (Antocha) aegina*** Alexander

1970. *Antocha aegina* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**39** : 73.

Type-locality : Gery, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

34. ***Antocha (Antocha) arjuna*** Alexander

1969. *Antocha arjuna* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**38** : 33.

Type-locality : Dakwani, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

35. ***Antocha (Antocha) indica*** Brunetti

1912. *Antocha (Antocha) indica* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 426.

Type-locality : Kurseong.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : China, Malaya.

36. ***Antocha (Antocha) scapularis*** Alexander

1968. *Antocha scapularis* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**37** : 48.

Type-locality : Dhar, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

37. ***Antocha (Antocha) unilineata*** Brunetti

1912. *Antocha unilineata* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 427.

Type-locality : Mundali, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun)

Elsewhere : Nil.

38. ***Antocha (Orimargula) almorae*** Alexander

1970. *Antocha almorae* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**39** : 76.

Type-locality : Loharket, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

Genus ***Helius*** Lepeletier and Serville, 1828

39. ***Helius (Helius) catreus*** Alexander

1966. *Helius catreus* Alexander, *Philipp. J. Sci.*, **95** : 249.

Type-locality : Saran, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

40. ***Helius (Helius) serenus*** Alexander

1966. *Helius serenus* Alexander, *Philipp. J. Sci.*, **95** : 258.

Type-locality : Rishikesh, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Genus ***Limonia*** Meigen, 1803

41. ***Limonia (Achyrolimonia) immerens*** Alexander

1963. *Limonia immerens* Alexander, *Philipp. J. Sci.*, **92** : 228.

Type-locality : Kulara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

42. ***Limonia (Atypophthalmus) kurma*** Alexander

1965. *Limonia kurma* Alexander, *Philipp. J. Sci.*, **95** : 406.

Type-locality : Koti, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

43. ***Limonia (Dicranomyia) chandra*** Alexander

1964. *Limonia chandra* Alexander, *Philipp. J. Sci.*, **93** : 294.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

44. ***Limonia (Dicranomyia) cinerascens*** (Brunetti)

1912. *Dicranomyia cinerascens* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 381.

Type-locality : Kurseong, Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

45. ***Limonia (Dicranomyia) fraterna*** (Brunetti)

1912. *Dicranomyia fraterna* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 378.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

46. ***Limonia (Dicranomyia) kubera*** Alexander

1964. *Limonia kubera* Alexander, *Philipp. J. Sci.*, **93** : 300.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

47. ***Limonia (Dicranomyia) malina*** Alexender

1960. *Limonia malina* Alexender, *Philipp. J. Sci.*, **93** : 317.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

48. ***Limonia (Dicranomyia) microentmema*** Alexender

1964. *Limonia microentmema* Alexender, *Philipp. J. Sci.*, **93** : 319.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

49. ***Limonia (Dicranomyia) neabjuncta*** Alexender

1963. *Limonia neabjuncta* Alexender, *Philipp. J. Sci.*, **92** : 225.

Type-locality : Khati, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

50. ***Limonia (Dicranomyia) pentadactyla*** Alexander

1964. *Limonia pentadactyla* Alexander, *Philipp. J. Sci.*, **93** : 296.

Type-locality : Dakwani, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

51. ***Limonia (Dicranomyia) pulchripennis*** (Brunetti)

1912. *Dicranomyia pulchripennis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 376.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), Assam, Jammu & Kashmir, Sikkim, West Bengal.

Elsewhere : Nil.

52. ***Limonia (Dicranomyia) rixosa*** Alexander

1964. *Limonia rixosa* Alexander, *Philipp. J. Sci.*, **93** : 304.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

53. ***Limonia (Dicranomyia) sordida*** (Brunetti)

1912. *Dicranomyia sordida* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 382.

Type-locality : Kurseong, Almora.

Distribution : India : Uttarakhand (Almora, Kumaon), Assam.

Elsewhere : China (Kwangtung), Formosa, Malaya, Myanmar, Philippines, Sri Lanka, Sumatra; Society Islands, Tibet.

54. ***Limonia (Dicranomyia) tyrranica*** Alexender

1964. *Limonia tyrranica* Alexender, *Philipp. J. Sci.*, **93** : 314.

Type-locality : Tarak Tal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon), Sikkim.

Elsewhere : Nil.

55. ***Limonia (Dicranomyia) umbonis*** Alexander

1964. *Limonia umbonis* Alexander, *Philipp. J. Sci.*, **93** : 316.

Type-locality : Wau, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

56. ***Limonia (Dicranomyia) yaksha*** Alaxander

1964. *Limonia yaksha* Alaxander, *Philipp. J. Sci.*, **93** : 301.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

57. ***Limonia (Melanolimonia) priapula*** Alexander

1965. *Limonia priapula* Alexander, *Philipp. J. Sci.*, **94** : 404.

Type-locality : Dogalbeta, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

58. ***Limonia (Rhipidia) antennata*** (Brunetti)

1911. *Ceratostephanus antennata* Brunetti, *Rec. Indian Mus.*, **6** : 272.

Type-locality : Simla.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : Nil.

59. ***Limonia (Rhipidia) crassirostris*** Alexander

1964. *Limonia crassirostris* Alexander, *Philipp. J. Sci.*, **93** : 464.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

60. ***Limonia (Rhipidia) josephi*** Alexander

1971. *Limonia josephi* Alexander, *Orient. Insects*, **5** : 78.

Type-locality : Goaldam, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

61. ***Limonia (Rhipidia) ugra*** Alexander

1964. *Limonia ugra* Alexander, *Philipp. J. Sci.*, **93** : 467.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

62. ***Limonia (Sivalimnobia) rahula*** Alexander

1963. *Limonia rahula* Alexander, *Philipp. J. Sci.*, **92** : 223.

Type-locality : Tapoban, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

63. ***Limonia (Uncertain) luteitarsis*** Alexander

1964. *Limonia luteitarsis* Alexander, *Philipp. J. Sci.*, **93** : 458.

Type-locality : Kanol, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Orimarga*** Osten Sacken, 1869

64. ***Orimarga (Orimarga) fuscicosta*** Alexander

1965. *Orimarga fuscicosta* Alexander, *Philipp. J. Sci.*, **94** : 422.

Type-locality : Khumyara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

65. ***Orimarga (Orimarga) platystyla*** Alexander

1965. *Orimarga platystyla* Alexander, *Philipp. J. Sci.*, **94** : 425.

Type-locality : Gangrea, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

66. ***Orimarga (Orimarga) resupina*** Alexander

1965. *Orimarga resupina* Alexander, *Philipp. J. Sci.*, **94** : 426.

Type-locality : Rishikesh, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

67. ***Orimarga (Orimarga) varuna*** Alexander

1960. *Orimarga varuna* Alexander, *Philipp. J. Sci.*, **94** : 430.

Type-locality : Pagna Malla, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Dicranota*** Zetterstedt, 1838

69. ***Dicranota (Dicranota) strepens*** Alexander

1960. *Dicranota strepens* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**29** : 160.

Type-locality : Badrinath, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

70. ***Dicranota (Rhaphidolabina) trichoneura*** Alexander

1960. *Dicranota trichoneura* Alexander, *Proc. R. ent. Soc. Lond.*, (B)29 : 163.

Type-locality : Tungnath, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

71. ***Dicranota (Rhaphidolabis) balarama*** Alexander

1961. *Dicranota balarama* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**30** : 168.

Type-locality : Binaik Chatti, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

72. ***Dicranota (Rhaphidolabis) indra*** Alexander

1961. *Dicranota indra* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**30** : 169.

Type-locality : Kulara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

73. ***Dicranota (Rhaphidolabis) khumyarae*** Alexander

1960. *Dicranota khumyarae* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**29** : 164.

Type-locality : Khumyara, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

4. ***Dicranota (Rhaphidolabis) lacteipennis*** Alexander

1961. *Dicranota lacteipennis* Alexander, *Proc. R. ent. Soc. Lond.*, (B)30 : 167.

Type-locality : Kulara, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

75 ***Dicranota (Rhaphidolabis) shushna*** Alexander

1961. *Dicranota shushna* Alexander, *Proc. R. ent. Soc. Lond.*, (B)30 : 168.

Type-locality : Timarsen, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal).

Elsewhere : Nil.

76. ***Dicranota (Rhaphidolabis) vajra*** Alexander

1961. *Dicranota vajra* Alexander, *Proc. R. ent. Soc. Lond.*, (B)**30** : 170.

Type-locality : Gangarea, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

78. ***Dicranota (Rhaphidolabis) vritra*** Alexander

1961. *Dicranota vritra* Alexander, *Proc. R. ent. Soc. Lond.*, (B)30 : 171.

Type-locality : Gangarea, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Pedicia*** Latreille, 1809

79. ***Pedicia (Tricyphona) glabripennis*** (Brunetti)

1912. *Amalopis glabripennis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 515.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

Genus ***Hexatoma*** Latreille, 1809

80 ***Hexatoma (Eriocera) furtiva*** Alexander

1961. *Hexatoma furtiva* Alexander, *Ent. News*, **72** : 239.

Type-locality : Rishikesh, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

81. ***Hexatoma (Eriocera) prolixa*** Alexander

1961. *Hexatoma prolixa* Alexander, *Ent. News*, **72** : 235.

Type-locality : Koti, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Limnophila*** Macquart, 1834

82. ***Limnophila (Afrolimnophila) pusan*** Alexander

1964. *Limnophila pusan* Alexander, *Ent. News*, **75** : 21.

Type-locality : Khumyara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

83. ***Limnophila (Dicranophragma) karma*** Alexander

1966. *Limnophila karma* Alexander, *Ent. News*, **77** : 218.

Type-locality : Tarak Tal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

84. ***Limnophila (Eloeophila) ornata*** (Brunetti)

1912. *Ephelia ornata* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 527.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Bhowali, Kumaon).

Elsewhere : Nil.

Genus ***Paradelphomyia*** Alexander, 1936

85. ***Paradelphomyia (Oxyrhiza) angustistyla*** Alexander

1970. *Paradelphomyia angustistyla* Alexander, *Ent. News*, **81** : 81.

Type-locality : Kulara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

86. ***Paradelphomyia (Oxyrhiza flavescens*** (Brunetti)

1911. *Cladura flavescens* Brunetti, *Rec. Indian Mus.*, **6** : 284.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

87. ***Paradelphomyia (Oxyrhiza) tritumula*** Alexander

1965. *Paradelphomyia tritumula* Alexander, *Ent. News*, **76** : 47.

Type-locality : Manghu Chatti, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Phyllolabis*** Osten Sacken, 1877

88. ***Phyllolabis beesoni*** Alexander

1929. *Phyllolabis beesoni* Alexander, *Philipp. J. Sci.*, **40** : 339.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Mussoorie).

Elsewhere : Nil.

89. ***Phyllolabis brunettii*** Alexander

1961. *Phyllolabis brunettii* Alexander, *Trans. R.. ent. Soc. Lond.*, (B)**113** : 143.

Type-locality : Rata, Almora,Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

90. ***Phyllolabis mannheimsi*** Alexander

1961. *Phyllolabis mannheimsi* Alexander, *Trans. R. ent. Soc. Lond.*, (B)**113** : 149.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

91. ***Phyllolabis seniorwhitei*** Alexander

1961. *Phyllolabis seniorwhitei* Alexander, *Trans. R. ent. Soc. Lond.*, (B)**113** : 152.

Type-locality : Rata, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

Genus ***Pseudolimnophila*** Alexander, 1919

92. ***Pseudolimnophila honesta*** (Brunetti)

1912. *Limnophila honesta* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 570.

Type-locality : Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

93. ***Pseudolimnophila monomelania*** Alexander

1963. *Pseudolimnophila monomelania* Alexander, *Philipp. J. Sci.*, **92** : 231.

Type-locality : Rishikesh, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

94. ***Pseudolimnophila spatiosa*** Alexander

1965. *Pseudolimnophila spatiosa* Alexander, *Ent. News*, **76** : 217.

Type-locality : Tungnath, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Taiwanomyia*** Alexander, 1923

95. ***Taiwanomyia sicula*** Alexander

1967. *Taiwanomyia sicula* Alexander, *Ent. News*, **78** : 195.

Type-locality : Khumyara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Baeoura*** Alexander, 1924

98. ***Baeoura coloneura*** Alexander

1964. *Baeoura coloneura* Alexander, *Jl N. Y. ent. Soc.*, **72** : 169.

Type-locality : Kat kor, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

99. ***Baeoura dihybosa*** Alexander

1964. *Baeoura dihybosa* Alexander, *Jl N.Y. ent. Soc.*, **72** : 168.

Type-locality : Akhrot koti, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

100. ***Baeoura schmidiana*** Alexander

1964. *Baeoura schmidiana* Alexander, *Jl N. Y. ent. Soc.*, **72** : 169.

Type-locality : Pau Kal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Crypteria*** Bergroth, 1913

101. ***Crypteria (Crypteria) basistylata*** Alexander

1960. *Crypteria basistylata* Alexander, *Jl N.Y. ent. Soc.*, 68 : 136.

Type-locality : Tapoban, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

102. ***Crypteria (Crypteria) haploa*** Alexander

1960. *Crypteria haploa* Alexander, *Jl N. Y. ent. Soc.*, **68** : 137.

Type-locality : Kulara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nepal.

Genus ***Erioptera*** Meigen, 1803

103. ***Erioptera (Meterioptera) halterata*** Brunetti

1960. *Erioptera halterata* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 457.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

Genus ***Gonomyia*** Meigen, 1818

104. ***Gonomyia (Gonomyia) brachyura*** Alexander

1963. *Gonomyia rachyuran* Alexander, *Philipp. J. Sci.*, **92** : 237.

Type-locality : Tapoban, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

105. ***Gonomyia (Gonomyia) ishana*** Alexander

1961. *Gonomyia ishana* Alexander, *Jl N.Y. ent. Soc.*, **69** : 129.

Type-locality : Trijugi, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

106. ***Gonomyia (Gonomyia) periploca*** Alexander

1963. *Gonomyia periploca* Alexander, *Philipp. J. Sci.*, **92** : 241.

Type-locality : Kanol, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

107. ***Gonomyia (Gonomyia) ravana*** Alexander

1961. *Gonomyia ravana* Alexander, *Philipp. J. Sci.*, **90** : 202.

Type-locality : Gangarea, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

108. ***Gonomyia (Gonomyia) yama*** Alexander

1961. *Gonomyia yama* Alexander, Philipp. *J. Sci.*, **90** : 205.

Type-locality : Gangarea, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

109. ***Gonomyia (Idiocera) maharaja*** Alexander

1961. *Gonomyia maharaja* Alexander, *Jl N.Y. ent. Soc.*, 69 : 124.

Type-locality : Lata, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

110. ***Gonomyia (Lipophleps) curvistyla*** Alexander

1961. *Gonomyia curvistyla* Alexander, *Jl N.Y. ent. Soc.*, **69** : 126.

Type-locality : Tehri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Tehri Garhwal, Kumaon).

Elsewhere : Nil.

111. ***Gonomyia (Lipophleps) kama*** Alexander

1963. *Gonomyia kama* Alexander, *Jl N.Y. ent. Soc.*, **71** : 76.

Type-locality : Sutol, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

112. ***Gonomyia (Lipophleps) pentacantha*** Alexander

1967. *Gonomyia pentacantha* Alexander, *Jl N.Y. ent. Soc.*, **75** : 184.

Type-locality : Tapoban, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

113. ***Gonomyia (Lipophleps) varsha*** Alexander

1963. *Gonomyia varsha* Alexander, *Jl N.Y. ent. Soc.*, **71** : 79.

Type-locality : Pagna Malla, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon), West Bengal.

Elsewhere : Nil.

114. ***Gonomyia (Protogonomyia) aitholodes*** Alexander

1961. *Gonomyia aitholodes* Alexander, *Jl N.Y. ent. Soc.*, **69** : 121.

Type-locality : Lingari, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Molophilus*** Curtis, 1833

115. ***Molophilus (Molophilus) genitalis*** (Brunetti)

1912. *Erioptera genitalis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 456.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Bhowali, Kumaon).

Elsewhere : Nil.

116. ***Molophilus (Molophilus) gurkha*** Alexander

1958. *Molophilus gurkha* Alexander, *Jl N.Y. ent. Soc.*, **66** : 167.

Type-locality : Nepal

Distribution : India : Uttarakhand (Kumaon), Assam, Sikkim, Uttar Pradesh.

Elsewhere : Nepal.

117. ***Molophilus (Promolophilus) grishma*** Alexander

1969. *Molophilus grishma* Alexander, *Trans. Am. Ent. Soc.*, **95** : 467.

Type-locality : Git Dabling (West Bengal)

Distribution : India : Uttarakhand (Kumaon), Sikkim, Uttar Pradesh.

Elsewhere : Nil.

118. ***Molophilus (Promolophilus) munkar*** Alexander

1969. *Molophilus munkar* Alexander, *Trans. Am. Ent. Soc.*, **95** : 470.

Type-locality : Ramni, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Neolimnophila*** Alexander, 1920

119. ***Neolimnophila bifusca*** Alexander

1960. *Neolimnophila bifusca* Alexander, *Jl N.Y. ent. Soc.*, **68** : 135.

Type-locality : Gangarea, Pauri Garhwal, Kumaon.

Distribution : India: Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

120. ***Neolimnophila genitalis*** (Brunetti)

1912. *Gnophomyia genitalis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 490.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Ormosia*** Rondani, 1856

121. ***Ormosia (Oreophila) licina*** Alexander

1966. *Ormosia licina* Alexander, *Jl N.Y. ent.* Soc., **74** : 66.

Type-locality : Dakwani, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon), Kashmir.

Elsewhere : Nil.

122. ***Ormosia (Oreophila) stenostyla*** Alexander

1965. *Ormosia stenostyla* Alexander, *Jl N.Y. ent. Soc.*, **73** : 33.

Type-locality : Kanol, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

123. ***Ormosia (Ormosia) grahami*** Alexander

1931. *Ormosia grahami* Alexander, *Philipp. J. Sci.*, **44** : 364.

Type-locality : Mupin, China.

Distribution : India : Uttarakhand (Kumaon), Sikkim, Uttar Pradesh.

Elsewhere : Myanmar, China.

124. ***Ormosia (Ormosia) harsha*** Alexander

1965. *Ormosia harsha* Alexander, *Jl N.Y. ent. Soc.*, **73** : 164.

Type-locality : Gangarea, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

125. ***Ormosia (Ormosia) moghalensis*** Alexander

1965. *Ormosia moghalensis* Alexander, *Jl N.Y. ent. Soc.*, **73** : 163.

Type-locality : Ugsara, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

126. ***Ormosia (Ormosia) pulcher*** (Brunetti)

1912. *Rhypholophus pulcher* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 442.

Type-locality : Phagu, Shimla.

Distribution : India : Uttarakhand (Nainital), Uttar Pradesh.

Elsewhere : Nil.

127. ***Ormosia (Parormosia) perdiffusa*** Alexander

1965. *Ormosia perdiffusa* Alexander, *Jl N.Y. ent. Soc.*, **73** : 38.

Type-locality : Ukhal, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Rhabdomastix*** Skuse, 1890

128. ***Rhabdomastix (Rhabdomastix) himalayensis*** Alexander

1960. *Rhabdomastix himalayensis* Alexander, *Jl N.Y. ent. Soc.*, 68 : 142.

Type-locality : Salkhola, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

129. ***Rhabdomastix (Sacandaga) almorae*** Alexander

1960. *Rhabdomastix almorae* Alexander, *Jl N.Y. ent. Soc.*, **68** : 143.

Type-locality : Bageshwar, Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

130. ***Rhabdomastix (Sacandaga) teriensis*** Alexander

1962. *Rhabdomastix teriensis* Alexander, *Ent. News*, **73** : 122.

Type-locality : Teri, Tehri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Tehri Garhwal, Kumaon).

Elsewhere : Nil.

Genus ***Styringomyia*** Loew, 1845

131. ***Styringomyia mitra*** Alexander

1954. *Styringomyia mitra* Alexander, *Ann. Mag. Nat. Hist.*, (12)7 : 911.

Type-locality : Ammatti, S. Coorg.

Distribution : India : Uttarakhand (Kumaon), Karnataka Uttar Pradesh.

Elsewhere : Nil.

Genus ***Trentepohlia*** Bigot, 1854.

122. ***Trentepohlia (Mongoma) argopoda*** Alexander

1960. *Trentepohlia argopoda* Alexander *Jl N.Y. ent. Soc.*, **68** : 138.

Type-locality : Goaldam, Pauri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

123. ***Trentepohlia (Mongoma) varipes*** Alexander

1960. *Trentepohlia varipes* Alexander, *Jl N.Y. ent. Soc.*, **68** : 140.

Type-locality : Gawani, Tehri Garhwal, Kumaon.

Distribution : India : Uttarakhand (Tehri Garhwal, Kumaon).

Elsewhere : Nil.

Infraorder PSYCHOMORPHA

Family PSYCHODIDAE

The Psychodidae includes both "moth flies" and "sand flies" (previously considered as a separate family Phlebotomidae). They are minute flies with broadly ovate and densely setose folded tent-like over the abdomen, with short legs, they are weak fliers found in moist places. Larvae are mostly aquatic and feed on fallen leaves and other organic materials. Although moth flies donot bite, sand flies are blood feeders, and certain species are known to transmit pathogens, including sand fly fever virus and those cause the various types of leismaniasis. 79 species of 10 genera have been reported from India, of them only 4 species of 3 genera are being reported from Uttarakhand.

Subfamily PSYCHODINAE

Genus ***Pericoma*** Walker, 1856.

124. ***Pericoma margininotata*** Brunetti

1908. *Pericoma margininotata* Brunetti, *Rec. Indian Mus.*, **2** : 381.

Type-locality : Simla.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : Nil.

125. ***Pericoma metatarsalis*** Brunetti

1911. *Pericoma metatarsalis* Brunetti, *Rec. Indian Mus.*, **4** : 305.

Type-locality : Simla.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : Nil.

Genus ***Psychoda*** Latreille, 1796

126. ***Psychoda alternata*** Say

1824. *Psychoda alternata* Say, *in Keating, Major Long's second expedition (Appendix)*, **2** : 358.

Type-locality : Philadelphia, U.S.A.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Cosmopolitan.

Subfamily PHLEBOTOMINAE

Genus ***Sergentomyia*** Franca & Parrot, 1920.

127. ***Sergentomyia (Parrotomyia) himalayensis*** (Annandale)

1910. *Phlebotomus himalayensis* Annandale, *Rec. Indian Mus.*, **4** : 50.

Type-locality : Naini Tal, Bhowali, Kurseong.

Distribution : India : Uttarakhand (Nainital), West Bengal.

Elsewhere : Nil.

Infraorder PTYCHOPTER OMORPHA
Family PTYCHOPTERIDAE

Ptychopteridae, or false crane flies, are small to medium-sized flies very similar in general habitus to crane flies (Tipulidae and related families). The family is distinguished by a combination of the following characters : 1 anal vein, no ocelli, long 5-jointed palps with terminal joint longest, a pre-haltere, and a 4-branched radius. The antenna is noticeably longer in the males, with 13 flagellomeres, and the long legs have prominent, hairy tibial spurs. Because of these characters, together with wings that are often banded, the adults resemble large fungus gnats (Mycetophilidae). Immatures are found in saturated mud along stream edges. 4 species of 1 genus have been reported from India, of them only 1 species of 1 genus is being reported from Uttarakhand.

Genus ***Ptychoptera*** Meigen, 1803
128. ***Ptychoptera garhwalensis*** Alexander

1959. *Ptychoptera garhwalensis* Alexander, *Bull. Brooklyn ent. Soc.*, **54** : 57.

Type-locality : Manghu Chatti, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal).

Elsewhere : Nil.

Family TANYDERIDAE

The members of Tanyderidae are primitive of all living Diptera. Adult males swarm in large numbers during the evenings and are found hanging from riparian vegetation during day time. Only 3 species under 1 genus have been reported from India while only 1 species under 1 genus is being reported from the Uttarakhand.

Genus ***Protanyderus*** Handlirsch, 1909.
129. ***Protanyderus schmidi*** Alexander

1959. *Protanyderus schmidi* Alexander, *Bull. Brooklyn ent. Soc.*, **54** : 53.

Type-locality : Loharket, Almora.

Distribution : India : Uttarakhand (Almora).

Elsewhere : Nil.

Infraorder CULICOMORPHA
Family CERATOPOGONIDAE

The family Ceratopogonidae (Keras=horn, pogon=beared), commonly known as biting midges, no-see-ums or punkies. The flies are tiny, often with spotted wings (e,g. Culicoides); adult females suck the blood of vertebrates and other, or prey on other insects. Members of most species, however feed on necter or pollen and rendered considerable benefit to the human beings through pollination. Larvae occupy a variety of moist habitats, including soil, moss, under bark and in the rock pools; they may be algaevorous, saprophagous, mycophagous or predaceous. In India, 220 species under 21 genera of biting midges are reported of which only a lone species *Forcipomyia (Forcipomyia) lignicola* (Brunetti) reported from Uttarakhand.

Subfamily LEPTOCONOPINAE
Genus ***Forcipomyia*** Meigen, 1818
130. ***Forcipomyia (Forcipomyia) lignicola*** (Brunetti)

1912. *Ceratopogon lignicola* Brunetti, *Rec. Indian Mus.*, **7** : 445.

Type-locality : Dehra Dun, Thano, W. Himalayas.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Family CULICIDAE

The family Culicidae better known as mosquitoes comprises of small, elongate flies, with prominent proboscis and long palpi; best recognized by scaly wings. Adult males are phytophagous and also necter feeder; females are haematophagous, carry human diseases; larvae and pupae acquatic. The family is cosmopolitan in distribution and represented by 300 species under 15 genera in India. While 6 species under 3 genera is being reported from Uttarakhand.

Subfamily CULICINAE
Genus ***Aedes*** Meigen, 1818
131. ***Aedes (Finlaya) var. doonii*** Wattal, Bhatia and Kalra

1958. *Aedes doonii* Wattal, Bhatia and Kalra, *Indian J. Malar.*, **12** : 220.

Type-locality : Kalsi, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

132. ***Aedes (Finlaya) pseudotaeniatus*** (Giles)

1901. *Culex pseudotaeniatus* Giles, *J. Bombay nat. Hist. Soc.*, **13** : 607.

Type-locality : Bakloh and Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Myanmar, Sri Lanka.

133. ***Aedes (Finlaya) pulchriventer*** (Giles)

1901. *Culex pulchriventer* Giles, *J. Bombay nat. Hist. Soc.*, **13** : 609.

Type-locality : Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Tibet.

Genus ***Culex*** Linnaeus, 1758

134. ***Culex (Culiciomyia) ramakrishnii*** Wattal and Kalra

1965. *Culex ramakrishnii* Wattal and Kalra, *Bull. Indian Soc. Malar. Comm. Dis.*, **2** : 309.

Type-locality : Lachhiwala Reserve Forest, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

135. ***Culex (Culiciomyia) viridiventer*** Giles

1901. *Culex viridiventer* Giles, *J. Bombay nat. Hist. Soc.*, **13** : 609.

Type-locality : Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nepal, Pakistan.

Genus ***Culiseta*** Felt, 1904

136. ***Culiseta (Culiseta) niveitaeniata*** (Theobald)

1907. *Pseudotheobaldia niveitaeniata* Theobald, *Monogr. Cul.*, **4** : 272.

Type-locality : Dehra Dun.

Distribution : India : Uttarakhand (Dehra Du).

Elsewhere : China, Pakistan; Tibet.

Family DIXIDAE

The Dixidae (known as Dixa midge) form a small but widely distributed group that is frequently considered a subfamily of the Culicidae, mainly on the basis of the adult wing venation and the similarity between the larval and pupal stages of the two groups. Of the 11 species under a single genus *Dixa* in India, a lone species *Dixa amabilis* Alexander is being reported from Uttarakhand.

Genus ***Dixa*** Meigen, 1818

137. ***Dixa amabilis*** Alexander

1959. *Dixa amabilis* Alexander, *Bull. Brooklyn ent. Soc.*, **54** : 59.

Type-locality : Tehri Garhwal.

Distribution : India : Uttarakhand (Tehri Garhwal, Kumaon).

Elsewhere : Nil.

Family THAUMALEIDAE

The members of the family Thaumaleidae commonly have known as "solitary midges" consititute a small, homogenous family of rather small flies with shiny yellow to dark brown bodies. Eyes are holoptic in both sexes, and the antennae are short, with the flagellomeres slender and arista-like. Wings have a characteristic venation and can fold downward from near their bases to a slanting rooflike position much as in Psychodidae. The primarily diurnal adults are not strong fliers and frequent damp areas near the habitats of the immature stages. Larvae are amphipneustic and superficially resemble chironomids. They are found in cool water of shaded areas. Of the 14 species under a single genus *Thaumalea* in India, 4 species are so far reported from Uttarakhand.

Genus ***Thaumalea*** Ruthe, 1831

138. ***Thaumalea dirghakantaka*** Schmid

1970. *Thaumalea dirghakantaka* Schmid, *Naturaliste can.*, **97** : 510.

Type-locality : Gawana, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon), Assam, Sikkim, West Bengal.

Elsewhere : Nil.

139. *Thaumalea nanarupa* Schmid

1970. *Thaumalea nanarupa* Schmid, *Naturaliste can.*, **97** : 503.

Type-locality : Dhur, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

140. *Thaumalea tchakrarupa* Schmid

1970. *Thaumalea tchakrarupa* Schmid, *Naturaliste can.*, **97** : 507.

Type-locality : Timarsan, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

141. *Thaumalea vartula* Schmid

1970. *Thaumalea vartula* Schmid, *Naturaliste can.*, **97** : 507.

Type-locality : Jungal Chatti, Pauri Garhwal.

Distribution : India : Uttarakhand (Pauri Garhwal, Kumaon).

Elsewhere : Nil.

Family CHIRONOMIDAE

The Chironomidae, commonly known as non-biting midges, is a large, cosmopolitan family of nematocerans whose adults are small and delicate and superficially resemble mosquitoes. Antennae conspicuously plumose in males, pilose in females, mesonotun without V-shaped suture, venation of anterior wing more strongly marked than posterior. Adults occur in great numbers in the vicinity of lakes, ponds and streams. The larvae are aquatic. These are generally large larvae (>1/2 inch) that are red coloured, hence the term "blood worm" 165 species under 25 genera are reported from India of them only 2 species under 2 genera reported from Uttarakhand.

Subfamily CHIRONOMINAE

Genus *Chironomus* Meigen, 1803

142. *Chironomus macrogaster* Kieffer

1911. *Chironomus macrogaster* Kieffer, *Rec. Indian Mus.*, **6** : 142.

Type-locality : Maldhun, Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Genus *Paratendipes* Kieffer, 1911

143. *Paratendipes digraphis* (Kieffer)

1911.*Tendipes digraphis* Kieffer, *Rec.Indian Mus.*, **6** : 335.

Type-locality : Simla,Mundali,Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Family SIMULIIDAE

The common name, black fly, is somewhat of a misnomer since many species are gray and others are light yellow in color. Adults are typically robust with a characteristic arched or humped prothorax giving them to the common name,"buffalo gnat" Both sexes feed on the nectar of flowers; only the female requires a blood meal for ovarian development. Some species are vectors of various filarial, protozoan, and viral diseases. Out of 52 species under a single genus Simulium from India only 2 species are reported from Uttarakhand.

Genus *Simulium* Latreille, 1802

144. *Simulium (Simulium) griseifrons* Brunetti

1911. *Simulium griseifrons* Brunetti, *Rec. Indian Mus.*, **4** : 285.

Type-locality : Kalighat, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Malaya, Thailand.

145. *Simulium (Simulium) novolineatum* Puri

1933. *Simulium novolineatum* Puri, *Indian J. med. Res.*, **20** : 817.

Type-locality : Marianbarie, Terai Bengal, West Bengal.

Distribution : India : Uttarakhand (Kumaon), Karnataka, Uttar Pradesh, West Bengal.

Elsewhere : Nil.

Infraorder BIBINOMORPHA

Family MYCETOPHILIDAE

The Mycetophilidae also called as a fungus gnats are delicate flies of small or medium size (2.2-13.3mm) often robust, bearing a resemblance to gnats or midges and exceedingly numerous in individuals and species. Fungus gnats are fragile

usually strikingly black, brown and yellowish, sometimes bringhtly coloured with pictured wings. The flies have their heads with eyes separated, ocelli present and antennae long. The body is elongated, and compressed with the thorax more or less arched and sometime marked so. The antennae are almost always filiform, and composed of 12-17 segments. Adults are mostly nocturnal and so they are commonly found within damp, dark places, especially among forest undergrowth during the day. Only 1 species under 1 genus is represented from Uttarakhand, while 77 species under 22 genera so far reported from India.

Subfamily MYCETOPHILINAE

Genus ***Mycetophila*** Meigen, 1803

146. ***Mycetophila curvilinea*** Brunetti

1912. *Mycetophila curvilinea* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 116.

Type-locality : Darjeeling.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Nil.

Family BIBIONIDAE

The bibionids are commonly called as "March-flies" They are robust flies, often pubescent, with shorter legs and wings than most Nematocera. The eyes are holoptic in males and often occupy nearly the whole of the head and the upper facets being much larger than the lower. The wings have membrane usually clear. The larvae are terrestrial. The adults frequent medows, grassy hillsides or decaying organic materials and often appear in large swarms. They feed on nectar of flowers and are relatively short lived and in general the bibionids should probably be considered beneficial. The family is cosmopoliton in distribution and 39 species under 4 genera are found in India. Of them 10 species under 3 genera are so far reported from Uttarakhand.

Genus ***Bibio*** Geoffroy, 1762

148. ***Bibio brunettii*** Hardy

1911. *Bibio brunettii* Hardy, *Rec. Indian Mus.*, **4** : 276.

Type-locality : Badrinath, Garhwal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

149. ***Bibio collaripes*** Brunetti

1925. *Bibio collaripes* Brunetti, *Rec. Indian Mus.*, **27** : 449.

Type-locality : Onari, Garhwal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

150. ***Bibio fuscitibia*** Brunetti

1911. *Bibio fuscitibia* Brunetti, *Rec. Indian Mus.*, **4** : 279.

Type-locality : Phakia, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

Genus ***Penthetria*** Meigen, 1803

151. ***Penthetria brunettii*** Hardy

1948. *Penthetria brunettii* Hardy, *J. Kans. ent. Soc.*, **21** : 36.

Type-locality : Kumaon; Nepal.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

152. ***Penthetria carbonaria*** (Brunetti)

1912. *Parapleciomyia carbonaria* Brunetti, *Rec. Indian Mus.*, **7** : 447.

Type-locality : nr. Bhowali, W. Himalayas.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

153. ***Penthetria japonica*** Wiedemann

1830. *Penthetria japonica* Wiedemann, *Aussereurop. zweifl. Insekt.*, **2** : 618.

Type-locality : Japan.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : China, Formosa, Nepal; Japan.

154. ***Penthetria melanaspis*** Wiedemann

1828. *Penthetria melanaspis* Wiedemann, *Aussereurop. zweifl. Insekt.*, **1** : 72.

Type-locality : Java.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Java.

155. ***Penthetria obscura*** (Brunetti)

1911. *Plecia obscura* Brunetti, *Rec. Indian Mus.*, **6** : 272.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Mussoorie).

Elsewhere : Nil.

Genus ***Plecia*** Wiedemann, 1828

156. ***Plecia impostor*** Brunetti

1912. *Plecia impostor* Brunetti, *Rec. Indian Mus.*, **7** : 446.

Type-locality : Airadeo, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

157. ***Plecia tecta*** Hardy

1949. *Plecia tecta* Hardy, *Notes Ent. chin.*, **13** : 8.

Type-locality : Muktesar, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Family SCIARIDAE

The sciarids are small flies commonly called as "root gnats" similar to fungus gnats but more compact, separated from other related families by the usual dorsal extension of the eye which meet medially forming an `eye bridge' Adults are about 1-11mm longs slender, to moderately robust, long legged, usually black, brown or yellowish in colour. Larvae have a shining black head and a 12 segmented essentially featureless white translucent body and in some species are migrate in a snake like formation. Larvae feed on fungus, animal excrement or decaying plant meterial. Out of 61 species under 8 genera are reported from India only 3 species under 1 genera reported from Uttarakhand.

Genus ***Sciara*** Meigen, 1803

158. ***Sciara fratercula*** Brunetti

1912. *Sciara fratercula* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 132.

Type-locality : Kurseong and Bhim Tal, Kumaon.

Distribution : India : Uttarakhand (Bhim Tal, Kumaon).

Elsewhere : Nil.

159. ***Sciara nitidithorax*** Brunetti

1912. *Sciara nitidithorax* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 145.

Type-locality : Kalighat, Garhwal.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

160. ***Sciara segmenticornis*** Brunetti

1912. *Sciara segmenticornis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 141.

Type-locality : Bindukhera, Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Family CECIDOMYIIDAE

The cecidiomyids (gall-midges) are minute delicate flies with long moniliform antennae adorned with conspicuous whorls of hairs. The antennal characters and the greatly simplified venetion, enable the midges to be easily recognised. Adults are entirely saprophagous, and rarely precdaceous. The larvae exhibit a wide range of habits. Out of 310 species under 60 genera are reported from India only 8 species under 8 genera reported from Uttarakhand.

Genus ***Kamptodiplosis*** Felt, 1918

161. ***Kamptodiplosis ramanathi*** Mani

1963. *Kamptodiplosis ramanathi* Mani, *Bull. Ent. Loyola Coll.*, **4** : 13.

Type locality : Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Genus ***Odinadiplosis*** Mani, 1935

162. ***Odinadiplosis odinae*** Mani

1935. *Odinadiplosis odinae* Mani, *Rec. Indian Mus.*, **37** : 346.

Type-locality : Thanjavur and Calcutta.

Distribution : India : Uttarakhand (Dehra Dun), Tamil Nadu, West Bengal.

Elsewhere : Nil.

Genus ***Procontarinia*** Kieffer and Cecconi, 1906

163. ***Procontarinia echinogalliperda*** (Mani)

1947. *Amradiplosis echinogalliperda* Mani, *Bull. ent. Res.*, **38** : 443.

Type-locality : New Forest, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Genus ***Sissudiplosis*** Mani, 1942.

164. ***Sissudiplosis chatterjeei*** Mani

1942. *Sissudiplosis chatterjeei* Mani, Indian *J. Ent.*, **4** : 44.

Type-locality : Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

The following are unplaced species of the family Cecidomyiidae

165. ***Liebeliola dehradunensis*** Rao

1956. *Liebeliola dehradunensis* Rao, *Rec. Indian Mus.* **54** : 186.

Type locality : Dehradun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

166. ***Pseudohormomyia orientalis*** Rao

1956. *Pseudohormomyia orientalis* Rao, *Proc. zool. Soc.* Calcutta.

Type locality : Dehradun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

167. ***Karschomyia visvanathi*** (Rao)

1952. *Macrodiplosis visvanathi* Rao, *Rec. Indian Mus.* **50** : 314.

Type locality : Dehradun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

168. ***Meinertomyia aequipalpis*** Mani

1935. *Meinertomyia aequipalpis* Mani, *Rec. Indian Mus.*, **37** : 426.

Type locality : Jhajra, Dehradun

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Suborder BRACHYCERA

Most Brachycera are rather stout flies with antennae having fewer than seven segments, and often an arista. Larvae are hemicephalous or acephalous (maggot like), with sickle shaped mandible. Members of this suborder were traditionally placed in two subgroups, Orthorrhapha (Brachycera sensu stricto) and Cyclorrhapha (previously treated as separate suborder)

Infraorder STRATIOMYOMORPHA

Family XYLOMYIDAE

The Xylomyidae are more closely related to the Stratiomyidae than to the Rhagionidae. The family differs from the Stratiomyidae by having R_s arising distinctly basal to the discal cell, fourth posterior cell closed, and mid tibia apically spurred. Adults of living forms are sylvan in habit and larvae have been reared from rotting wood. Larvae are either saprophagous or predaceous. Out of species under genera reported from India, only a lone species solva (solva) interindia (Brunet) is reported from Uttarakhand.

Genus ***Solva*** Walker, 1860

169. ***Solva (Solva) intermedia*** (Brunetti)

1923. *Xylomia intermedia* Brunetti, *Rec. Indian Mus.*, **25** : 173.

Type-locality : Naini Tal, Kumaon.

Distribution : India : Uttarakhand (Naini Tal, Kumaon).

Elsewhere : Nil.

Family STRATIOMYIDAE

Stratiomyids or soldier flies, compose a moderately large family of infraorder Stratiomyomorpha under the suborder Brachycera of Diptera that exhibit an extreme array of morphological diversity, as well as a moderate range of life histories. The adult flies are more or less flattened, and vary in color from black, metallic blue, green or purple, to brightly colored black and yellow patterns. The flies are invariably bare of bristles or spines (except the side thoracic spines in a few genera), but often possess dense soft pubescence extending over the whole body and femora; antennae are characteristic among flies in having a long terminal segment which, when bent, gives a flagged appearance. Among the 73 species of 34 genera in India, 6 species of 6 genera are reported from Uttarakhand.

Subfamily BERIDAE
Genus ***Beris*** Latreille, 1802
170. ***Beris geniculata*** Curtis

1830. *Beris geniculata* Curtis, *Br. Ent.*, **7** : pl. 337.

Type-locality : England.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Europe.

Genus ***Chorisops*** Rondani, 1856
171. ***Chorisops tibialis*** (Meigen)

1820. *Beris tibialis* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **2** : 3.

Type-locality : England.

Distribution : India : Uttarakhand (Binsar).

Elsewhere : Myanmar; Europe, North Africa.

Subfamily SARGINAE
Genus ***Ptecticus*** Loew, 1855
172. ***Ptecticus aurifer*** (Walker)

1854. *Sargus aurifer* Walker, *List Dipt. Colln Br. Mus.*, **5** : 96.

Type-locality : India; North China.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Borneo, China (Fukien), Formosa, Malaya.

Genus ***Odontomyia*** Meigen, 1803
178. ***Odontomyia kashmirensis*** Brunetti

1920. *Odontomyia kashmirensis* Brunetti, *Fauna Br. India, Dipt.* **1** : 67.

Type-locality : Kashmir.

Distribution : India : Uttarakhand (Kumaon), Kashmir.

Elsewhere : Nil.

Subfamily CLITELLARIINAE
Genus ***Adoxomyia*** Bezzi, 1907
179. ***Adoxomyia bistriata*** (Brunetti)

1912. *Clitellaria bistriata* Brunetti, *Rec. Indian Mus.*, **7** : 452.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Lasiopa*** Brulle, 1832
180. ***Lasiopa himalayensis*** Brunetti

1907. *Lasiopa himalayensis* Brunetti, *Rec. Indian Mus.*, **1** : 117.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Dehradun).

Elsewhere : Nil.

Infraorder TABANOMORPHA
Family TABANIDAE

The family Tabanidae belongs to the suborder Brachycera, infraorder Tabanomorpha, commonly known as horse flies (*Tabanus*), deer flies (*Chrysops*), and clegs (*Haematopota*). The members of this family are mostly sturdy flies and usually strong fliers. Adult Tabanid are large flies with broad bodies and bulging eyes. The males are easily differentiated from female flies because eyes are contiguous in the males and widely separated in the females. The antennae are three segmented. The thorax and abdomen are covered with fine hairs. The adults of both sexes feed on nectar and pollen of flowers. Females of most species have piercing mandibles and also take blood meals. Out of 200 species under 12 genera are reported from India, only 25 species under 8 genera have been reported from Uttarakhand.

Genus ***Philoliche*** Wiedemann, 1828
181. ***Philoliche longirostris*** (Hardwicke)

1823. *Pangonia longirostris* Hardwicke, *Trans. Linn. Soc.Lond*, **14** : 135.

Type-locality : Nepal.

Distribution : India : Uttarakhand (Bhowali, Muktesar, Mussoorie), Assam, Himachal Pradesh, Kerala, Meghalaya, Sikkim, West Bengal.

Elsewhere : Nepal; Tibet (China).

Genus ***Chrysops*** Meigen, 1803
182. ***Chrysops designatus*** Ricardo

1911. *Chrysops designatus* Ricardo, *Rec Indian Mus.*, **4** : 383.

Type-locality : Sarah, Nepal and Jaulasal, Naini Tal.

Distribution : India : Uttarakhand (Naini Tal), Arunachal Pradesh, Jammu & Kashmir, West Bengal.

Elsewhere : China, Myanmar, Nepal, Pakistan.

183. ***Chrysops flavocinctus*** Ricardo

1902. *Chrysops flavocinctus* Ricardo, *Ann. Mag. nat. Hist.*, (7)**9** : 380.

Type-locality : Khasi Hills, Assam.

Distribution : India : Uttarakhand (Bhowali, Chamoli), Arunachal Pradesh, Assam, Meghalaya, Sikkim.

Elsewhere : Borneo, China (Oriental), Laos, Malaysia, Myanmar, Taiwan, Thailand, Vietnam.

Genus ***Silvius*** Meigen, 1820

184. ***Silvius (Silvius) indianus*** Ricardo

1911. *Silvius indianus* Ricardo, *Rec. Indian Mus.*, **4** : 374.

Type-locality : Bhura, Naini Tal.

Distribution : India : Uttarakhand (NainiTal).

Elsewhere : Nil.

Genus ***Atylotus*** Osten Sacken, 1876

185. ***Atylotus agrestis*** (Wiedemann)

1818. *Tabanus agrestis* Wiedemann, *Aussereurop. zweifl. Insekt.*, **1** : 557.

Type-locality : Egypt.

Distribution : India : Uttarakhand (Naini Tal), Assam, Bihar, Haryana, Kerala, Madhya Pradesh, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Sri Lanka, China; widespread Palaearctic and Ethiopian regions.

186. ***Atylotus cryptotaxis*** Burton

1978. *Atylotus cryptotaxis* Burton, *Tabanini of Thailand* : 125.

Type-locality : Thailand.

Distribution : India : (NainiTal), Assam, Orissa, Uttar Pradesh.

Elsewhere : Thailand.

187. ***Atylotus nemocallosus*** (Ricardo)

1909. *Tabanus nemocallosus* Ricardo, *Ann. Mag. nat. Hist.*, (8)**3** : 490.

Type-locality : Pusa, Bengal.

Distribution : India : Uttarakhand (Uttar Kashi), Bihar.

Elsewhere : Pakistan, Nepal.

188. ***Atylotus virgo*** (Wiedemann)

1824. *Tabanus virgo* Wiedemann, *Analecta Ent.* : 22.

Type-locality : Indies. orientalis.

Distribution : India : Uttarakhand (Naini Tal), Andaman Islands, Himachal Pradesh, Madhya Pradesh, Punjab, West Bengal.

Elsewhere : Pakistan, Sri Lanka.

Genus ***Hybomitra*** Enderlein, 1922

189. ***Hybomitra hirta*** (Walker)

1850. *Tabanus hirta* Walker, *Insecta Saundersiana*, **1** : 52.

Type-locality : East India.

Distribution : India : Uttarakhand (Chamoli, Kumaon), Himachal Pradesh.

Elsewhere : Nil.

190. ***Hybomitra subcallosa*** (Ricardo)

1911. *Tabanus subcallosa* Ricardo, *Rec. Indian Mus.*, **4** : 227.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Dehradun).

Elsewhere : Nil.

191. ***Hybomitra wyvillei*** (Ricardo)

1911. *Tabanus wyvillei* Ricardo, *Rec. Indian Mus.*, **4** : 229.

Type-locality : Narkanda, Himalayas.

Distribution : India : Uttarakhand (Chamoli), Himachal Pradesh.

Elsewhere : Nepal, China.

Genus ***Tabanus*** Linnaeus, 1758

192. ***Tabanus (Pseudobolbodimyia) albocostatus*** (Bigot)

1892. *Atylotus albocostatus* Bigot, *Mem. Soc. zool. France*, **5** : 649.

Type-locality : India.

Distribution : India : Uttarakhand (Tehri Garhwal).

Elsewhere : Nil.

193. ***Tabanus (Pseudobolbodimyia) auristriatus*** Ricardo

1911. *Tabanus auristriatus* Ricardo, *Rec. Indian Mus.*, **4** : 161.

Type-locality : North Kanara, India.

Distribution : India : Uttarakhand (Dehra Dun), Karnataka, Kerala, Tamil Nadu.

Elsewhere : Myanmar.

194. ***Tabanus (Pseudobolbodimyia) biannularis*** Philip

1960. *Tabanus biannularis* Philip, *Stud. Inst. med. Res. Malaya*, **29** : 42.

Type-locality : North Kanara, India.

Distribution : India : Uttarakhand (Dehra Dun), Karnataka, Kerala.

Elsewhere : Formosa, Malaysia, Vietnam.

195. ***Tabanus (Tabanus) excelsus*** Ricardo

1913. *Tabanus excelsus* Ricardo, *Ann. Mag. nat. Hist.*, **11** : 543.

Type-locality : Simla Hills, India.

Distribution : India : Uttarakhand (Dehra Dun), Himachal Pradesh.

Elsewhere : Nil.

196. ***Tabanus (Tabanus) orientis*** Walker

1848. *Tabanus orientis* Walker, *List. Dipt. British Mus.*, **1** : 152.

Type-locality : Nepal.

Distribution : India : Uttarakhand (Chamoli, Tehri, Garhwal, Kumaon, Naini Tal), Assam, Himachal Pradesh, West Bengal.

Elsewhere : Pakistan, Nepal, China.

197. ***Tabanus (Tabanus) oxyceratus*** (Bigot)

1892. *Atylotus oxyceratus* Bigot, *Mem. Soc. zool. France*, **5** : 652.

Type-locality : India.

Distribution : India : Uttarakhand (Dehradun, Tehri Garhwal), Chenna Forest, Himalayas.

Elsewhere : Myanmar, Nepal.

Genus ***Haematopota*** Meigen, 1800

198. ***Haematopota albofasciatipennis*** Brunetti

1912. *Haematopota albofasciatipennis* Brunetti, *Rec. Indian Mus.*, **7** : 458.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital, Dehra Dun), West Bengal.

Elsewhere : Nepal.

199. ***Haematopota crossi*** Stone and Philip

1974. *Haematopota crossi* Stone and Philip, *U.S. Dep. Agric. Res. Serv. Tech. Bull.*, 1489 : 84.

Type-locality : Sohawa, Pakistan.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nepal, Pakistan.

200. ***Haematopota dissimilis*** Ricardo

1911. *Haematopota dissimilis* Ricardo, *Rec. Indian Mus.*, **4** : 331.

Type-locality : Baste, North Kanara, India.

Distribution : India : Uttarakhand (Hempur), Karnataka.

Elsewhere : Nil.

201. ***Haematopota javana*** Wiedemann

1821. *Haematopota javana* Wiedemann, *Dipt. exot.*, **1** : 100.

Type-locality : Java.

Distribution : India : Uttarakhand (Dehra Dun, Nainital), Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Meghalaya, Tamil Nadu, West Bengal.

Elsewhere : Bangladesh, China, Java, Laos, Malaysia, Myanmar, Pakistan, Sumatra, Thailand, Vietnam.

202. ***Haematopota lata*** Ricardo

1906. *Haematopota lata* Ricardo, *Ann. Mag. nat. Hist.*, (7)**18** : 121.

Type-locality : Khasi Hills, India.

Distribution : India : Uttarakhand (Dehra Dun), West Bengal.

Elsewhere : China, Laos, Thailand, Myanmar.

203. ***Haematopota mukteswarensis*** Kapoor

1988. *Haematopota mukteswarensis* Kapoor, *Taxonomic Studies of Indian Tabanids, PAU, Ludhiana* : 170.

Type-locality : Muktesar, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Hippocentrodes*** Philip, 1961

204. ***Hippocentrodes striatipennis*** (Brunetti)

1912. *Haematopota striatipennis* Brunetti, *Rec. Indian Mus.*, **7** : 460.

Type-locality : Dehra Dun, Mussoorie Hills.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Unplaced species of the family Tabanidae

205. *Diachlorus fulvescens* Brunetti

1912. *Diachlorus fulvescens* Brunetti, *Rec. Indian Mus.*, **7** : 456.

Type-locality : Dha Kuri, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Family RHAGIONIDAE

Rhagionidae is a small family in lower Brachycera. However, historically the Rhagionidae has included a rather heterogeneous mixture of genera, some of which are seemingly related to other families of lower Brachycera, especially the Stratiomyidae, the Xylophagidae, and the Tabanidae. Rhagionis are commonly known as "Snipe flies" and are sparsely setose almost bristleless, elongate flies and with non annulated antennae. One of the most important specific characters in the family Rhagionidae is colouration of various parts of the body. Adults are found in open woods and meadows in vicinity of water or marshy places. Larvae are carnivorous, preying on other insects or their larvae and occur in damp soil, leaf litter, mud soil etc. The family is one of the oldest dipteran families with 30 species of 5 genera in India of them only 2 species of a single genus *Chrysopilus* Macquart are reported from Uttarakhand.

Genus ***Chrysopilus*** Macquart, 1826

206. ***Chrysopilus flavopilosus*** Brunetti

1920. *Chrysopilus flavopilosus* Brunetti, *Fauna Br. India, Dipt.*, **1** : 138.

Type-locality : Almora, Kumaon.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

207. ***Chrysopilus sordidus*** Brunetti

1920. *Chrysopilus sordidus* Brunetti, *Fauna Br. India, Dipt.*, **1** : 143.

Type-locality : Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Superfamily NEMESTRINIODEA

Family NEMESTRINIDAE

Nemestrinids are called "Tangle-veined Flies"; the venation is unique, many of the veins running parallel with the hind margins of the wing. The proboscis is often long, or very long. These flies are usually inhabitants of hot and arid regions where there is a minimum of rainfall. Rather like Bombyliidae; larvae parasitic in grasshoppers, locusts, perhaps beetles; remarkable for beautiful hovering. Adults usually frequently flowers having hover there while inbibing nectar. Larvae are parasitic on grasshoppers. Out of 6 species under 2 genera in India only 2 species under 1 genus are found in Uttarakhand.

Subfamily HIRMONEURINAE

Genus ***Hirmoneura*** Meigen, 1820

208. ***Hirmoneura annandalei*** Lichtwardt

1913. *Hirmoneura annandalei* Lichtwardt, *Rec. Indian Mus.*, **9** : 333.

Type-locality : Simla and Kufri.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

209. ***Hirmoneura opaca*** Lichtwardt

1909. *Hirmoneura opaca* Lichtwardt, *Dt. ent. Z.*, **1909** : 643.

Type-locality : Kangra Valley.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Family THEREVIDAE

Therevids (Stiletto flies) are more or less elongate densely pubescent flies with slender non-prehensile legs. Though they resemble Asilids but their weaker legs and non-protuberart eyes enable them to be readily separated from robber flies. They are found in a variety of habitats ranging from rainforest to desert, but are generally most diverse in arid regions where the sandy soils provide a suitable habitat for their fossorial (soil dwelling) larvae. Adults are nectar feeders, while the larvae are voracious predators of soil arthropods. Larvae can be found in almost all types

of terrestrial habitats but are especially diverse where sandy soils are dominant (e.g. dry forests, coastal dunes and deserts). The family includes 16 species under 3 genera in India with only 1 species being reported under the lone genus *Phycus* Walker from Uttarakhand.

Genus ***Phycus*** Walker, 1850.

210. ***Phycus argentiventris*** Brunetti

1920. *Phycus argentiventris* Brunetti, *Fauna Br. India, Dipt.*, **1** : 309.

Type-locality : Unchogaon, Naini Tal.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Sri Lanka.

Superfamily EMPIDOIDEA
Family EMPIDIDAE

The family "Empididae" in the traditional sense is a diverse group of medium to small sized (1 to 15 mm), grey, yellowish or dark very rarely metallic coloured flies. The head is variously shaped and usually narrower than thorax

The antenna has a one-segmented, variously shaped first flagellomere. The wings are of varied shape and size, sometimes broadened, rarely reduced, with the alula and anal lobe often lacking; the wing colour is hyaline to infuscate and sometimes patterned. They are commonly called as " dance-flies" and gain their common name from their courtship behaviour. Adult empidids are usually predaceous on soft bodied insects and may be found on flowers, in woods and over pools and streams. Larvae are soil inhabitants, but also soametimes found in decaying wood, humus, dungs moss or in water. The family includes 57 species under 19 genera in India with only 12 species being reported under 9 genera from Uttarakhand.

Subfamily HYBOTINAE
Genus ***Hybos*** Meigen, 1803

211. ***Hybos (Pseudosyneches) insignis*** (Brunetti)

1913. *Syneches insignis* Brunetti, *Rec. Indian Mus.*, **9** : 19.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : Nil.

Genus ***Syndyas*** Loew, 1857

212. ***Syndyas vitripennis*** (Brunetti)

1913. *Leptopeza vitripennis* Brunetti, *Rec. Indian Mus.*, **9** : 31.

Type-locality : Oncha Gaon, Naini Tal; Rangoon, Burma.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Myanmar.

Genus ***Syneches*** Walker, 1852

213. ***Syneches (Syneches) fratellus*** Brunetti

1913. *Syneches fratellus* Brunetti, *Rec. Indian Mus.*, **9** : 18.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : Nil.

Subfamily OCYDROMINAE
Genus ***Ocydromia*** Meigen, 1820

214. ***Ocydromia unifasciata*** (Brunetti)

1913. *Rhamphomyia unifasciata* Brunetti, *Rec. Indian Mus.*, **9** : 29.

Type-locality : Mundali, Jaunsa Division, Dehra Dun, Simla.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Subfamily EMPIDINAE
Genus ***Empis*** Linnaeus, 1758

215. ***Empis (Empis) centralis*** Brunetti

1913. *Empis centralis* Brunetti, *Rec. Indian Mus.*, **9** : 26.

Type-locality : Mundali, Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

216. ***Empis (Empis) elegans*** Brunetti

1913. *Empis elegans* Brunetti, *Rec. Indian Mus.*, **9** : 26.

Type-locality : Mundali.

Distribution : India : Uttarakhand (Dehradun).

Elsewhere : Nil.

217. ***Empis (Empis) griseonigra*** Brunetti

1913. *Empis griseonigra* Brunetti, *Rec. Indian Mus.*, **9** : 25.

Type-locality : Mundali, Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

218. ***Empis (Empis) subcilipes*** Brunetti

1913. *Empis subcilipes* Brunetti, *Rec. Indian Mus.*, **9** : 24.

Type-locality : Mundali, Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

66. Genus ***Rhamphomyia*** Meigen, 1822

219. ***Rhamphomyia (Rhamphomyia) griseonigra*** Brunetti

1913. *Rhamphomyia griseonigra* Brunetti, *Rec. Indian Mus.*, **9** : 29.

Type-locality : Mundali, Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Subfamily CLINOCERINAE

Genus ***Acanthoclinocera*** Saigusa, 1965

220. ***Acanthoclinocera glaucescens*** (Brunetti)

1917. *Clinocera glaucescens* Brunetti, *Rec. Indian Mus.*, **13** : 80.

Type-locality : Phagu, Simla.

Distribution : India : Uttarakhand (Almora).

Elsewhere : Nil.

Genus ***Clinocera*** Meigen, 1803

221. ***Clinocera fluviatilis*** Brunetti

1913. *Clinocera fluviatilis* Brunetti, *Rec. Indian Mus.*, **9** : 34.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : Nil.

Subfamily TACHYDROMIINAE

Genus ***Platypalpus*** Macquart, 1827

222. ***Platypalpus brunettii*** Melander

1928. *Platypalpus brunettii* Melander, *Genera Insect.*, **185** : 349.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Dehradun).

Elsewhere : Nepal.

Family DOLICHOPODIDAE

The dolichopodids or "long-legged flies" comprise one of the most diverse fly families. Most dolichopodids are recognised by their small and slender bristly bodies metallic blue or green colour, short fleshy proboscis, dorsal or terminal hair-like arista thorax with strong setae, discal and 2nd basal cells united and shortened, or often absent. Flies are often abundant in moist habitats and are frequently found on foliage, tree trunks, mud flats, and river rocks. Adults are predaceous on soft-bodied invertebrates and serve as important general control agents of many pest species. The maggot like larvae is found in soil, rotten vegetation, mud, and under bark. Most are predators or scavengers. Among 134 species of 27 genera reported from India, only 4 species of 4 genera are reported from Uttarakhand.

SUBFAMILY SCIAPODINAE

Genus ***Chrysosoma*** Guerin-Meneville, 1831

223. ***Chrysosoma oculatum*** Becker

1922. *Chrysosoma oculatum* Becker, *Capita zool.*, **1**(4) : 155.

Type-locality : nr. Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Genus ***Condylostylus*** Bigot, 1859

224. ***Condylostylus conspectus*** Becker

1922. *Condylostylus conspectus* Becker, *Capita zool.*, **1**(4) : 225.

Type-locality : Calcutta, Unchagoan, Naini Tal.

Distribution : India : Uttarakhand (Naini Tal), Karnataka, West Bengal.

Elsewhere : Myanmar.

Subfamily HYDROPHORINAE

Genus ***Phalacrosoma*** Becker, 1922

225. ***Phalacrosoma imperfectum*** Becker

1922. *Phalacrosoma imperfectum* Becker, *Capita zool.*, **1**(4) : 46.

Type-locality : Berg Hoozan, Kosempo, Formosa; nr. Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : Formosa.

Subfamily DIAPHORINAE
Genus ***Chrysotus*** Meigen,1824
226. ***Chrysotus discretus*** Becker

1922. *Chrysotus discretus* Becker, *Capita zool.*, 1(4) : 89.

Type-locality : Mundali, Jaunsa Division, Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun), Assam, West Bengal.

Elsewhere : Formosa, Myanmar, Nepal.

SERIES ASCHIZA
Family PHORIDAE

The family Phoridae (Mushroom Flies , Scuttle flies, coffin flies, Humpbacked flies) are small (1/8 inch) and resemble fruit flies in appearance. The Phorid fly lacks the red eye color that is the classic trademark of the fruit fly. The most easily recognized feature (seen with the naked eye) is the habit of the adult Phorid fly running rapidly across surfaces instead of immediately flying when disturbed. Phorid flies are common in homes and commercial facilities where food is prepared and served, but they are also a key pest in food warehouses, and hospitals. Because these flies frequent unsanitary conditions, they are a potential health concern when they occur in food facilities and hospitals. Phorid fly larvae have been found in the open wounds of patients in nursing homes and hospitals. In nature, they are typically associated with dead animals and heavily decaying vegetation. Out of 48 species under 18 genera in India only a lone species ***Puliciphora termitum*** Schmitz is found in Uttarakhand.

Subfamily METOPININAE
Genus ***Puliciphora*** Dahl, 1897
227. ***Puliciphora termitum*** Schmitz

1926. *Puliciphora termitum* Schmitz, *Entomologist's mon. Mag.*, **62** : 15.

Type-locality : Haldwani, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

SERIES SCHIZOPHORA

All flies with a ptilinal suture in head; larvae with no external head structure, mouth hooks visible through cuticle, one pair of prothoracic spiracles and one pair of posterior spiracles, each with either three slits or a mass of small pores; larvae with fore end pointed and hind end truncate are called maggots; larvae with both ends blunt and fleshy, with bulges and tracts of spines, are called grubs.

SECTION ACALYPTRATE

Thoracic squamae (*i.e.*, calypters that join base of wing to thorax) are small or evanescent; small soft-bodied flies; major families well established.

Superfamily NERIOIDEA
Family DIOPSIDAE
227a. ***Diopsis indica*** Westwood

1837. *Diopsis indica* Westwood, *Trans. Linn. Soc. Lond (Zool.)*, **17** 299, TL : Bengal.

Distribution : India : Uttarakhand (Nainital), Arunachal, Assam, Gujrat, West Bengal.

Elsewhere : Myanmar, Bangladesh torouthern China, South to Java.

227b. ***Teleopsis quadriguttata*** (Walker)

1856. *Diopsis quadriguttata* Walkar, *J. Proc. Linn. Soc. Lond., Zool.*, **1** : 37. TL : Malacca, Malaya.

Distribution : India : Uttarakhand (Almora), Assam, Meghalaya, West Bengal.

Elsewhere : China, Borueo, Malaysia, Taiwan.

227c. ***Sphyracephala hearsiana*** (Westwood)

1845. *Siopsis hearsiana* Westwood, *J. Proc. ent. Soc. Lond*, 1844 : 99, TL : India.

Superfamily CARNOIDEA
Family CHLOROPIDAE

The family Chloropidae, sometimes referred to as grass-or frit-flies, contains small, usually yellowish or blackish acalypterate flies found worldwide. Adults frequent grasses, flowers, and some (the "eye gnats") are attracted to the eyes and open wounds of humans and animals. Larvae

are mostly saprophagous or phytophagous, feeding in a variety of habits including cereals and grasses, insect frass, decaying plant matter, and fungi. Others are predaceous or parasitic. Out of 23 species under 15 genera in India, only 5 species under 5 genera are found in Uttarakhand.

Subfamily OSCINELLINAE
Genus ***Dactylothyrea*** de Meijere, 1910
228. ***Dactylothyrea indica*** Cherian

1976. *Dactylothyrea indica* Cherian, *Oriental Insects*, **10**(2) : 153-154.

Type-Locality : Darjeeling.

Distribution : India : Uttarakhand (Dehradun), Meghalaya, Mizoram, West Bengal.

Elsewhere : Nil.

Genus ***Elachiptera*** Macquart, 1835
229. ***Elachiptera (Melanochaeta) indistincta*** (Becker)

1911. *Gampsocera indistincta* Becker, *Annls hist.-nat. Mus. natn. hung.*, **9** : 134.

Type-Locality : Pattipola, Sri Lanka.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : China, Sri Lanka, Sumatra.

Genus ***Rhodesiella*** Adams, 1905
230. ***Rhodesiella manii*** Cherian

1977. *Rhodesiella manii* Cherian, *Oriental Insects*, **11**(4) : 481-483.

Type-Locality : Darjeeling.

Distribution : India : Uttarakhand (Ranikhet), Kerala, Meghalaya, Mizoram, West Bengal.

Elsewhere : Nil.

Subfamily CHLOROPINAE
Genus ***Mepachymerus*** Speiser, 1910
231. ***Mepachymerus (Steleocerellus) crucifer*** (de Meijere)

1916. *Steleocerus crucifer* de Meijere, *Tijdschr. Ent.*, **59** : 208.

Type-locality : Madiun, Java.

Distribution : India : Uttarakhand (Kumaon), Assam, Himachal Pradesh, Karnataka, Maharastra.

Elsewhere : Java, Philippines (Luzon, Palawan, Mindanao), Thailand.

Genus ***Thaumatomyia*** Zenker, 1833
232. ***Thaumatomyia notata*** (Meigen)

1830. *Chlorops notata* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **6** : 144.

Type-locality : Presumably central Europe.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa, Myanmar, Pakistan; Japan; Widespread Palaearctic region.

Superfamily EPHYDROIDEA
Family DROSOPHILIDAE

Adults of most species of Drosophilidae are attracted and feed upon a great variety of fermenting substances, hence the common name, vinegar, pomace, or fruit flies (the latter not to be confused with the true fruit flies of the family Tephritidae). Oviposition and larval breeding are, however, more highly specialized in fruits or flowers, slime fluxes, decaying leaves, or fungi. Some species are leaf mining, commensal, or even predatory. Out of 102 species under 11 genera in India only 78 species under 8 genera are found in Uttarakhand.

Genus ***Amiota*** Loew, 1862
Subgenus PHORTICA Schiner, 1862
233. ***Amiota (Phortica) bandes*** Singh & Negi,

1992. *Amiota (Phortica) bandes* Singh & Negi, *Senckbergiana biol.*, **72** : 321-327.

Distribution : India : Uttarakhand (Nainital, Almora).

Elsewhere : Nil.

234. ***Amiota (Phortica) pseudotau*** Toda & Peng

1990. *Amiota pseudotau* Toda & Peng, *Entomotoxonomia*, Vol. **XII**(1) : 41-55.

Type-Locality : China.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : China, Gangdong.

235. ***Amiota biprotrusa*** Chen & Toda

1998. *Amiota biprotrusa* Chen & Toda, *Entomological Science*, **1**(3) : 403-407.

Type-Locality : China.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : China, Myanmar.

Genus ***Gitona*** Meigen, 1830

236. ***Gitona distigma*** Meigen

1830. *Gitona distigma* Meigen, *Syst. Besch. Bekante. Europ. Zweifl. Insekt.*, **6** : 129

Distribution : India : Uttarakhand (Nainital, Pithoragarh).

Elsewhere : Europe.

Genus ***Leucophenga*** Mik, 1886.

237. ***Leucophenga (Leucophenga) albiceps*** (de Meijere)

1914. *Drosophila albiceps* de Meijere, *Tijdschr. Ent.*, **57** : 258.

Type-Locality : Java.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa, Java, Japan, Taiwan, Indonesia, Nepal.

238. ***Leucophenga (Leucophenga) angulata*** Singh, Dash and Fartyal

2000. *Leucophenga angulata* Singh, Dash and Fartyal, *Senckenbergiana biologica*, **80**(1/2) : 149-154.

Type-Locality : Paharpani, Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

239. ***Leucophenga (Leucophenga) angusta*** Okada

1956. *Leucophenga angusta* Okada, *Syst. Study Drosophilidae Japan* : 28.

Type-Locality : Tokyo.

Distribution : India : Uttarakhand (Kumaon), Orissa.

Elsewhere : China, Hong Kong, Indonesia, Java, Myanmar, Malaysia, Nepal, Philippines, Singapore, Sumatra; Sri Lanka, Ryukyu Island, Taiwan, Vietnam, Micronesia, Australia, Japan, Korea.

240. ***Leucophenga (Leucophenga) bellula*** (Bergroth)

1894. *Leucophenga bellula* Bergroth, Entomol. Zeit. Stettin, **55** : 71-75.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : China, Indonesia, Malaysia, Nepal, New Guinea, Sri Lanka, Australia, Africa, Japan, Micronesia.

241. ***Leucophenga (Leucophenga) champawatensis*** Fartyal and Singh

2005. *Leucophenga champawatensis* Fartyal and Singh, *Entomological Science*, **8** : 405-417.

Type-Locality : Champawat.

Distribution : India : Uttarakhand (Chanpawat).

Elsewhere : Nil.

242. ***Leucophenga (Leucophenga) chaubattiaensis*** Fartyal and Toda

2005. *Leucophenga chaubattiaensis* Fartyal and Toda, *Entomological Science*, **8** : 405-417.

Type-Locality : Chaubattia, Almora.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

243. ***Leucophenga (Leucophenga) clubiata*** Singh, Dash and Fartyal

2000. *Leucophenga clubiata* Singh, Dash and Fartyal, *Senckenbergiana biologica*, **80**(1/2) : 149-154.

Type-Locality : Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

244. ***Leucophenga (Leucophenga) kumaonensis*** Fartyal and Singh

2005. *Leucophenga kumaonensis* Fartyal and Singh, *Entomological Science*, **8** : 405-417.

Type-Locality : Nainital.

Distribution : India : Uttarakhand (Nainital, Kumaon).

Elsewhere : Nil.

245. ***Leucophenga (Leucophenga) nainae*** Fartyal and Singh

2005. *Leucophenga nainae* Fartyal and Singh, *Entomological Science*, **8** : 405-417.

Type-Locality : Chaubattia, Almora.

Distribution : India : Uttarakhand (Almora, Kumaon).

Elsewhere : Nil.

246. *Leucophenga (Leucophenga) neointerrupta* Fartyal and Toda

2005. *Leucophenga neointerrupta* Fartyal and Toda, *Entomological Science*, **8** : 405-417.

Type-Locality : Ranikhet.

Distribution : India : Uttarakhand (Almora), Uttar Pradesh, West Bengal.

Elsewhere : Nil.

248. *Leucophenga (Leucophenga) neolacteusa* Singh and Bhatt,

1988. *Leucophenga neolacteusa* Singh and Bhatt, Orient. Ins.., **22** : 147-161.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

249. *Leucophenga (Leucophenga) okhalkandensis* Singh, Dash and Fartyal

2000. *Leucophenga okhalkandensis* Singh, Dash and Fartyal, *Senckenbergiana biologica*, **80**(1/2) : 149-154.

Type-Locality : Okhalkanda, Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

249A. *Leucophenga (Lencophenga) ornata* Wheeler

1914. *Drosophila (Leucophenga) ornatipennis* de Meijere : 256.

1924. *Leucophenga ornatipennis* : Duda : 186.

1956. *Leucophenga (Leucophenga) ornatipennis* : Okada : 37.

1959. *Leucophenga ornata* Wheeler : 184.

Distribution : India : Uttarakhand.

Elsewhere : China, Indonesia (Java), Nepal, New Guinea, Philippines, Taiwan, Vietnam; Australia, New Caledonia; Japan, Korea.

250. *Leucophenga (Leucophenga) quadripunctata* (de Meijere)

1908. *Drosophila quadripunctata* de Meijere, *Tijdschr. Ent.*, **51** : 154.

Type-Locality : Java.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : China, Formosa, Hong Kong, Indonesia, Malaysia, New Guinea, Sri Lanka, Taiwan, Thailand, Japan, Korea, Russia, Australia.

250A. *Leucophenga (Leucophenga) regina* Malloch

1935. *Leucophenga regina* Malloch : 90.

Distribution : India : Uttarakhand, Orissa.

Elsewhere : China; Japan, Australia.

251. *Leucophenga (Leucophenga) singhi* Fartyal and Singh

2005. *Leucophenga singhi* Fartyal and Singh, *Entomological Science*, **8** : 405-417.

Type-Locality : Muktesar.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

251A. *Leucophenga (Lencophenga) subpollinosa* (de Meijere)

1914. *Drosophila (Leucophenga) subpollinosa* : de Meijere, Tijsdschr. Ent. **57** : 263.

1956. *Leucophenga (Leucophenga) subpollinosa* : Okada : 30.

1971. *Leucophenga subpollinosa* : Bächli : 58.

Distribution : India : Uttarakhand, Uttar Pradesh, Maharashtra.

Elsewhere : China, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Taiwan, Thailand, Vietnam, Sri Lanka; Japan, Micronesia, Australia, Eritrea, Nigeria, Malawi, South Africa.

252. *Leucophenga (Paraleucophenga) neojavanaii* Singh & Negi

1992. *Leucophenga neojavanaii* Singh & Negi, *Senckenbergiana Biol.*, **72** : 321-327.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

253. *Leucophenga (Paraleucophenga) todai* Fartyal and Singh

2004. *Leucophenga todai* Fartyal and Singh, *Senckenbergiana biologica*, **83**(2) : 177-180.

Type-Locality : Kailakhan, Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Genus ***Stegana*** Meigen, 1830

254. ***Stegana (Steganina) nainitalensis*** Singh and Fartyal

2002. *Stegana nainitalensis* Singh and Fartyal, *Proc. zool. Soc. Calcutta*, **55**(1) : 11-18.

Type-Locality : Naina Peak, Nainital.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Dettopsomyia*** Lamb, 1914

255. ***Dettopsomyia nigrovittata*** Malloch 1924

Distribution : India : Uttarakhand (Naini Tal, Champawat).

Elsewhere : Japan, Medeira, Canary Island, North & South America, Africa (Zaiere), Australia.

Remarks : Synonymy of the species and type-locality has not been found by the authors.

Genus ***Drosophila*** Fallen, 1823

Subgenus *Dorsilopha* Sturtevant, 1942

256. ***Drosophila (Dorsilopha) busckii*** Coquillett

1901. *Drosophila busckii* Coquillett, *Ent. News*, **12** : 18.

Type-Locality : Washington D.C.

Distribution : India : Uttarakhand (Kumaon), Bihar, Karnataka, Manipur, Orissa, West Bengal.

Elsewhere : China, Formosa, Nepal, Ryukyu Island, Sumatra, Thailand; Cosmopolitan.

Subgenus ***Drosophila*** Fallen, 1823

257. ***Drosophila (Drosophila) annalspinai*** Singh & Negi

1995. *Drosophila (Drosophila) annalspinai* Singh & Negi, *Entomol. Z.*, **105** : 421-420.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

258. ***Drosophila (Drosophila) bageshwarensis*** Singh, Dash and Fartyal

2004. *Drosophila bageshwarensis* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

259. ***Drosophila (Drosophila) bishti*** Singh & Negi

1995. *Drosophila bishti* Singh & Negi, *Entomol. Z.*, **105** : 421-420.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

260. ***Drosophila (Drosophila) bizonata*** Kikkawa and Peng

1938. *Drosophila bizonata* Kikkawa and Peng, *Jap. J. Zool.*, **7** : 532.

Type-Locality : Japan.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Ryukyu Island, Myanmar, Japan, Korea, Pin Oo Lwin, Mandalay, Hawaii.

261. ***Drosophila (Drosophila) elongata*** Singh, Dash and Fartyal

2004. *Drosophila (Drosophila) elongata* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

262. ***Drosophila (Drosophila) hexaspina*** Singh, Dash and Fartyal

2004. *Drosophila hexaspina* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

263. ***Drosophila (Drosophila) immigrans*** Sturtevant

1921. *Drosophila immigrans* Sturtevant, *Carnegie Inst. Wash. Publs.*, **301** : 83.

Type-Locality : New York.

Distribution : India : Uttarakhand (Kumaon), Assam, Bihar, Karnataka, Jammu & Kashmir, Manipur.

Elsewhere : China, Formosa, Ryukyu Island, Sri Lanka, Thailand; Cosmopolitan.

264. ***Drosophila (Drosophila) khansuensis*** Singh, Dash and Fartyal

2004. *Drosophila khansuensis* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

265. ***Drosophila (Drosophila) lacertosa*** Okada

1956. *Drosophila lacertosa* Okada, *Syst. Study Drosophilidae Japan* : 158.

Type-Locality : Japan.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa; Japan, Korea.

266. ***Drosophila (Drosophila) mukteshwarensis*** Joshi, Fartyal and Singh

2005. *Drosophila mukteshwarensis* Joshi, Fartyal and Singh, *Entomon*, **30**(1) : 77.

Type-Locality : Mukteshwar, Nainital.

Distribution : India : Uttarakhand (Nainital)

Elsewhere : Nil.

267. ***Drosophila (Drosophila) nainitalensis*** Singh & Bhatt

1988. *Drosophila (Drosophila) nainitalensis* Singh & Bhatt, Orient. Ins., **22** : 147-161.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

268. ***Drosophila (Drosophila) nasuta*** Lamb

1914. *Drosophila nasuta* Lamb, *Trans. Linn. Soc. Lond. (Zool.)*, 16 : 346.

Type-Locality : Mareaux Cochons; Mont Pot-a-eau; Seychelles.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Sri Lanka, Nepal; Africa, Madagascar, Seychelles.

269. ***Drosophila (Drosophila) notostriata*** Okada

1966. *Drosophila notostriata* Okada, *Bull. Br. Mus. nat. Hist. (Ent.) Suppl.*, **6** : 107.

Type-Locality : Nepal.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

270. ***Drosophila (Drosophila) paharpaniensis*** Singh, Dash and Fartyal

2004. *Drosophila paharpaniensis* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Nil.

271. ***Drosophila (Drosophila) painii*** Singh & Negi

1995. *Drosophila painii* Singh & Negi, *Entomol. Z.*, **105** : 421-420.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

272. ***Drosophila (Drosophila) paramarginata*** Singh, Dash and Fartyal

2004. *Drosophila paramarginata* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

272A. ***Drosophila (Drosophila) parazonata*** Dwivedi and Gupta

1980. *Drosophila (Drosophila) parazonata* Dwivedi and Gupta, Entomon, **5**(2) : 129-134.

Distribution : India : Uttarakhand, West Bengal.

273. ***Drosophila (Drosophila) paunai*** Singh & Negi, 1995

1995. *Drosophila paunai* Singh & Negi, *Entomol. Z.*, **105** : 421-420.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

274. ***Drosophila (Drosophila) repleta*** Wollaston

1858. *Drosophila repleta* Wollaston, *Ann. Mag. nat. Hist.*, (3)**1** : 117.

Type-Locality : Africa.

Distribution : India : Uttarakhand (Kumaon), Karnataka, Maharastra, West Bengal.

Elsewhere : Borneo, Sri Lanka, Formosa, Java, Ryukyu Island, Sumatra; Africa, Australia, Europe, Japan, Korea, Nearctic, Neotropical.

275. ***Drosophila (Drosophila) serrata*** Singh, Dash and Fartyal

2004. *Drosophila serrata* Singh, Dash and Fartyal, *Senckenbergiana Biologica*, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

276. ***Drosophila (Drosophila) sulfurigaster*** Duda

1923. *Drosophila sulfurigaster* Duda, Annls *Hist.-nat. Mus. natn. hung.*, **20** : 48.

Type-Locality : New Guinea.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Borneo, Cambodia, Malaya, Philippines, Singapore, Sri Lanka, Sumatra, Thailand; Australia, Fiji, Guam, Hawaii, Moluccas, New Guinea, Polynesia, Samoa.

277. ***Drosophila (Drosophila) surangensis*** Singh, Dash and Fartyal

2004. *Drosophila surangensis* Singh, Dash and Fartyal, Senckenbergiana Biologica, **83**(2) : 163-176.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

278. ***Drosophila (Drosophila) trizonata*** Okada

1966. *Drosophila trizonata* Okada, *Bull. Br. Mus. nat. Hist. (Ent.) Suppl.*, **6** : 97.

Type-Locality : Nepal.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

Subgenus ***Hirtodrosophila*** Duda, 1924

279. ***Drosophila (Hirtodrosophila) hexaspina*** Fartyal & Singh

2002. *Drosophila hexaspina* Fartyal & Singh, *Entomon*, **27**(4) : 355-364.

Type-locality : Cheena peak, Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

280. ***Drosophila (Hirtodrosophila) quadrivittata*** Okada

1956. *Drosophila quadrivittata* Okada, *'Systematic study of Drosophilidae and Allied families of Japan'. Gihodo Co., Tokyo, Japan.*, pp 183.

Type-Locality : Japan.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Japan, Korea, China, Russia.

Subgenus ***Scaptodrosophila*** Duda 1923.

281. ***Drosophila (Scaptodrosophila) actinia*** Okada

1991. *Drosophila actinia* Okada, *Proc. zool. Soc. Calcutta.*, **55**(1) : 11-18.

Type-Locality : Japan.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

282. ***Drosophila (Scaptodrosophila) chandraprabhiana*** Gupta and Ray-Chaudhuri

1970. *Drosophila chandraprabhiana* Gupta and Ray-Chaudhuri, *Proc. R. ent. Soc. Lond.*, (B)**39** : 62.

Type-Locality : Chandraprabha, Varanasi.

Distribution : India : Uttarakhand (Bageshwar, Nainital), Madhya Pradesh, Karnataka, Uttar Pradesh.

Elsewhere : Nil.

283. ***Drosophila (Scaptodrosophila) coracina*** Kikkawa and Peng

1938. *Drosophila coracina* Kikkawa and Peng, *Jap. J. Zool.*, **7** : 523.

Type-Locality : Japan.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Borneo, China, Ryukyu Island; Japan, Korea.

284. ***Drosophila (Scaptodrosophila) hirsuata*** Singh and Dash

1993. *Drosophila hirsuata* Singh and Dash, Proc.Zool.Soc. Calcutta, **46**(2) : 3-140.

Distribution : India : Uttarakhand Uttarakhand (Kumaon).

Elsewhere : Nil.

Subgenus ***Sophophora*** Sturtevant

285. ***Drosophila (Sophophora) bifasciata*** Pomini

1940. *Drosophila bifasciata* Pomini, *Boll. Ent. R. Univ. Bologna*, **12** : 155.

Type-Locality : Italy.

Distribution : India : Uttarakhand (Kumaon), Kashmir, Punjab.

Elsewhere : Europe, Japan, Korea.

286. ***Drosophila (Sophophora) hubeiensis*** Sperlich and Watabe

1997. *Drosophila hubeiensis* Sperlich and Watabe, *Jpn. J. Ent.*, **65**(3) : 621-633.

Type-Locality : China.

Distribution : India : Uttarakhand (Mukteshwar, Kumaon).

Elsewhere : Highlands of Hubei and Sichuan Provinces, Central China.

287. ***Drosophila (Sophophora) jambulina*** Parshad & Paika

1964. *Drosophila jambulina* Parshad & Paika, *Res. Bull. Panjab. Univ. (n. Ser.)*, **15** : 240.

Type-Locality : Chandigarh and Malerkotla.

Distribution : India : Uttarakhand (Kumaon), Karnataka, Jammu & Kashmir, Madhya Pradesh, Maharastra, Punjab.

Elsewhere : Combodia, Formosa, Hong Kong, Java.

288. ***Drosophila (Sophophora) kikkawai*** Burla

1954. *Drosophila kikkawai* Burla, *Revta Bras. Biol.*, **14** : 47.

Type-Locality : Brazil.

Distribution : India : Uttarakhand (Kumaon), Bihar, Jammu & Kashmir, Madhya Pradesh, Maharastra, Manipur, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Borneo, China, Formosa, Java, Malaya, Nepal, Philippines, Sri Lanka; Ryukyu Island, Sumatra; Thailand, Vietnam; Africa, Fiji, Hawaii, Japan, Korea, Micronesia, Neotropical, New Guinea, Samoa.

289. ***Drosophila (Sophophora) malerkotliana*** Parshad & Paika

1964. *Drosophila malerkotliana* Parshad & Paika, *Res. Bull. Panjab Univ. (n. Ser.)*, **15** : 230.

Type-Locality : Chandigarh, Pinjore and Malerkotla.

Distribution : India : Uttarakhand (Kumaon), Andaman & Nicobar Islands, Assam, Bihar, Karnataka, Madhya Pradesh, Maharastra, Manipur, Orissa, Punjab, Uttar Pradesh, West Bengal.

Elsewhere : Borneo, Celebes, Java, Malaya, Philippines, Singapore, Sri Lanka, Sumatra, Thailand.

290. ***Drosophila (Sophophora) melanogaster*** Meigen

1830. *Drosophila melanogaster* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **6** : 85.

Type-Locality : Austria.

Distribution : India : Uttarakhand (Kumaon), Karnataka, Jammu & Kashmir, Madras, Maharastra, Manipur, Orissa, Uttar Pradesh, West Bengal.

Elsewhere : Borneo, China, Formosa, Java, Philippines, Ryukyu Island, Singapore, Sumatra, Thailand, Vietnam; Cosmopolitan.

291. ***Drosophila (Sophophora) neobaimaii*** Singh & Dash

1998. *Drosophila neobaimaii1* Singh & Dash, *Proc. Zool. Soc. Calcutta*, **51** : 45-56.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

292. ***Drosophila (Sophophora) neokhaoyana*** Singh & Dash

1998. *Drosophila neokhaoyana* Singh and Dash, *Proc. Zool. Soc. Calcutta*, **51**(1) : 49-56.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

293. ***Drosophila (Sophophora) nepalensis*** Okada

1955. *Drosophila nepalensis* Okada, *Sci. jap. Exped. Nepal Himalaya*, **1** : 388.

Type-Locality : Nepal.

Distribution : India : Uttarakhand (Kumaon), Jammu & Kashmir, Manipur, Punjab, Uttar Pradesh.

Elsewhere : Formosa, Nepal, Ryukyu Island, Singapore, Thailand.

294. ***Drosophila (Sophophora) punjabiensis*** Parshad & Paika

1964. *Drosophila punjabiensis* Parshad & Paika, *Res. Bull. Panjab Univ. (n. Ser.)*, **15** : 241.

Type-Locality : Mysore.

Distribution : India : Uttarakhand (Kumaon), Assam, Karnataka, Punjab.

Elsewhere : Malaya, Singapore, Thailand.

295. ***Drosophila (Sophophora) saraswati*** Singh & Dash,

1998. *Drosophila saraswati* Singh & Dash, *Proc. Zool. Soc. Calcutta*, **51**(1) : 49-56.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

296. ***Drosophila (Sophophora) sargakhetensis*** Joshi, Fartyal and Singh

2005. *Drosophila sargakhetensis* Joshi, Fartyal and Singh, *Entomon*, **30**(1) : 79.

Type-Locality : Sargakhet, Nainital.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

297. ***Drosophila (Sophophora) suzukii indica*** Parshad & Paika

1964. *Drosophila indica* Parshad & Paika, *Res. Bull. Panjab Univ. (n. Ser.)*, **15** : 230.

Type-Locality : Chandigarh, Manimajra.

Distribution : India : Uttarakhand (Kumaon), Kashmir, Punjab.

Elsewhere : China, Ryukyu Island, Thailand; Japan, Korea.

298. ***Drosophila (Sophophora) takahashii*** Sturtevant

1927. *Drosophila takahashii* Sturtevant, *Philipp. J. Sci.*, **32** : 371.

Type-Locality : Taipei, Formosa.

Distribution : India : Uttarakhand (Kumaon), Karnataka, Madhya Pradesh, Maharastra, Manipur, Punjab, Uttar Pradesh, West Bengal.

Elsewhere : Borneo, China, Formosa, Java, Malaya, Nepal, Philippines, Ryukyu Island, Thailand; Japan, Korea, Manchuria, Micronesia.

Genus ***Lissocephala*** Malloch, 1929

299. ***Lissocephala parasiatica*** Takada and Momma, 1975

Distribution : India : Uttarakhand (Naini Tal, Bageshwar).

Elsewhere : Malaysia.

Genus ***Scaptomyza*** Hardy, 1849

300. ***Scaptomyza (Parascaptomyza) elmoi*** Takada

1970. *Scaptomyza elmoi* Takada, *Annotnes zool. jap.*, **43** : 144.

Type-Locality : Formosa.

Distribution : India : Uttarakhand (Mukteshwar, Kumaon).

Elsewhere : Formosa; Hawaii, Japan.

301. ***Scaptomyza (Parascaptomyza) himalayana*** Takada

1970. *Scaptomyza himalayana* Takada, *Annotnes zool. jap.*, **43** : 146.

Type-Locality : Nepal.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal.

302. ***Scaptomyza quadruangulata*** Singh & Dash

1993. *Scaptomyza quadruangulata* Singh and Dash, *Proc. Zool. Soc.* Calcutta, **46**(2) : 3-140.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nil.

Genus ***Zaprionus*** Coquillett

303. ***Zaprionus indianus*** Gupta

Distribution : India : Uttarankhand (Nainital and Almora districts).

Elsewhere : Nil.

Beside this the following species have also been reported from the state of Uttarakhand, but related literatures are not available to the authors.

Leucophenga (Paraleucophenga) lissocephala
Leucophenga (Leucophenga) maculata
Leucophenga (Leucophenga) mutabilis
Leucophenga (Leucophenga) proxima
Leucophenga (Paraleucophenga) parasiatica

Superfamily CONOPOIDEA

Family CONOPIDAE

The family conopidae commonly known as thick-headed flies coming under suborder Brachycera; infraorder Muscomorpha division Schizophora series Acalyptrate. They are medium to large sized flies, usually bare or thinly haired,

often resembling solitary wasps in appearance. Head as wide as or wider than the thorax. Many are attractive and mimic wasps and bees, their primary prey. Adults lay eggs inside these hosts and larvae develop there, ultimately killing the hosts. Some species have been considered pests (particularly those that attack honey bees), but they can also be viewed as beneficial – adults visit flowers and are important pollinators. Females seek out hosts disturbed by the ants and dive at these hosts, using their impact to secure recurrently barbed eggs in the host cuticle. Larvae are reported as internal parasites of various aculeate Hymenoptera, Orthoptera, Dictyoptera, and some calyptrate. Among the 48 species 0f 11 genera in India 3 species of 3 genera are reported from Uttarakhand.

Subfamily CONOPINAE
Genus ***Physocephala*** Schiner, 1861.
304. ***Physocephala bicolorata*** Brunetti

1925. *Physocephala bicolorata* Brunetti, *Rec. Indian Mus.*, 27 : 79.

Type-locality : Seuduim Spur, Sitong, Sureil, Darjeeling; Konsanie, Kumaon; Simla; Cherrapunji; Khasi hills; Nepal.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh, Meghalaya, West Bengal.

Elsewhere : China, Nepal.

Subfamily MYOPINAE
Genus ***Myopa*** Fabricius, 1775
305. ***Myopa nigriventris*** Brunetti

1923. *Myopa nigriventris* Brunetti, *Fauna Br. India, Dipt.*, **3** : 380.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Dehradun), Jammu & Kashmir.

Elsewhere : Nil.

Genus ***Zodion*** Latreille, 1796.
306. ***Zodion griseum*** Brunetti

1923. *Zodion griseum* Brunetti, *Fauna Br. India, Dipt.*, **3** : 375.

Type-locality : Mussoorie, Simla.

Distribution : India : Uttarakhand (Dehradun), Himachal Pradesh, Jammu & Kashmir.

Elsewhere : Nil.

Superfamily TEPHRITOIDEA
Family PYRGOTIDAE

There are about 330 species and 50 genera of Pyrgotidae worldwide with 15 species and 6 genera in India. Among them only 3 species under 2 genera are reported from Uttarakhand. The biology of only a few species is known. The larvae are internal parasitoids of Coleoptera and Hymenoptera. The adults are mainly nocturnal; some also visit flowers by day.

Subfamily PYRGOTINAE
Genus ***Adapsilia*** Waga, 1842
307. ***Adapsilia angustifrons*** Bezzi

1914. *Adapsilia angustifrons* Bezzi, *Ann. Mag. nat. Hist.*, (8)**14** : 158.

Type-locality : near Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

308. ***Adapsilia nocturna*** Bezzi

1914. *Adapsilia nocturna* Bezzi, *Ann. Mag. nat. Hist.*, (8)**14** : 159.

Type-locality : near Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Genus ***Tylotrypes*** Bezzi, 1914
309. ***Tylotrypes immsi*** Bezzi

1914. *Tylotrypes immsi* Bezzi, *Ann. Mag. nat. Hist.*, (8)**14** : 162.

Type-locality : near. Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Superfamily SCIOMYZOIDEA
Family DRYOMYZIDAE

The family Dryomyzidae is coming under suborder Brachycera of the infraorder Muscomorpha of division Schizophora series Acalyptrate. The flies are yellowish or reddish brown found in moist places, associated with rotting seaweed, putrifying matter or rotting fungi. Wings very large, much longer than the abdomen.

Only a lone species *Dryomyza formosa* (Wiedemann) is reported from Uttarakhand.

Genus ***Dryomyza*** Fallen, 1820

310. ***Dryomyza formosa*** (Wiedemann)

1830. *Scatophaga Formosa* Wiedemann, *Aussereurop. zweifl. Insekt.*, **2** : 447.

Type-locality : Japan.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : China, Formosa; Japan.

Family SEPSIDAE

Adults are small, black, roundhead flies, sometimes with spots at wing tips; may breed to infestation level in sewage sludge or found on animal and human excrement (less often on other rotting organic matter) where eggs are laid and larvae develop, and on nearby vegetation, carrion, fermenting tree sap, and shrubs and herbs. Many Sepsidae apparently play an important biological role as decomposers of animal excrement. Some species may have a limited hygenic importance because of their association with human feces. The worldwide family Sepsidae contains 17 species of the 8 genera in the Indian fauna of them only *Sepsis albopunctata* Lamb is reported from Uttarakhand.

Subfamily SEPSINAE

Genus ***Sepsis*** Fallen, 1810

311. ***Sepsis albopunctata*** Lamb

1914. *Sepsis albopunctata* Lamb, *Trans. Linn. Soc. Lond. (2) Zool.*, **16** : 323.

Type-locality : Mahe, Seychelles.

Distribution : India : Uttarakhand (Garhwal), Andhra Pradesh, Assam, Bihar, Kerala.

Elsewhere : Borneo, Bangladesh, Formosa, Lesser Sunda Islands, Philippines; Australasian, Ethiopian.

Superfamily OPOMYZOIDAE

Family AGROMYZIDAE

The Agromyzidae belong to the highly diverse dipteran group Cyclorrhapha that is well characterized by the presence of the ptilinum just above the antennae. Adults can be minute, with wing length of little more than 1 mm. The maximum size known is 6.5 mm. The majority of species are in the range of 2 to 3 mm. Agromyzidae are exclusively phytophagous, the larvae feed either as leaf miners, internally in all parts of the plant, or selectively in the root, stem, or flower head. Probably less than 50 percent are true leaf miners. There is a high degree of host specificity. Agromyzidae (mining flies) are small black, greyish or yellowish flies usually 2-5 mm long. Despite their color variation, there are several common characters that usually allow easy identification of the family. The family is cosmopoliton in distribution and 137 species under 17 genera are found in India. Of them 22 species under 8 genera are so far reported from Uttarakhand.

Subfamily AGROMYZINAE

Genus ***Melanagromyza*** Hendel, 1920

312. ***Melanagromyza conspicua*** Spencer

1961. *Melanagromyza conspicua* Spencer, *Trans. R. ent. Soc. Lond.*, **113** : 70.

Type-locality : Singapore and Peradeniya, Ceylon.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Formosa, Malaya, Philippines, Ryukyu Islands, Sri Lanka; Australia, Bismark Islands, New Caledonia, New Guinea, New Hebrides.

313. ***Melanagromyza ranibaghae*** Garg

1971. *Melanagromyza ranibaghae* Garg, *Orient. Insects Suppl.*, **1** : 195.

Type-locality : Ranibagh, Naini Tal

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Genus ***Ophiomyia*** Braschnikov, 1897

314. ***Ophiomyia berii*** Garg

1971. *Ophiomyia berii* Garg, *Orient. Insects Suppl.*, **1** : 273.

Type-locality : Haldwani-Tanakpur Road, Naini Tal.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Subfamily PHYTOMYZINAE

Genus ***Cerodontha*** Rondani, 1835

315. ***Cerodontha (Cerodontha) denticornis*** (Panzer)

1806. *Chlorops denticornis* Panzer, *Fauna German. No.*, 104.

Type-locality : Germany.

Distribution : India : Uttarakhand (Naini Tal), Himachal Pradesh, West Bengal.

Elsewhere : Formosa; Afghanistan, Africa, Europe, Japan.

316. ***Cerodontha (Cerodontha) intermedia*** Garg

1971. *Cerodontha intermedia* Garg, *Orient. Insects Suppl.*, **1** : 213.

Type-locality : Ranikhet-Almora Rd.

Distribution : India : Uttarakhand (Ranikhet).

Elsewhere : Nil.

317. ***Cerodontha (Cerodontha) mussooriensis*** Garg

1971. *Cerodontha mussooriensis* Garg, *Orient. Insects Suppl.*, **1** : 219.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Mussoorie).

Elsewhere : Nil.

318. ***Cerodontha (Cerodontha) versicolor*** Ipe

1971. *Cerodontha versicolor* Ipe, *Orient. Insects*, **5** : 169.

Type-locality : Conemera Estate, Kumili, Kerala.

Distribution : India : Uttarakhand (Pithoragarh), Kerala.

Elsewhere : Nil.

319. ***Cerodontha (Dizygomyza) morosa*** (Meigen)

1830. *Agromyza morosa* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **6** : 170.

Type-locality : Europe.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Canada, Europe, Japan, U.S.A.

320. ***Cerodontha (Poemyza) pygmella*** (Hendel)

1931. *Dizygomyza pygmella* Hendel, *Fliegen palaearkt. Reg.*, **59** : 48.

Type-locality : Kamtschatka, U.S.S.R.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Japan, Kamchatka.

Genus ***Chromatomyia*** Hardy, 1849

321. ***Chromatomyia alysicarpi*** (Singh and Ipe)

1968. *Phytomyza alysicarpi* Singh and Ipe, *Orient. Insects*, **2** : 89.

Type-locality : Valley of Flowers, Chamoli.

Distribution : India : Uttarakhand (Chamoli).

Elsewhere : Nil.

322. ***Chromatomyia horticola*** (Goureau)

1851. *Phytomyza horticola* Goureau, *Ann. Soc. ent. Fr.*, **9** : 148.

Type-locality : France.

Distribution : India : Uttarakhand (Naini Tal), Jammu & Kashmir, Punjab.

Elsewhere : Formosa, Ryukyu Islands, Thailand; Palaearctic.

323. ***Chromatomyia nigra*** (Meigen)

1830. *Phytomyza nigra* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **6** : 191.

Type-locality : Europe.

Distribution : India : Uttarakhand (Ranikhet).

Elsewhere : Formosa; Europe, Japan, Kamchatka, Siberia, U.S.A.

Genus ***Liriomyza*** Mik, 1894

324. ***Liriomyza brassicae*** (Riley)

1884. *Oscinis brassicae* Riley, *Rep. U.S. Dept. Agric.*, **1884** : 332.

Type-locality : U.S.A.

Distribution : India : Uttarakhand (Pithoragarh), Bihar, Delhi, Maharastra, Punjab, Rajasthan.

Elsewhere : Sri Lanka, Formosa, Philippines, Ryukyu Islands, Singapore; Cosmopolitan.

325. ***Liriomyza congesta*** (Becker)

1903. *Agromyza congesta* Becker, *Mitt. zool. Mus. Berl.*, **2** : 190.

Type-locality : Europe.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Europe, USA, USSR.

326. ***Liriomyza himalayana*** Garg

1971. *Liriomyza himalayana* Garg, *Orient. Insects Suppl.*, **1** : 237.

Type-locality : Jauljibi, Pithoragarh.

Distribution : India : Uttarakhand (Pithoragarh).

327. ***Liriomyza kumaonensis*** Garg

1971. *Liriomyza kumaonensis* Garg, *Orient. Insects Suppl.*, **1** : 239.

Type-locality : Ranikhet-Almora road.

Distribution : India : Uttarakhand (Ranikhet-Almora).

Genus ***Phytoliriomyza*** Hendel, 1931

328. ***Phytoliriomyza dimidiatipennis*** (Garg)

1971. *Lemurimyza dimidiatipennis* Garg, *Orient. Insects Suppl.*, **1** : 267.

Type-locality : Haldwani, Nainital.

Distribution : India : Uttarakhand (Naini Tal).

Genus ***Phytomyza*** Fallen, 1810

329. ***Phytomyza cheilanthus*** Garg

1971. *Phytomyza cheilanthus* Garg, *Orient. Insects Suppl.*, **1** : 251.

Type-locality : Ranikhet-Almora road.

Distribution : India : Uttarakhand (Ranikhet-Almora).

330. ***Phytomyza fumariacea*** Garg

1971. *Phytomyza fumariacea* Garg, *Orient. Insects Suppl.*, **1** : 247.

Type-locality : Ranikhet-Almora road.

Distribution : India : Uttarakhand (Almora).

331. ***Phytomyza kumaonensis*** Singh and Ipe

1967. *Phytomyza kumaonensis* Singh and Ipe, *Orient. Insects*, **1** : 61.

Type-locality : Ramgarh, Kumaon.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

332. ***Phytomyza thalictricola*** Hendel

1925. *Phytomyza thalictricola* Hendel, *Konowia*, **4** : 309.

Type-locality : Austria.

Distribution : India : Uttarakhand (Almora), Himachal Pradesh.

Elsewhere : Europe, Japan.

Genus ***Pseudonapomyza*** Hendel, 1920

333. ***Pseudonapomyza alternantherae*** (Seguy)

1951. *Phytomyza alternantherae* Seguy, *Mem. Inst. Sci. Madagascar (A)*, **5** : 320.

Type-locality : Madagascar.

Distribution : India : Uttarakhand (Haridwar), Maharastra, Punjab, West Bengal.

Elsewhere : Sri Lanka; Madagascar.

SECTION CALYPTRATE

Characterized by large squamae (calypters that join base of wing to thorax).

Family HIPPOBOSCIDAE

Species of Hippoboscidae are commonly known as louse flies. Both sexes are bloodsuckers and are obligate ectoparasites, chiefly on various kinds of birds and mammals also. The larvae are nurtured internally until fully developed, ready to pupate, and attaining the prepupa stage. One genus is wingless, 3 genera show wing reduction, and another 3 genera shed their wings after finding a suitable host mammal. They are predominantly tropical and subtropical in distribution. Hippoboscids are dorsoventrally compressed and occur with our without wings. The abdomen is large, leathery and usually lacks distinct segmentation. The head is small and tightly appressed to the thorax. 16 species under 14 genera have been reported from the State of Uttarakhand.

Subfamily ORNITHOMYINAE

Genus ***Ornithoica*** Rondani, 1878

334. ***Ornithoica (Ornithoica) stipituri bistativa*** Maa

1966. *Ornithoica stipituri bistativa* Maa, *Pacif. Insects Monogr.*, **10** : 52.

Type-locality : Tenom, Sabah, Borneo.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Borneo, Java, Malaya, Myanmar, Nepal, Thailand, Pakistan; Iran.

Genus ***Ornithomya*** Latreille, 1802

335. ***Ornithomya biloba*** Dufour

1827. *Ornithomya biloba* Dufour, *Annls Sci. nat.*, **10** : 243.

Type-locality : Saint Sever, France.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal; Europe, N. Africa.

Genus ***Ornithophila*** Rondani, 1879

336. ***Ornithophila metallica*** (Schiner)

1864. *Ornithomyia metallica* Schiner, *Fauna Austriaca (Dipt.)*, **2** : 646.

Type-locality : Austria.

Distribution : India : Uttarakhand (Kumaon), Bihar, Karnataka, Maharastra, West Bengal.

Elsewhere : Bangladesh, Borneo, China, Myanmar, Pakistan, Formosa, Hainan Island, Java, Malaya, Philippines, Thailand, Vietnam; Africa, C. Pacific, S. Europe, W. Asia.

Genus ***Pseudolynchia*** Bequaert, 1926

337. ***Pseudolynchia canariensis*** (Macquart)

1840. *Olfersia canariensis* Macquart, *in Webb and Berthelot, Hist. nat. Iles Canaries*, **2**(2) : Zool. : 119.

Type-locality : Canary Island.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa, Java, Malaya, Nepal, Philippines, Ryukyu Island, Sapudi Island near Madura, Sumatra, Thailand, Vietnam; Nearly cosmopolitan where domestic pigeons are kept.

Subfamily HIPPOBOSCINAE

Genus ***Hippobosca*** Linnaeus, 1758

338. ***Hippobosca longipennis*** Fabricius

1805. *Hippobosca longipennis* Fabricius, *Syst. Antliat.* : 338.

Type-locality : Tranquebar, Madras.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : China, Viet Nam, Pakistan, Sri Lanka, Africa, Europe, Korea, Siberia, W. Asia.

339. ***Hippobosca variegata*** Megerle von Muhlfeld

1803. *Hippobosca variegata* Megerle von Muhlfeld, *Appendix Cat. insect.* : (14).

Type-locality : Bengal.

Distribution : India: Uttarakhand (Kumaon), Andaman Island.

Elsewhere : Celebs, Nepal, Philippines, Sri Lanka, Sumba; Africa, Iraq, Madagascar, Mauritius, Seychelles.

Subfamily LIPOPTENINAE

Genus ***Lipoptena*** Nitzsch, 1818

340. ***Lipoptena capreoli*** Rondani

1878. *Lipoptena capreoli* Rondani, *Annali Mus. civ. Stor. nat. Giacomo Doria*, **12** : 152.

Type-locality : Cyprus.

Distribution : India: Uttarakhand (Kumaon), Punjab.

Elsewhere : Pakistan, S. Europe, W. Asia.

Genus ***Melophagus*** Latreille, 1802

341. ***Melophagus ovinus ovinus*** (Linnaeus)

1758. *Hippobosca ovinus ovinus* Linnaeus, *Syst. Nat., Ed.*, 10, **1** : 607.

Type-locality : Sweden.

Distribution : India: Uttarakhand (Kumaon).

Elsewhere : Widespread in temperate countries and on highlands of tropical countries where domestic sheep are kept.

Subfamily CYCLOPODIINAE

Genus ***Cyclopodia*** Kolenati, 1863

342. ***Cyclopodia sykesii*** (Westwood)

1834. *Nycteribia sykesii* Westwood, *Proc. zool. Soc. Lond.*, **2** : 137.

Type-locality : "India orientali"

Distribution : India : Uttarakhand (Kumaon), Assam, Bihar, Karnataka, Kerala, Madras, Maharastra, Orissa, Uttar Pradesh, West Bengal.

Elsewhere : Maldive Island, Myanmar, Pakistan, Sri Lanka.

Genus ***Eucampsipoda*** Kolenati, 1857

343. ***Eucampsipoda sundaica*** Theodor

1955. *Eucampsipoda sundaica* Theodor, *Parasitology*, **45** : 213.

Type-locality : Farm Caves, Moulmein,Burma.

Distribution : India : Uttarakhand (Kumaon), Tamil Nadu.

Elsewhere : Borneo, Cambodia, Laos, Malaya, Myanmar, Philippines, Sumatra, Thailand, Vietnam.

Genus ***Leptocyclopodia*** Theodor

344. ***Leptocyclopodia (Leptocyclopodia) ferrarii ferrarii*** (Rondani)

1878. *Nycteribia ferrarii ferrarii* Rondani, *Annali Mus. civ. Stor. nat. Giacomo Doria,* **12** : 151.

Type-locality : Bogor, Java.

Distribution : India : Uttarakhand (Kumaon), Andaman Island, Andhra Pradesh, Maharastra, Tamil Nadu, West Bengal.

Elsewhere : Borneo, Cambodia, China, Java, Malaya, Myanmar, Simeulue Island, Sri Lanka, Sumatra, Thailand, Vietnam.

345. ***Leptocyclopodia (Leptocyclopodia) thaii*** Maa

1968. *Leptocyclopodia thaii* Maa, *Pacif. Insects,* **10** : 11.

Type-locality : Doi Phahompok, Thailand.

Distribution : India : Uttarakhand (Kumaon), Uttar Pradesh.

Elsewhere : Thailand.

Subfamily NYCTERIBIINAE

Genus ***Basilia*** Miranda Ribeiro, 1905

346. ***Basilia (Paracyclopodia) roylii*** (Westwood)

1834. *Nycteribia roylii* Westwood, *Proc. Zool. Soc. Lond.*, **2** : 138.

Type-locality : "India Orientali"

Distribution : India : Uttarakhand, Bihar, Tamil Nadu

Elsewhere : Afganistan,Pakistan, Sri Lanka

Genus ***Nycteribia*** Latreille, 1796

347. ***Nycteribia latreillii kumaonica***

Remarks : Literature not available.

Subfamily NYCTERIBOSCINAE

Genus ***Brachyotheca*** Maa

348. ***Brachyotheca molossa*** (Giglioli)

1864. *Strebla molossa* Giglioli, *Q.J. microsc. Soc. (n. Ser.),* **4** : 24.

Type-locality : Amoy, Fukien, China.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : China, Malaya.

Genus ***Brachytarsina*** Macquart, 1851

349. ***Brachytarsina (Brachytarsina) modesta*** (Jobling)

1934. *Nycteribosca modesta* Jobling, *Parasitology,* **26** : 82.

Type-locality : Alutnevara, Ceylon.

Distribution : India : Uttarakhand (Kumaon), Maharastra.

Elsewhere : Sri Lanka.

Family ANTHOMYIDAE

Adult anthomyiids are generally retiring in habit, preferring wooded or moist habitats, but a few are synanthropic. Larval habitats are largely unknown but seem to be diverse: some species are well-known agricultural pests (*Delia platura*), while others are scavengers in decaying organic matter (*Anthomyia, Fucellia*) or are phytophagous (*Botanophila*). 3 specie under 2 genera have been reported from Uttarakhand state.

Genus ***Delia*** Robineau-Desvoidy, 1830

350. ***Delia bracata*** (Rondani)

1866. *Hylemyia bracata* Rondani, *Atti Soc. ital. Sci. nat.,* **9** : 183.

Type-localities : Parma Dist. and Bologna, Italy.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Nepal; Ethiopian, Southern Palaearctic.

351. ***Delia platura*** (Meigen)

1826. *Anthomyia platura* Meigen, *Syst. Beschr. europ. zweifl. Insekt.,* **5** : 171.

Type-locality : Germany.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa, Pakistan; Cosmopolitan.

Genus ***Emmesomyia*** Malloch, 1917

352. ***Emmesomyia socia*** (Fallen)

1825. *Musca socia* Fallen, *Monogr. Musc. Sueciae,* **9** : 82.

Type-locality : Sweden.

Distribution : India : Uttarakhand (Kumaon), West Bengal.

Elsewhere : Formosa; Palaearctic.

Family FANNIIDAE

The Fanniidae are a small, primitive group of Calyptratae, largely confined to the Holarctic and temperate Neotropical regions. Adults are medium-sized to small species and are often mainly dark in body and leg color. Males congregate in characteristic dancing swarms beneath trees; females are more retiring in habit and are collected by sweeping vegetation. Larvae are characterized by their flattened bodies with striking lateral protuberances, and live as scavengers in various kinds of decaying organic matter. Of the 5 species under single genera *Fannia* Robineau-Desvoidy of India, only 3 species are reported from Uttarakhand.

Genus ***Fannia*** Robineau-Desvoidy

Fannia carbonaria (Meigen)

1826. *Anthomyia carbonaria* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **5** : 154.

Type-locality : Aachen, Germany.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa; Palaearctic.

Fannia leucosticta (Meigen)

1838. *Anthomyia leucosticta* Meigen, *Syst. Beschr. europ. zweifl. Insekt.*, **7** : 328.

Type-locality : Germany.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : China, Formosa, Java, Sumatra; Solomon Island, Caroline Island, S. Palaearctic, Ethiopian, Nearctic.

Fannia prisca Stein

1918. *Fannia prisca* Stein, *Annls hist.-nat. Mus. natn. hung.*, **16** : 154.

Type-locality : Takao, Kankau and Tainan, Formosa.

Distribution : India : Uttarakhand (Kumaon), Uttar Pradesh, West Bengal.

Elsewhere : China, Formosa, Malaya, Myanmar; Japan, Bonin Island.

SUMMARY

It may be concluded that this communication reports 363 species under 133 genera of 35 families from the state of Uttarakhand. Among the 35 families reported from Uttarakhand, the family Limoniidae (97) shares the maximum number of species followed by Drosophilidae (79), Tipulidae (29), Tabanidae (25), Agromyzidae (22), Hippoboscidae (16), Empididae (12), and Bibionidae (10). Other families like Cecidomyidae (8), Culicidae (6), Staritomyidae (6), Chloropidae (5), Psychodidae (4), Thaumaleidae (4), Dolichopodidae (4), Trichoceridae (3), Sciaridae (3), Conopidae (3), Pyrgotidae (3), Anthomyidae (3), Fannidae (3), Chironomidae (2), Simuliidae (2), Rhagionidae (2), and Nemestrinidae (2) are represented with very less number of species. The Ptychopteridae, Tanyderidae, Ceratopogonidae, Dixidae, Mycetophilidae, Xylomyidae, Therevidae, Phoridae, Dryomyzidae and Sepsidae families are also represented with a lone species each.

Interesting to note that, the more than 50 percent species (201) are endemic to this state. However, the distribution pattern of rest of the species is as follows: 34 species found in this state restrict their distribution within India and 50 species restrict themselves within the the boundary of the Oriental region. Rest of the species (78) distributed outside the Oriental region of which 11 species are cosmopolitan in distribution.

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REFERENCES

Datta, M. Parui, P amd Mukherjee, M. 1997. Insecta : Diptera. 1-76. *In* Fauna of West Bengal. *State fauna Ser.,* 3(7). Zoological Survey of India, Kolkata.

Delfinado, M.D. and Hardy, D.E (1973). (eds.). *A Catalog of Diptera of the Oriental Region.* **1** : 1- Univ. of Hawaii Press, Honolulu.

Delfinado, M.D. and Hardy, D.E (1975). (eds.). *A Catalog of Diptera of the Oriental Region.* **2** : 1- Univ. of Hawaii Press, Honolulu.

Delfinado, M.D. and Hardy, D.E (1977). (eds.). *A Catalog of Diptera of the Oriental Region.* **3** : 1- Univ.of Hawaii Press, Honolulu.

Evenheuis, N.L. 1994. Catalog of the fossil flies of the world (Insecta : Diptera). Backhuys Publishers, Leiden, pp : 1-600.

McAlpine, J.F and D.M. Wood (eds.). *Manual of Nearctic Diptera*, Vol. 3. Research Branch, Agriculture Canada, Monograph 32.

Chaturvedi, N 1981. Some entomological notes from a visit to the Valley of Flowers. *J. Bomb. Nat. Hist. Soc.* **78**(2) : 402-407.

Devi, N. Pemola and Jauhari, R.K. Relationship between Anopheles fluviatilis & Anopheles stephensi (Diptera : Culicidae) catches & the prevalence of malaria cases at Kalsi area in Dehradun district Uttaranchal).

Devi, N. Pemola., Mahesh, R.K and Jauhari, R.K. 2001. Morphological variations in relation to seasonal prevalence of natural population of *Anopheles maculatus* Theobald (1901) collected from Doon Valley. *U.P. Journ. Zool.* **21**(3) : 211-220.

Fartyal, R.S., Singh, B.K. 2001. List of drosphilid species so far described and recorded from India. *Drosophila-Information-Service*, **84** : 30-38.

Fartyal, R.S. 2002. Family Drosophilidae (Insecta : Diptera) in Kumaon region, India, with the description of one new species and three new records. *Proc. Zool. Soc. Calcutta.* **55**(1) : 11-18.

Fartyal, R.S and Singh, B.K. 2000. List of drosophilid species so far described and recorded from Kumaon region, India. Drosophila-Information-Service. **83** : 71-73.

Fartyal, R. S and Singh, B.K. 2000. Report on the genus Dettopsomyia (Insecta : Diptera : Drosophilidae) from Kumaon region, India. *Drosophila-Information-Service,* **83** : 58-59.

Jauhari, R.K., Singh, R.P. and Singh, S. 1995. Breeding and resting site of mosquitoes in the forested areas of Doon Valley. *Indian Journal of Forestry,* **18**(3) : 249-250.

Kaul, S.M and Wattal, B.L. 1981. A note on sandflies of Pauri Garhwal (Uttar Pradesh), *Indian. Journ. Comm. Diseases,* **13**(2) : 136-137.

Kapoor, V.C and Agarwal, M.L. and Grewal, J.S. 1980. Two new species of pipunculids (Diptera : Pipunculidae) from Ranikhet (Kumaon Hills - Uttar Pradesh) India. *Bull. Ent.,* **18**(1-2) : 74-77.

Mahesh, R.K and Jauhari, R.K. 2002. Resting preferences of anophelines in different parts of Doon Valley, Uttranchal (India). (Uttaranchal), *India Journal-of-Nature-Conservation,* **14**(1) : 7-14.

Mahesh, R.K and Jauhari, R.K. 1997. Observations on the survival and development of Anopheles culicifacies (Diptera : Culicidae) larvae in the rice fields of Dehradun Valley. *Rivista-di-Parassitologia,* **14**(2) : 257-262.

Rao, J.S., Sharma, S.K., Bhattacharya, D. and Saxena, N.B. 2001 .Sandfly survey in Nainital and Almora districts of Uttaranchal with particular reference to Phlebotomus argentipes vector of kala-azar. *Nat. Jour. Comm.Dise.,* **33**(1) : 7-11.

Singh, B.K., Fartyal, R.S. 1997. A list of drosophilid species so far described and recorded from Kumaun region, India., *Drosophila-Information-Service,* **80** : 43-45.

Singh, B.K., Fartyal, R.S. 1998. Drosophilidae collected from Chaubatiya Garden, Ranikhet, Kumaun, India. *Drosophila-Information-Service,* **81** : 160-161.

Singh, B.K and Fartyal, R.S. 2002. Family Drosophilidae (Insecta : Diptera) in Kumaon region, India, with the description of one new species and three new records. *Proc. Zool. Soc. Calcutta,* **55**(1) : 11-18.

Singh,B.K and Dash, S. 1994. Record of further new species from Uttarakhand region, India. *Drosophila-Information-Servic,.* **75** : 60-61.

Singh, B.K and Dash, S. 1998. Drosophilidae of Kumaun Region, India : with the description of four new species (Insecta : Diptera). *Proc. Zool. Soc. Calcutta,* **51**(1) : 45-56.

Singh, B.K., Dash, S., Fartyal, R.S. 2000. Further additions to the genus Leucophenga from Kumaon, India (Insecta, Diptera, Drosophilidae). *Senckenbergiana-Biologica,* **80**(1-2) : 149-154.

Singh, B.K. and Negi, N.S. 1992. Further report on the drosophilid fauna of Uttarakhand region., *Drosophila-Information-Service,* **71** : 255-256.

Singh, C.P., Mahesh, R.K., Pokhriyal, B.P. and Jauhari, R.K. 1998. Morphological variations in some anopheline mosquitoes inhabiting different altitudes in lower Garhwal Himalayas. *Rivista-di-Parassitologia,* **15**(1) : 89-94.

Singh, S., Singh, R.P and Jauhari, R.K. 1995. Studies on the longevity of a malaria vector Anopheles culicifacies Giles, 1901 in Doon-Valley. *Rivista-di-Parassitologia,* **12**(2) : 237-242.

Singh, R.P., Singh, S. and Jauhari, R.K. 1995. Natural parasitism of anopheline larvae in rural areas of south eastern Doon-Valley. *Rivista-di-Parassitologia,* **12**(2) : 233-236.

Shukla, R.P., Nanda, N., Pandey, A.C., Kohli, V.K., Joshi, H. and Subbarao, S.K.1998. Studies on bionomics of Anopheles fluviatilis and its sibling species in Nainital District, U.P. *Indian-Journal-of-Malariology,* **35**(2) : 41-47.

Shukla, R.P., Kohli,V.K., Pandey, A.C.,Ojha, V.P and Pathak, P.K., 1996. Ecology of immature mosquitoes in paddy fields of district Nainital, UP, India. *Mosquito-Borne-Diseases-Bulletin,* **13**(3-4) : 31-36.

Shukla, R.P., Kohli, V.K., Pandey, A.C., Ojha, V.P and Pathak, P.K, 1998. Larval ecology of malaria vectors in paddy fields of district Nainital, U.P. {a} Malaria Research Centre, Field Station, Bhotia Parao, Haldwani - 263 141, India, *Journal of Communicable Diseases,* **30**(4) : 301-303.

Shukla, R.P., Pandey, A.C., Kohli, V.K.,. Ojha, V.P. and Sharma, V.P. 1995. Bionomics of vector anophelines in District Naini Tal, Uttar Pradesh. *Indian Journal of Malariology,* **32**(4) : 153-163.

Shukla, R.P., Sharma, S.N; Kohli, V.K., Nanda, N., Sharma, V. P. and Subbarao, S.K. 2001. Dynamics of malaria transmission under changing ecological scenario in and around Nanak Matta Dam, Uttaranchal, India. *Indian Journal of Malariology,* **38**(3-4) : 91-98.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 413-423.

INSECTA : DIPTERA : ASILIDAE

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INTRODUCTION

Linnaeus (1758), in his tenth edition of "Systema naturae" erected the genus *Asilus*, ascribing to it 11 species, and added 4 others in his twelfth edition (1767) of the same work. Of these 15 species included in the genus by Linnaeus, 10 have been assigned to other genera, 2 remain in *Asilus* and 3 cannot be recognized with certainty, because of the brevity of the original descriptions. A list of reassignments of Linnaeus species is given under the subfamily Asilinae. His species *Asilus crabroniformis* (1758) stands as the type of the genus *Asilus* and the type of the family Asilidae. Ultimately Leach in Samouelle (1819) given the Family status (Hull, 1962).

The Robber flies, or Asilidae, comprise one of the largest and most abundant families, belong to the suborder Brachycera, infra Order Tabanomorpha, and superfamily Asiloidea of present day insects (Mc Alpine, 1989). The Asilidae contains about 5, 000 described species worldwide with over 400 genera, 800 species under 83 genera are found in the Oriental Region and around 482 species under 55 genera are known from India.

Adult stages are medium to large flies often observed on stems of plants, on the ground and grass or flying low. Species vary in appearance and some mimic wasps and bees. Most species are gray to black, hairy-bodied, have a long, narrow, tapering abdomen containing segments that may be banded, patterned or contrasting in color. Area between eyes (Vertex) deeply indented and face often bearded. Mouthparts are stout piercing-sucking. Third antennal segment usually elongate, often with terminal style. They have long, strong legs for grabbing prey. Adults prey on a variety of arthropods; considered to be beneficial insects, except for those that feed on bees and other beneficial insects. Because of their predatory habit of feeding on other insects and their voracious appetites, they contribute to the maintenance of the natural balance among insect populations.

The present paper is based on the recent surveys in Uttarakhand by the scientists of the Diptera section of Zoological survey of India (2003-2005) as well as the previously published data. This report is as such the first consolidated report of the Family Asilidae from the state of Uttarakhand after its separation from the state of erstwhile Uttar Pradesh (Uttarakhand, known as Uttaranchal from 2000 2006 became the 27th state of Republic of India separated on 9th November 2002). The present report accounts for 28 species of robber flies belonging to 14 genera and 7 subfamilies along with their systematic account, valid scientific names, species diagnosis and zoogeographical remarks from the state of Uttarakhand.

PHYLOGENY

The phylogenetic relationships of taxa within the monophyletic Asilidae are still very poorly known. The Asilidae have been classified into a varying number of subfamilies and tribes (reviewed by Papavero 1973a). Hull (1962) recognized five subfamilies, Dasypogoninae, Leptogastrinae, Laphriinae, Megapodinae, and Asilinae.

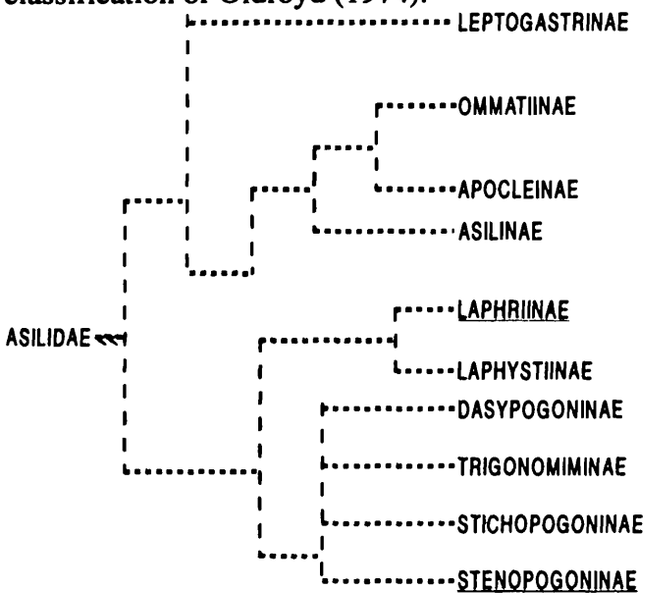
More recently, Papavero (1973a, 1973b) recognized eight subfamilies of Asilidae, not including *Leptogaster* and its allies which he considered as a separate family, following Martin (1968a). Papavero split the Asilinae into three subfamilies, Apocleinae, Asilinae, and Ommatiinae. The basis for separation of the Apocleinae seems to be the absence of hair or bristles on the anatergite.

The first molecular hypothesis of the higher-level phylogenetic relationships within the Asilidae

based on DNA-sequence data was recently published by Bybee *et al.* (2004).

In recent times the most comprehensive morphological analysis is based on a selected number of characters of the body of the imagines (Papavero 1973). In this communication the classification followed after Papavero (1973a).

Where as in earlier work Joseph & Parui 1998, *Fauna of India* : Asilidae Part-I followed this classification of Oldroyd (1974).



MORPHOLOGY AND TERMINOLOGY

Morphology and Terminology is already stated in Fauna of West Bengal by Joseph and Parui (1997).

MATERIALS AND METHODS

The materials and methods described by Joseph and Parui. (1997) were employed here for collecting, killing and preserving adult robber flies. Subfamily keys were adopted from Artigas & Papavero (1988).

SYSTEMATIC LIST

Subfamily LEPTOGASTERINAE

1. *Lobus himalayae* Martin

Subfamily DASYPOGONINAE

2. *Pegesimallus volcatus* (Walker)

Subfamily STENOPOGONINAE

3. *Stenopogon imbrex* (Walker)

Subfamily TRIGONOMIMINAE

4. *Damalis fusca* Walker
5. *Damalis speculiventris* de Meijere

Subfamily OMMATINAE

6. *Michotamia aurata* (Fabricius)

Subfamily ASILINAE

7. *Asilus ephippium* Macquart
8. *Astochia hindostani* (Ricardo)
9. *Clephydroneura annulatus* (Fabricius)
10. *Clephydroneura flavicornis* (Macquart)
*11. *Heligmoneura ricardi* Joseph & Parui
12. *Heligmoneura tenuicornis* (Walker)
13. *Machimus angularis* (Ricardo)
14. *Machimus coerulescens* Ricardo
15. *Machimus dubius* Ricardo
16. *Machimus indianus* Ricardo
17. *Machimus montanus* Ricardo
18. *Machimus nigrimus* Ricardo
19. *Machimus pallipes* Ricardo
20. *Machimus rufipes* Ricardo
21. *Machimus tibialis* Ricardo
22. *Neoitamus grandis* Ricardo
23. *Neoitamus inornatus* Ricardo
24. *Neoitamus tropicus* Ricardo
25. *Neomochtherus gnavus* (van der Wulp)

Subfamily APOCLEINAE

*26. *Philodicus femoralis* Ricardo
27. *Philodicus javanus* (Wiedemann)
28. *Promachus duvaucelii* (Macquart)

SYSTEMATIC ACCOUNT

Key to the Subfamiles

1. Abdominal tergite 1 five or more times as long as wide (Fig.1). Alula and pulvilli lacking. Abdominal sternite 1 extending about halfway back under tergite 2 .... LEPTOGASTERINAE

— Abdominal tergite 1 no more than four times as long as wide. Usually both alula and pulvilli present. Abdominal sternite 1 confined beneth tergite 1 2

2. Fore tibia with an apical spur; one of the spines at the apex of the ventral side of the fore tibia differentiated, enlarged and stouter

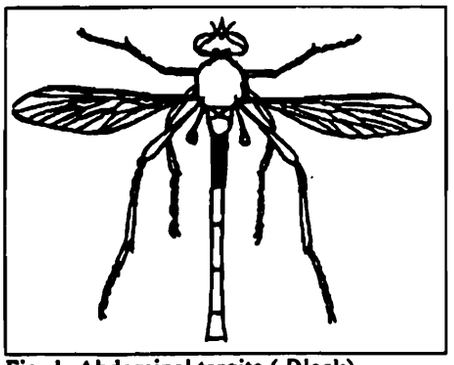


Fig. 1. Abdominal tergite (Black)

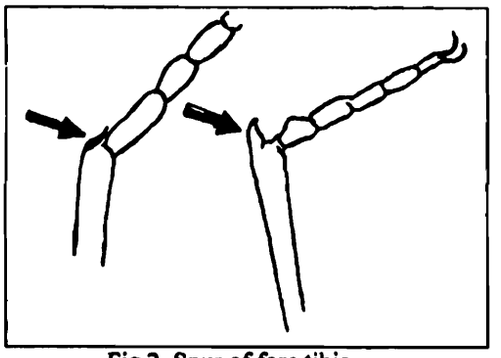


Fig.2. Spur of fore tibia

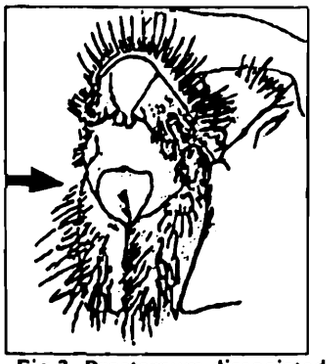


Fig.3. Prosternum dissociated

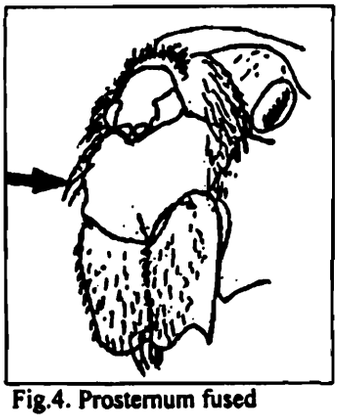


Fig.4. Prosternum fused

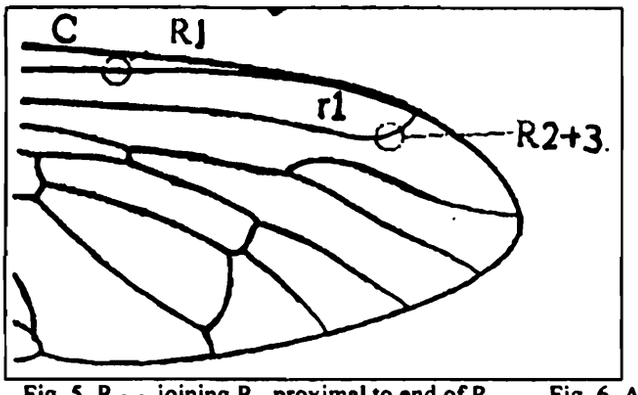


Fig. 5. R_{2+3} joining R_1 proximal to end of R_1

Fig. 6. Arista plumose

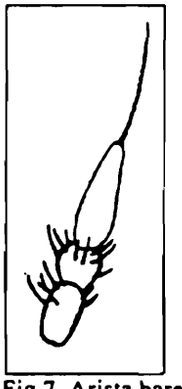


Fig.7. Arista bare

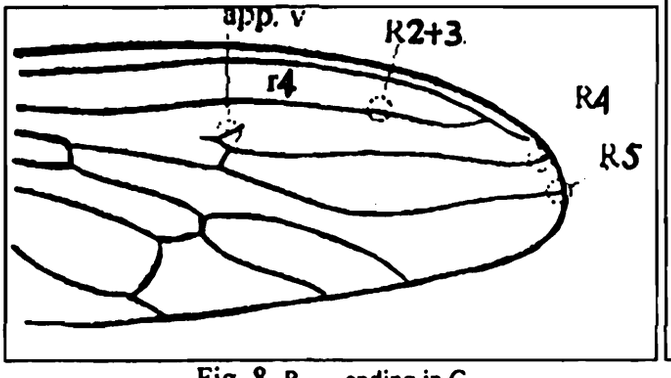


Fig. 8. R_{2+3} ending in C

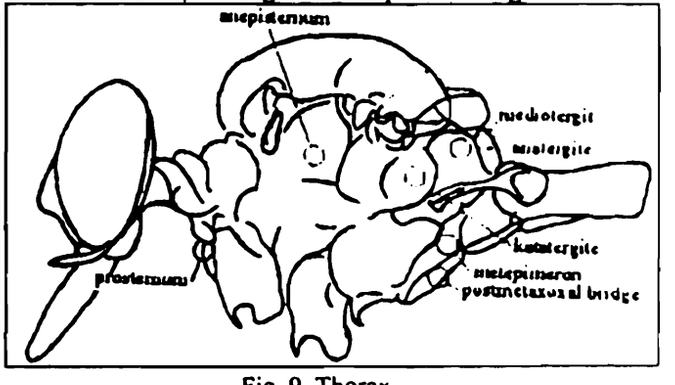


Fig. 9. Thorax

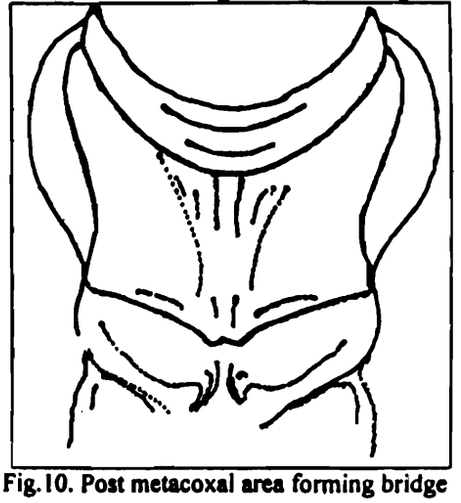


Fig.10. Post metacoxal area forming bridge

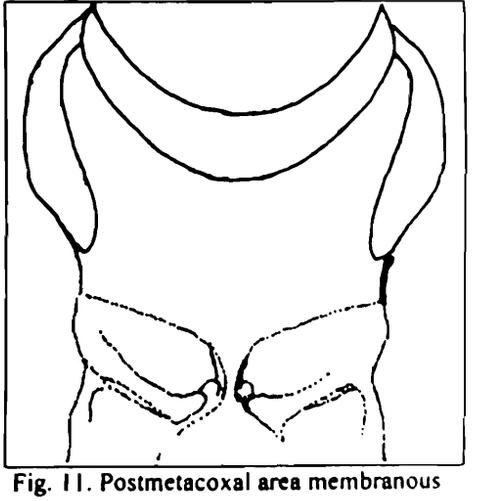


Fig. 11. Postmetacoxal area membranous

than remaining spines, or if not noticeably larger, twisted and sigmoid (Fig.2). Prosternum dissociated by a membranous area from proepisternum, in *Blepharepium* Rondani (Fig.3) ..... DASYPOGONINAE

— Fore tibia without an apical spur; all apical spines on fore tibia straight, or if one is slightly curved then it is not thickened or sigmoid. Prosternum either dissociated from proepisternum or fused to it 3

3. R2+3 ending in C (except in *Enigmomorphus* Hermann) (Fig.8). Neither a strong bristle present on the supero-posterior angle of anepisternum nor a row of bristles present on the katatergite (Fig.9) 4

— R2+3 joining R1 proximal to end of R1, with cell r1 thus separated from wing margin (Fig.5). Either an episternum with at least one strong bristle on its supero-posterior angle, or katatergite with a vertical row of bristles or bristly hairs (Fig.9) 5

4. Prosternum dissociated from proepisternum by a membranous area (Fig.3) ..... STENOPOGONINAE

— Prosternum fused to proepisternum, forming a precoxal bridge (Fig.4) ..... TRIGONOMIMIMAE

5. Anatergite pilose, the hair situated on top of it (Fig.4). R4 never with an extra vein ..... ASILINAE

— Anatergite bare, or if some hairs, these placed mostly on latero-internal margin of anatergite and on immediately adjacent area of mediotergite, but never on top of anatergite and R4, in this case , always with a short extra vein present at its junction with R5, the short vein ending in cell R_{2+3} (Fig.6) 6

6. Antennal style plumose (Fig.6). Postmetacoxal area heavily sclerotized, forming a complete bridge behind hind coxae (Fig.9) ..... OMMATINAE

— Antennal stylus bare (Fig.7). Postmetacoxal area membranous (Fig.11) ..... APOCLENINAE

Subfamily LEPTOGASTERINAE Schiner, 1862
Genus ***Lobus*** Martin

1972. *Lobus* Martin, *J.Kansas ent. Soc.*, **45** : 8.

Type-species : *Leptogaster pallipes* Janssens

Diagnosis : Antennal style projecting from dorsal surface of flagellum with or without dense recumbent hairs; posterior margin of scutellum with short weak hairs or small bristles; third longitudinal vein (R4) forks at an angle of 20 to 60 and ends in or below wing tip and pod-like ventral organ of male genitalia itself signify the genus.

1. ***Lobus himalayae*** Martin

1972. *Lobus himalayae* Martin, *J. Kansas ent. Soc.*, **45** : 15.

Type-locality : Mussoorie.

Diagnosis : Mystax consisting of 4 long pale hairs; antennal scape and pedicel yellow, flagellum brown, thorax black with an indistinct median stripe and a lateral narrow stripes; scutellum brown; grayish tomentose; fourth longitudinal vein (M2) angulate, anterior two pair of legs yellowish posterior pair yellow with a reddish brown band; dorsum blackish brown, tergites 2-4 with yellow; bands on posterior margin; a pair of bristle like hypendrial apodems, proctiger ovoid.

Distribution : India : Uttarankhand (Dehradun district).

Elsewhere : None.

Subfamily DASYPOGONINAE Macquart, 1838
Genus ***Pegesimallus*** Loew

1858. *Pegesimallus* Loew, *Ofvens. Sevenska Vet-Akad. Forhandl.*, **14** : 344.

Type-species : *Pegesimallus ursinus* Loew

Diagnosis : Face more prominent on lower part than upper; flagellum greatly expanded dorsoventrally with an apical truncate segment which bears a conical spine at apex; scutellum thick, bearing about 7 minute setae on each side; hind femur slightly dilated apically and bears 2 medial bristles at apex, apex of anterior tibia with a stout curve pressed inward against a nodular flange like expansion of the basitarsus; all posterior cell widely open or only fourth posterior cell narrowed on margin; abdomen long and rather slender, male terminalia conspicuous by the bowlike swelling of the inverted epandrium.

2. ***Pegesimallus volcatus*** (Walker)

1849. *Neolaparus volcatus* Walker, *List. Dipt. Colln. Br. Mus.*, **2** : 349.

Type-locality : East Indies.

1980. *Pegesimallus volcatus* : Londt, *Ann. Natl Mus.*, **24**(1) : 332-333.

Diagnosis : Frons with two yellow bristles along with small yellow setae; antennal segments yellowish brown to dull brown; scutum brownish yellow with yellow lateral margins; wing pale yellow tinged; legs reddish brown; abdomen dark red brown distally and pale orange brown basally.

Distribution : Uttarakhand (Dehradun district), Andhra Pradesh, Assam, Karnataka, Sikkim and West Bengal

Elsewhere : China, Myanmar, Pakistan, Sulawesi, Taiwan, Java.

Subfamily STENOPOGONINAE
Genus ***Stenopogon*** Loew

1847. *Stenopogon* Loew, *Linn.Ent.*, **2** : 453.

Type-species : *Dasypogon sabaudus* Fabricius.

Diagnosis : Third antennal segment with 2 microsegments, first one shorter than second; metanotal callosity micropubescent only; first posterior cell widely open to closed and stalked; epandrium widely divided near base causing prominent superior forceps; female terminalia with 7 pairs of blunt spoon like spines on acanthophorites.

3. *Stenopogon imbrex* (Walker)

1849. *Dasypogon imbrex* Walker, *List. Dipt. Colln. Br. Mus.* **2** : 315.

Type-locality : Nepal.

Diagnosis : Antennae reddish; legs red with tip of femora black; wings uniformly grey; abdomen reddish, first and second tergite short, rest long but decreasing in length toward tip.

Distribution : India, Uttarakhand (Kumaon).

Elsewhere : Nepal.

Subfamily TRIGONOMIMINAE, Enderlein,1914
Genus ***Damalis*** Fabricius

1805. *Damalis* Fabricius, *Syst. Antliat*, : 147.

Type-species : *Damalis planiceps*Fabricius

1817. *Xenomyza* Wiedemann, *Zool. Mag.*, **1** : 60.

Type-species : *Damalis planiceps* Fabricius

1989. *Damalis* Fabricius : Londt, *Ann. Nat. Mus.*, **30** : 53-145.

Diagnosis : It is a hump-backed google-eyed fly. Antenna with slender, terminal hair like arista but lacking a style; mesonotum extends as a sclerotized plate behind the posterior coxae.

Key to the Species

1. Mesonotum without stripe; abdomen wholly black ..... *fusca* (Walker)
— Mesonotum with only median longitudinal stripe; only tip of abdomen black .... *speculiventris* (de Meijere)

4. *Damalis fusca* (Walker)

1849. *Damalis fusca* Walker, *List. Dipt. Colln. Br. Mus.*, **2** : 481.

Type-locality : North Bengal.

1975. *Xenomyza fusca* (Walker) : Oldroyd, *Cat. Dipt. Orient. Reg.*, **2** : 127.

1994. *Damalis fusca* Walker : Joseph and Parui, *Wasman J. Biol.*, **50**(1-2) : 10.

Distribution : India : Uttarakhand (Dehra Dun district), Karnataka, Kerala, West Bengal.

Elsewhere : None.

5. *Damalis speculiventris* de Meijere

1911. *Damalis speculiventris* de Meijere, Tijdschr. Ent., **54** : 304.

Type-locality : Java.

1975. Xenomyza speculiventris (de Meijere) : Oldroyd, 1975, *Cat. Dipt. Orient. Reg.*, **2** : 128.

Damalis speculiventris de Meijere : new combination.

Distribution : India : Uttarakhand (Dehra Dun district), West Bengal.

Elsewhere : Java, Sumatra.

Subfamily OMMATIINAE Hardy, 1927
Genus ***Michotamia*** Macquart

1838. *Michotamia* Macquart, *Dipt exot.*, **1**(2) : 72.

Type-species : *Michotamia analis* Macquart.

Diagnosis : Antennal scape and pedicel quite short, and stout, flagellomere very long, at least

four times as long as the combined length of scape and pedicel, style shorter than flagellomere and it bears about a dozen plumes in two rows or in an apical tuft.

6. *Michotamia aurata* (Fabricius)

1794. *Asilus aurata* Fabricius, *Ent. Syst*; **4** : 387.

Type-locality : East India.

Diagnosis : Mystax pale yellow; antennal scape and pedicel orange yellow. First flagellomere black; thorax black with dense grayish-yellow and grey tomentum; scutum with a mediolongitudinal black stripe; legs yellowish brown and pale yellow; basal half of wing pale yellow, rest infuscated; tergites 1-4 and 7 yellowish brown, remaining tergites black; male genitalia dark brown and yellowish brown.

Distribution : India : Uttarakhand (Dehra Dun), Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Karnataka, Kerala, Madhya Pradesh, Orissa, Pondicherry, Tamil Nadu, West Bengal.

Elsewhere : Celebes, Myanmar, Pakistan, Taiwan.

Subfamily ASILINAE Leach, 1819

Genus *Asilus* Linnaeus

1758. *Asilus* Linnaeus, *Syst. Nat. Ed.*, **10** : 605.

Type-species : *Rcaboniformis* Linnaeus.

Diagnosis : Face well developed with its lower half highly gibbous; flagellum as long as or slightly longer than first two segments together; legs stout with stout bristles, anterior basitarsus longer than the next two segments, and hind basitarsus as long as the next three segments; base of second posterior cell abruptly widened; aedeagus.

7. *Asilus ephippium* Macquart

1855. *Asilus ephippium* Macquart, *Dipt. Exot. Suppl.*, **5** : 62.

Type-locality : Dehradun.

Diagnosis : Face reddish, mystax white arranged in a row above epistome and a few above it; antennae red; thorax with yellow pubescence and with a indistinct dark brown median stripe divided medially; legs reddish yellow with yellow bristles, wing yellow tinged, the grey shading of apex reaches upto cubital cell; abdomen velvety black, male genitalia bright chestnut colour, superior forceps with truncate apex.

Distribution : Uttarakhand (Dehra Dun district).

Elsewhere : Sri Lanka.

Genus *Astochia* Becker

1913. *Astochia* Becker, *Ann. Mus. Zool. Acad.* St. Petersberg, **17** : 538.

Type-species : *metatarsata* Becker.

Diagnosis : Wing with two submarginal cells; basitarsus of fore leg highly swollen; male genitalia pedunculate, epandrium long, arched upward and hypandrium arched downwards forming a distinct gap.

8. *Astochia hindostani* (Ricardo)

1919. *Neoitamus hindostani* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 62.

Type-locality : Dharmoti, Shum Ket, Bhowali, Kumaon.

Diagnosis : Mystax light yellow; antennae blackish brown; thorax with blackish-brown stripes, scutellum bears long yellow hairs on dorsum; femora black, tibial reddish yellow, wings clear with light grey shading at apex and on hind border; abdomen ashy grey with large dark brown spots on each segment.

Distribution : India : Uttarakhand (Kumaon), Arunachal Pradesh, West Bengal.

Elsewhere : Myanmar, Nepal.

Genus *Clephydroneura* Becker

1925. *Clephydroneura* Becker, *Ent Mitt.*, **14** : 68.

Type-species : *Asilus xanthopus* Wiedemann, design. by Oldroyd, 1938.

Diagnosis : Medium to large flies with face moderately produce above epistome, costa generally bulging outward, first two veins fused with costa, marginal cell closed and narrowly stalked, fourth posterior cell bulged onward so that the discal is costricted; metanotal callosity with a tuft of hairs which separates it from the much similar Ethiopian genus Synolcus Loew; male terminalia elongated with slender superior forceps; female terminalia consists of eighth to ten laterally compressed segments, eighth segment as long as sixth and seventh together.

Key to the Species

1. Wing infuscate at tip and along hind margin forming a sharply defined grayish area; fore femora with a trace of black band or short stripe infront ..... *annulatus* (Fabricius)

— Wings not infuscated, though they may have a yellowish stain; fore femur with a sharply defined black longitudinal stripe .... *flavicornis* (Macquart)

9. ***Clephydroneura annulatus*** (Fabricius)

1775. *Asilus annulatus* Fabricius, *Syst. Ent.*, : 798.

Type-locality : East India.

Distribution : India : Uttarakhand (Dehra Dun district), West Bengal.

Elsewhere : Sri Lanka.

10. ***Clephydroneura flavicornis*** (Macquart)

1838. *Asilus flavicornis* Macquart, *Dipt. Exot.*, **1**(2) : 142.

Type-locality : Bengal.

Distribution : India : Uttarakhand (Dehra Dun district), Tamil Nadu, West Bengal.

Elsewhere : None.

Genus ***Heligmoneura*** Bigot

1858. *Heligmoneura* Bigot, in Thomson, *Arch. Ent.*, **2** : 356.

Type-species : *modesta* Bigot.

Diagnosis : Facial tubercle poorly developed; posterior branch of third longitudinal vein highly sinuous; abdomen bare, male genitalia very large and superior forceps of various shapes.

Key to the species

1. Male with superior forcep trifurcate; mystax wholly pale yellow; 3rd antennal segment dark brown, rest pale yellow .... *ricardoi* Joseph & Parui

— Male with superior forcep bifurcate; mystax yellow with some black bristles; antennae wholly yellow ..... *tenuicornis* (Walker)

*11. ***Heligmoneura ricardoi*** Joseph & Parui

1980. *Heligmoneura ricardoi* Joseph & Parui, *Ent. Scand*; **11** : 283-244.

Type-locality : West Bengal.

Material examined : 1♂, 1♀, Champawat, Karkula, 17.IX.2004., Coll. B. Mitra.

Distribution : India : Uttarakhand (Champawat), West Bengal.

Elsewhere : None.

Remark : This species is reported for the first time from this state.

12. ***Heligmoneura tenuicornis*** (Walker)

1860. *Asilus tenuicornis* Walker, *J. Linn. Soc. Lond*; **4** : 108.

Type-locality : Celebes.

Diagnosis : Antennae yellow; mystax yellow with some black bristles in male, in female wholly yellow; facial tubercle distinct on lower part of face; legs yellow with apex of middle and hind femora black, hind tibia black on outer side; tarsi black; abdomen black with yellow segmentation.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : Celebes.

Genus ***Machimus*** Loew

1849. *Machimus* Loew, *Linn. Ent.*, **4** : 1.

Type-species : *Asilus chrysitis* Meigen.

Diagnosis : Facial tubercle highly developed extending almost upto antenna; aedeagus three pronged; eighth sternum round at apex.

Key to the Species

1. Eighth sternite produced 2

— Eighth sternite not produced 6

2. All tibiae black 3

— All tibiae reddish with dark apex; wings basally and anteriorly hyaline but with dark shading in centre of cell; eighth sternite ends in two teeth bearing white hairs .... *rufipes* Ricardo

3. Scutellum with four bristles on border 4

— Scutellum with more than four bristles on border 5

4. Superior forceps apically incised, eighth sternite produced to a short blank point with long black hairs; wings deeply infuscated except at base ..... *coerulescens* Ricardo

— Superior forceps gradually narrowed apically, eighth sternite considerably produced with fringe of black hairs; wings infuscated except in the middle ..... *nigrimus* Ricardo

5. Eighth sternite broadly produced bearing apically a mat of orange yellow hairs; all femora yellowish brown or dark brown .... *pallipes* Ricardo

— Eighth sternite narrowly produced bearing long black hairs on border; all femora anteriorly and ventrally black, rest yellowish brown .... *montanus* Ricardo

6. Posterior branch R5 of third vein sharply curved; superior forceps bulged below medially ..... *angularis* (Ricardo)

— Posterior branch R5 of third vein gently curved 7

7. Mystax pale yellow with one or two black bristles on each side at lower border 8

— Mystax black above and on sides, pale below; male genitalia dark brown above and reddish below ..... *tibialis* Ricardo

8. Wings hyaline with light shading distally which extends along hind border; eighth sternite with a few long black hairs at apex, superior forceps distinctly broader at apex than base ..... *dubius* Ricardo

— Wings largely infuscated, hyaline only at base; eighth sternite without long black hairs at apex, superior forceps uniformly broad from base to apex ..... *indianus* Ricardo

13. ***Machimus angularis*** (Ricardo)

1922. *Tolmerus angularis* Ricardo, *Ann. Mag. nat. Hist.*, (9)**10** : 64.

Type-locality : Mussoorie.

Material examined : 1♂, Champawat, Karkula, 17.IX.2004., Coll. B. Mitra; 2 ♂♂, Almora, Kardhara, 21.IX.2003, Coll. B. Mitra.

Distribution : India : Uttarakhand (Champawat, Dehra Dun, Almora districts)

Elsewhere : None.

14. ***Machimus coerulescens*** Ricardo

1919. *Machimus coerulescens* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 47.

Type-locality : Bhim Tal & Binsar, Kumaon.

Distribution : India : Uttarakhand (Nainital district).

Elsewhere : None.

15. ***Machimus dubius*** Ricardo

1919. *Machimus dubius* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 47.

Type-locality : Dharmoti, Bhowali and Takula, Kumaon.

Distribution : India : Uttarakhand (Nainital district)

Elsewhere : None.

16. ***Machimus indianus*** Ricardo

1919. *Machimus indianus* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 50.

Type-locality : Bhowali, Dharmoti, Bhim Tal, Takula, Airades, Chaubattia, Sat Tal, Kumaon; Thundiani, W. Himalayas; Mussoorie.

Distribution : India : Uttarakhand (Nainital and Dehra Dun districts)

Elsewhere : None.

17. ***Machimus montanus*** Ricardo

1919. *Machimus montanus* Ricardo, *Ann. Mag. Nat. Hist.* (9)**3** : 52.

Type-locality : Nilgiri Hills, Tamil Nadu.

Distribution : India : Uttarakhand (Kumaon), Tamil Nadu

Elsewhere : None.

18. ***Machimus nigrinus*** Ricardo

1919. *Machimus nigrinus* Ricardo, *Ann. Mag. Nat. Hist.* (9)**3** : 53.

Type-locality : Bowdali, Kumaon.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : None.

19. ***Machimus pallipes*** Ricardo

1922. *Machimus pallipes* Ricardo, *Ann. Mag. nat. Hist.*, (9)**10** : 65.

Type-locality : Charmoti.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : None.

20. *Machimus rufipes* Ricardo

1922. *Machimus rufipes* Ricardo, *Ann. Mag. nat. Hist.*, (9)**10** : 69.

Type-locality : Dehra Dun.

Distribution : India : Uttarankhand (Dehra Dun district), Punjab.

Elsewhere : None.

21. *Machimus tibialis* Ricardo

1919. *Machimus tibialis* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 55.

Type-locality : Dehra Dun.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : None.

Genus *Neoitamus* Osten Sacken

1878. *Neoitamus* Osten Sacken, *Smithson. Misc. collns*, **16** : 82., 235 (n. name for *Itamus* Loew.

Type-species : *Asilus cyanurus* Loew.

Diagnosis : Occipital bristles strongly proclinate; strong dorsocentral bristles infront of mesonotal suture; posterior basitarsus at least as long as the next three; male terminalia club shaped, superior forcep with a deep lateral constriction, ovipositor 5-segmented, elongate, laterally compressed.

Key to the Species

1. Mystax wholly yellow; middle tibia incrassate with numerous black bristles on lower side and some yellow ones on outerside .... *grandis* Ricardo

— Mystax mixed white and black 2

2. Fore femora incrassate, femora black with yellow apices, tibiae yellow with black apices ..... *inornatus* Ricardo

— Fore femora not incrassate, femora and tibiae black with reddish yellow apices .... *tropicus* Ricardo

22. *Neoitamus grandis* Ricardo

1919. *Neoitamus grandis* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 61.

Type-locality : Bhowali, Kumaon.

Distribution : India : Uttarakhand (Nainital district)

Elsewhere : None.

23. *Neoitamus inornatus* Ricardo

1919. *Neoitamus inornatus* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 63.

Type-locality : Mussoorie.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : None.

24. *Neoitamus tropicus* Ricardo

1919. *Neoitamus tropicus* Ricardo, *Ann. Mag. nat. Hist.*, (9)**3** : 69.

Type-locality : Sat Tal, Sham Ket and Bhowali.

Distribution : India : Uttarakhand (Nainital district).

Elsewhere : None.

Genus *Neomochtherus* Osten Sacken

1878. *Neomochtherus* Osten Sacken, *Smithson. Misc. collns.* **16** : 82, 235 (new name for *Mochtherus* Loew.

Type-species : *Asilus pallipes* Meigen.

Diagnosis : Face plane with short gibbosity at lower part, behind vertex on each side there is dense tuft of pile; flagellum slender with a short microsegment at apex bearing a short style about three-fourth of its length; acrostichal and dorsocentrals not developed, only posteriorly moderately developed, humerus pilose; marginal cell closed and stalked, lower end vein of discal cell curved towards side; sternites bears stout bristles, superior forcep large, elongate, swollen with notched apex and closely apposed at apex; female terminalia elongate, attenuate with a few minute hairs at apex.

25. *Neomochtherus gnavus* (van der Wulp)

1872. *Mochtherus gnavus* van der Wulp, *Tijdschr. Ent.*, **15** : 243.

Type-locality : Java.

Diagnosis : Mystax pale yellow with a few black bristles above and below; thorax black with

black bristles except humeri bearing pale yellow bristles; legs yellow except middle and hind femora black at apex; wing hyaline with apex and posterior margin infuscated; abdomen black.

Distribution : India : Uttarakhand (Kumaon), Assam, Arunachal Pradesh, Meghalaya, Sikkim.

Elsewhere : Borneo, Celebes, Java, Moluccas, Thailand, Sri Lanka.

Subfamily APOCLEINAE Lehr, 1969

Genus ***Philodicus*** Loew

1848. *Philodicus* Loew, *Linn. Ent;* **3** : 391.

Type-species : *Asilus javanus* Wiedemann.

Diagnosis : Antennae close together; radial fork longer than second posterior cell, apex of marginal cells bulbous, first posterior cell very long, narrow and of uniform width; in female the apical terga with numerous short spines, the apical spines longer and stout.

Key to the species

1. Legs black and red; mystax yellow and black ..... *javanus* (Wiedemann)

— Leg black, mystax white .... *femoralis* Ricardo

*26. ***Philodicus femoralis*** Ricardo

1921. *Philodicus femoralis* Ricardo, *Ann. Mag. nat. Hist.* (9)**8** : 190.

Type-locality : Myanmar.

Material examined : 3♂♂, Pithoragarh, Kalika, Dharchula, 26.ix.2004, coll. B. Mitra.

Distribution : India : Uttarakhand (Pithoragarh district), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Meghalaya, Orissa, Rajasthan, West Bengal.

Elsewhere : Myanmar.

Remark : This is the first report of this species from this state.

27. ***Philodicus javanus*** (Wiedemann)

1819. *Asilus javanus* Wiedemann, *Zool. Mag.*, **1**(3) : 32.

Type-locality : Tamil Nadu.

Distribution : India : Uttarakhand (Kumaon) and many other states of India.

Elsewhere : Bangladesh, Java, Myanmar, Pakistan, Sri Lanka, Sumatra.

Genus ***Promachus*** Loew

1848. *Promachus* Loew, *Linn. Ent;* **3** : 390.

Type-species : *Asilus maculatus* Fabricius.

Diagnosis : Antennae wide apart; apex of marginal cell in normal shape; radial fork shorter than second posterior cell, strongly divergent, the third submarginal cell and the base of the second marginal cell exceptionally narrow.

28. ***Promachus duvaucelii*** (Macquart)

1838. *Trupanea duvaucelii* Macquart, *Dipt. Exot.*, **1**(2) : 97.

Type-locality : Bengal.

Diagnosis : Head yellowish; mystax yellow with a few black hairs on upper part; thorax and scutellum with reddish hairs; legs black. Wings yellowish with an obscure streak in the marginal and first submarginal cells; first three abdominal segments with profuse red hairs, male genitalia shining black with concolourous hairs.

Distribution : India : Uttarakhand (Dehradun district), Delhi, Gujarat, Madhya Pradesh, Punjab, West Bengal.

Elsewhere : None.

SUMMARY

A comprehensive account of the Asilid fauna of Uttarakhand is dealt in this communication. Altogether 28 species under 14 genera of 7 subfamilies have been reported, of them 2 species are recorded for the first time (marked with asterisks) from this State. Keys and diagnostic characters to the identification of subfamilies, genera and species are reported here. Among the 28 species reported here, 11 species are confined to Uttarakhand, 6 species are confined to India and rest spreaded within the Oriental Region.

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REFERENCES

Artigas, J.N. & Papavero, N. 1988. The American genera of Asilidae (Diptera) : Keys for identification with an atlas of female spermatecae and other morphological details. I. Key to the subfamilies and subfamily Leptogastrinae. - Gayana. Zoologia. Univ. Concep., Instit. Central de Biologia **52**(1-2) : 95-114; Concepcion.

Bybee, S.M. & Taylor, S.D. & Nelson, C.R. & Whiting, M.F. A phylogeny of robber flies (Diptera : Asilidae) at the subfamilial level : molecular evidence. Molecular Phylogenetics & Evolution. [in press].

Delfinado, M.D. and Hardy, D.E (1973). (eds.). *A Catalog of Diptera of the Oriental Region.* **2** : 1-459. Univ. of Hawaii Press, Honolulu.

Hull, F.M. 1962. Robber flies of the world.-Bulletin of the United States National Museum **224**(1, 2) : 1-907; Washington.

Joseph, A.N.T. and Parui, P. 1993. Asilidae (Diptera) from Uttar Pradesh, India. *Rec. zool. Surv. India.* **92**(1-4) : 153-159.

Joseph, A.N. T and Parui, P. 1994. On Asilidae (Diptera) from India and adjacent countries present in the California Academy of sciences. *Wasmann. J. Biol.,* **50**(1-2) : 1-38.

Joseph, A.N.T and Parui, P. 1997. Asilidae : Diptera 77-126. *In* : Fauna of West Bengal, *State Fauna Ser.,* **3**(7). Zoological Survey of India, Kolkata.

Joseph, A.N.T. and Parui, P. 1998. The Fauna of India and adjacent conntnies (Diptera : Asilidae). *Fauna of India* (Part-I) : 278 pp.

Martin, C.H., 1968. The new family Leptogastridae (the grass flies) compared with the Asilidae (robber flies) (Diptera). *J. Kans. ent. Soc.,* **41** : 70-100.

Oldroyd, H. 1974. Some comments on the tribal classification of Asilidae (Diptera). *Israel J. Ent.* **9** : 5-21.

Papavero, N. 1973a. Studies of Asilidae (Diptera) systematics and evolution. I. A preliminary classification in subfamilies. Arquivos de Zoologia do Estado de Sao Paulo **23** : 217-274; Sao Paulo.

Papavero, N. 1973b. Studies of Asilidae (Diptera) systematics and evolution. II. The tribes of Dasypogoninae.-Arquivos de Zoologia do Estado de Sao Paulo **23** : 275-294; Sao Paulo.

Wood, G.C. 1981. Asilidae. In : McAlpine, J.F. & Peterson, B.V. & Shewell, G.E. & Teskey, H.J. & Vockeroth, J.R. & Wood, D.M. (Eds.) : Manual of Nearctic Diptera. V.1.Res. Branch, Agric. Canada, Monographs, **27** : 549-573.

Leach, W.E. 1819. [Asilidae], in: Samouelle : The entomologist_s useful compendium; or an introduction to the knowledge of British insects, London : 294–295.

McAlpine, J.F and D.M. Wood (eds.) 1989. Manual of Nearctic Diptera,Vol. 3. Research Branch, Agriculture Canada, Monograph 32. www. *Asilidae Homepage Information Phylogeny.htm* on Robber flies phylogeny introduction with a brief history of former studies by Torsten Dikow & Fritz Geller-Grimm.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, 18(Part-2), 2010 : 425-435.

INSECTA : DIPTERA : BOMBYLIIDAE

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INTRODUCTION

Uttarakhand, a newly born state (formed on the 9th of November 2002) of India lying in between 29° 5'- 31° 25' N latitudes and 77° 45'- 81° E longitudes, spreading over an area of 53, 483 sq kms (2001census), is about 9.62% of the Himalayan region in between 600m to 4000m altitude. It is divided into 13 districts, namely Udham Singh Nagar, Nainital, Almora, Champawat, Bageshwar, Pithoragarh, Chamoli, Rudra Prayag, Uttarkashi, Tehri Garhwal, Pauri Garhwal, Haridwar, and Dehradun(Map).

The bee-flies or Bombyliidae constitute one of the large and diverse families of brachycerous diptera. At present there are around 4547 species known worldwide with 257 species known from the Oriental region and 138 from India (Fig.1). The members of the family Bombyliidae range from very small, inconspicuous flies to very large, conspicuous (1-25mm) and usually colorful flies. Many of them particularly the members of the subfamily Bombyliinae, are hairy and have a general resemblance to bees and wasps, hence the common name bee flies. Most are capable of rapid flight, and many Bombyliinae, particularly males, hover over a marker.

A perusal of literature (Brunetti, 1909, 1912, 1920, Bowden, 1975, and Evenhuis and Greathead, 1999) revealed that few attempts have so far been made to explore the status of the beeflies from all over Uttarakhand. The first record of bee-fly from Uttarakhand dates back to 1893. When two female beeflies collected from Nainital were preserved in the Lucknow Museum. They were initially identified as *Anthrax himalayanus* Brunetti and later synonymised with *Anthrax referens* Walker (Bruncttti 1920) and at present the species is designated as *Hemipenthes referens* Walker (Evenhuis & Greathead, 1990).

The hills of Nainital, Dehradun, Tehri Garhwal, Almora and Mussorie, had been the favourite collection spots for the erstwhile collectors like Lt. Col. W. Thomson (1907), Sir Annandale (1909), Chatterjee (1904, 1912, 1913), Paiva (1911), Kemp (1911), Capt. Evans (1914), R.E.Loyd and Gravley (dates not known). Collections during this period of 1904-1915 seem to be uniquely regular but unfortunately restricted to the aforesaid 4 or 5 areas. Indeed, the story of the earlier collecting and describing species from the soil, in the jurisdiction of the newly formed Uttarakhand is very scanty. Recently several collecting trips were organized by the Diptera section (Bulganin Mitra, 2003-2005) and other entomological sections (B.G.Kundu, 2003) of Zoological survey of India, Kolkata in all the 13 districts of Uttarakhand in order to reveal the bee-fly fauna of the state.The present report accounts for 26 species of bombyliids belonging to11 genera and 7 tribes under 3 subfamilies of which 2 species under 2 genera are been recorded for the first time from the state of Uttarakhand.

MORPHOLOGY AND TERMINOLOGY

Traditionally, the characters used in classifying the Bombylioidea were chiefly details of the wing venation and to a lesser extent the head and antennae (Greathed and Evenhuis, 2001). Yeates (1994) made a detailed study of the anatomy of the internal and external skeleton, revealing many new characters of phylogenetic importance. Banerjee and Mitra (2005) have dealt with more simplistically the general morphology of the Family Bombyliidae in the state fauna of Arunachal Pradesh.

MATERIALS AND METHODS

The methods described by Datta *et al.* (1977) were employed here for collecting, killing and preserving adult flesh flies.

LIST OF SPECIES

Subfamily TOXOPHORINAE
Tribe **Gerontini**

** 1. *Geron (Geron) albescens* Brunetti
2. *Geron(Geron) argentifrons* Brunetti

Tribe **Systropodini**

3. *Systropus (S) ophioneus* Westwood

Subfamily BOMBYLIINAE
Tribe **Bombyliini**

** 4. *Bombomyia maculata* Fabricius
5. *Bombomyia tricolor* Guérin-Menéville
6. *Bombylisoma resplendens* (Brunetti)
* 7. *Systoechus nivalis* Brunetti
8. *Systoechus socius* Walker

Subfamily ANTHRACINAE
Tribe **Anthracini**

9. *Anthrax afra* Fabricius
10. *Anthrax distigma* Wiedemann

Tribe **Exoprosopini**

11. *Heteralonia (Isotamia) insulata* (Walker)
** 12. *Heteralonia (Isotamia) maculiventris* (Brunetti)
13. *Ligyra fuscipennis* (Macquart)
14. *Ligyra suffusipennis* (Brunetti)
15. *Ligyra tantalus* (Fabricius)

Tribe **Villini**

16. *Hemipenthes referens* (Walker)
17. *Villa aperta* (Walker)
** 18. *Villa aureohirta* (Brunetti)
** 19. *Villa clara* (Walker)
** 20. *Villa fuscolimbata* (Brunetti)
21. *Villa manifesta* (Walker)
22. *Villa panisca* (Rossi)
* 23. *Villa transversa* (Brunetti)

Tribe **Xeramoebini**

24. *Petrorossia claripennis* (Brunetti)
** 25. *Petrorossia limitarsis* (Brunetti)
** 26. Petrorossia *nigrofemorata* (Brunetti)

SYSTEMATIC ACCOUNT

Key to the Subfamilies

1. Flagellum with a single flagellomere, apical style absent, sperm pump absent or poorly developed ..... TOXOPHORINAE
– Flagellum with three, two, or one flagellomere, apical style may or may not be present, sperm pump present and well developed 2
2. Male eyes holoptic, cibarium simple, posterior tentorial pits rounded, post cranium flat, body usually broad and densely hairy, females with reduced or differentiated sand chamber with one spermatheca ..... BOMBYLIINAE
– Male eyes dichoptic, cibarium elongate, posterior tentorial pits elongate, post cranium deeply concave, body slender or broad with dense scales, hairs and bristles, females with well differentiated sand chamber and three spermathecae ..... ANTHRACINAE

Subfamily TOXOPHORINAE Schiner

Remarks : Bowden (1980) had united the Toxophorinae, Systropodinae, and Gerontinae of authors as tribes within a single subfamily and the phylogenetic analysis of Yeates (1994) supports his conclusion.

Key to the Tribes

1. Metasternum elongate, widely separating mid and hind coxae; abdomen long, slender, tending to be swollen apically in males; body almost bare and with short fine hairs only; ..... **Systropodini** Brauer
– Metasternum normal; mid and hind coxae not separated; abdomen tapered but not conspicuously elongated, apex not swollen in males; body with fine hair and scattered scales, usually whitish or brownish ..... **Gerontini** Hesse

Tribe **Gerontini** Hesse

Remarks : This tribe comprises of a single genus ***Geron*** Meigen with four subgenera. The subgenus ***Geron*** sensu stricto is cosmopolitan in distribution. ***Geron*** is one of the few genera of Bombyliidae present on oceanic islands.

Genus ***Geron*** Meigen, 1820

1820. *Geron* Meigen, *Syst. Bes. der. bek. europ. zweifl. insekt.*, : 223.

Type-species : *Geron gibbosus* Meigen, 1820.

Diagnosis : Base of cell r4 (second submarginal) usually distal to apex of discal cell; genae narrow and distance between eyes across oral cavity little wider than across face below antennae; males holoptic; spicules on tibiae present from near their bases; thorax markedly humped and deep.

Distribution : Cosmopolitan.

Key to the Species

1. Legs pale brown, tibiae paler; length 2½ - 4mm ..... *argentifrons* Brunetti
– Legs pale tawny; coxae, tips of femora and hind tarsi black; length 5 mm .... *albescens* Brunetti

****1. *Geron (Geron) albescens*** Brunetti

1909. *Geron albescens* Brunetti , *Rec. Indian Mus.*, **3** : 229.

Type-locality : Orissa.

Material examined : 5♂♂, 2♀♀, Chandipur, Dehradun dist., 29.ix.2003, coll. B.G. Kundu.

Distribution : India : Uttarakhand (Dehradun), Himachal Pradesh, Karnataka, Maharashtra, Orissa, Uttar Pradesh.

Elsewhere : Nil.

2. *Geron (Geron) argentifrons* Brunetti

1909. *Geron argentifrons* Brunetti, *Rec. Indian Mus.*, **3** : 482.

Type-locality : Pakistan.

Material examined : 4♀♀, 5♂♂, Berinag, Pithoragarh dist, 2. iv. 2005, coll.B. Mitra.

Distribution : India : Uttarakhand (Almora, Pithoragarh), Bihar, Himachal Pradesh, Maharashtra.

Elsewhere : Pakistan, Sri Lanka, Thailand.

Tribe **Systropodini** Brauer

Remarks : This tribe comprise of only three genera, the New World *Dolichomyia*, the Australasian *Zaclava*, and *Systropus*, which occurs in all zoogeographical regions.

Genus ***Systropus*** Wiedemann

1820. *Systropus* Wiedemann, *Munn. Rec. Acad. Chris. Albert. Int. adi. nov. dipt. Gen.*, : 18.

Type-species : *Systropus macilentus* Wiedemann, 1820.

Diagnosis : Pronotum normal, without bristles; mesothorax humped or not; proboscis elongate, longer than head; metasternum elongate, widely separating mid and hind coxae; abdomen long, slender, tending to be swollen apically in males; body almost bare and with short fine hairs only.

Distribution : Cosmopolitan.

3. *Systropus (Systropus) ophioneus* Westwood

1876. *Systropus ophioneus* Westwood, *Trans. Ent. Soc.* **5** : 223.

Type-locality : "India Oriental"

1909a. *Systropus nigricaudus* Brunetti, *Rec.Ind. Mus.*, : 483.

Type-locality : Nepal.

Diagnosis : Head with vertex reduced to a point, eyes contiguous, black, occupying $^1/_3$ of the head, proboscis long, black, antennal scape white basally; thorax black, finely punctuate, two narrow central grey stripes run along the mid antero dorsal line; abdomen contracting posteriorly, ending in a triangle, dorsum with grey and black hairs, venter orange yellow; fore coax pale, bare, fore femur pale yellow, fore tibia pale yellowish white bare, anterior tarsus pale yellow, posterior black; wings light brown, halteres pale yellow.

Distribution : India : Uttarakhand (Dehradun), Assam, Meghalaya, Sikkim, West Bengal.

Elsewhere : Nepal.

Subfamily BOMBYLIINAE Latreille, 1802
Tribe **Bombyliini** Latreille

Key to the Genera

1. Head usually distinctly narrower than thorax; laterotergites always with hair and cell r3 (first posterior) usually closed at a distance from the wing margin; wings usually large, broad at base with anal lobe, alula and squama well developed; hind femora always with well developed bristles on underside; body always broad; bristles usually well developed; male genitalia with a narrow or leaf-like gonostyli, aedeagus sheathed by epiphallus which only rarely has clasper-like outgrowths, phallosome projecting from middle of gonocoxae, apodemes usually large 2

- Head usually as broad as thorax; laterotergites bare and/or cell r5 broadly open at wing margin; wings often small, narrowed at base with at least alula reduced; hind femora often without bristles; body usually more elongate even narrow conical or cylindrical, bristles usually weak, often hair-like, especially those posterior to the wings; often with long robust gonostyli ending in a curved point; phallosome usually with large blunt epiphallus and originating near base of gonocoxae, apodemes usually small ..... ***Bombylisoma*** Rondani

2. Cell br (first basal) longer than cell bm (second basal), r-m sometimes equal to m-m; vestiture various, often with black hair and/or scale patches; wing pattern various, sometimes with a clear cut dark infuscation and/or with isolated dark spots; phallosome usually without clasper-like out growths ... . ***Bombomyia*** Greathead

- Cell br equal in length to bm; r-m usually much shorter than m-m, occasionally almost as long; vestiture fine and silky with a clipped appearance at least on occiput and thorax; hair white to straw-yellow or brown shading to paler on underside; wing infuscation, if present, diffuse and darker along fore border; male with phallosome compact often with clasper-like outgrowths .... ***Systoechus*** Loew

Genus ***Bombomyia*** Greathead

1995. *Bombomyia* Greathead, *Ent. Scand.*, **26** : 56.

Type-species : *Bombylius discoideus* Fabricius, 1794.

Distribution : Afrotropical, Palaearctic, Oriental.

Key to the Species

1. Wings with narrow, basal black band not extending upto the h-cv, a brown suffusion across the mid wing, costal cell diffuse light brown, abdomen with bright red pubescence ..... *tricolor* (Macquart)

- Wings with whole base dark brown upto the h-cv; apical part clear; costal cell yellowish; abdomen black with yellowish black pubescence ..... *maculata* (Fabricius)

4. ***Bombomyia maculata* Fabricius

1775. *Bombylius maculatus* Fabricius, *Syst.ent.insectorum class.*, : 803.

Type-locality : Karnataka.

Material examined : 2♂♂, 3♀♀, Askote, Pithoragarh, 23.iii.2005, coll. B. Mitra; 1♂, Berinag, Pithoragarh, 29.iii.2005, coll. B. Mitra.

Distribution : India : Uttarakhand (Pithoragarh), Gujarat, Karnataka, Orissa, Tamil Nadu.

Elsewhere : Nil.

Remarks : This is the first report from the state.

5. ***Bombomyia tricolor*** Guerin-Meneville

1835. *Bombylius tricolor* Guerin-Meneville, *Icon. du. anim. Cuvier.*, : **1844** : 538.

Type-locality : Bihar? West Bengal?

Material examined : 2♂♂, Askote, Pithoragarh dist., 29.iii.2005, coll. B. Mitra.

Distribution : India : Uttarakhand (Dehradun, Pithoragarh), Bihar, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Bangla Desh, Indonesia, Pakistan, Sri Lanka.

Genus ***Bombylisoma*** Rondani

1856. *Bombylisoma* Rondani, *Dip. Italic. Prod.*, **1** : 164.

Type-species : *Bombylius sulphureus* Fabricius, 1805.

Distribution : Afrotropical, Oriental.

6. ***Bombylisoma resplendens*** (Brunetti)

1909a. *Dischistus resplendens* Brunet, *Rec. Ind. Mus.*, **2** : 462.

Type-locality : Himachal Pradesh.

Diagnosis : Head black, antenna elongated, scape very long and pedicel short, flagellum long flat and with minute style, proboscis long, protruded as long as head and thorax together; thorax black, denued, both thorax and scutellum with brilliant green scales; abdomen with dorsum with long black hairs, venter black, legs black, tibiae and tarsi pale yellowish brown; wings dark grey, brownish anteriorly.

Distribution : India : Uttarakhand (Dehradun, Nainital), Andhra Pradesh, Assam, Himachal Pradesh, Sikkim.

Elsewhere : Nepal, Sri Lanka, Thailand.

Genus ***Systoechus*** Loew

1855. *Systoechus* Loew.

Type-species : *Bombylius sulphureus* Mikan, 1796.

Distribution : Holarctic, Afrotropical and Oriental.

Key to the Species

1. Proboscis extended as long as head and thorax (not scutellum); thorax and abdomen black densely covered with yellowish to bright yellowish orange pubescence ..... ***socius*** Walker

– Proboscis very long, extending upto the middle of abdomen; thorax and abdomen closely covered with pale yellowish to almost white bristly pubescence ..... ***nivalis*** Brunetti

*7. ***Systoechus nivalis*** Brunetti

1912. *Systoechus rivalis* Bruncti, *Rec. Indian Mus.*, **7** : 472.

Type-locality : Uttar Pradesh.

Material examined : 2♂♂, Khatima, Udham Singh Nagar dist., 18.iii.2005, coll. B. Mitra.

Distribution : India : Uttarakhand (Airadeo, Kumaon, Udham Singh Nagar).

Elsewhere : Nil.

8. ***Systoechus socius*** Walker

1852. *Bombylius socius* Walker *Insecta Saundersiana*, **1**(3) : 201.

Type-locality : "East Indias" (India).

1892. *Systoechus eupogonatus* Bigot, *Ann. Soc. Entomol. Fr.*, **61** : 365.

Type-locality : "Indoustan" [= India].

Material examined : 3♂♂, 4♀♀, Askote, Pithoragarh dist, 23.iii.2005, coll. B. Mitra; 1♂, Khirakote, Bageshwar dist, 25.ix.2003, coll. B. Mitra.

Distribution : India : Uttarakhand (Bageshwar, Udham Singh Nagar, Dehradun, Haridwar, Pithoragarh, Nainital), Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Jammu & Kashmir, Sikkim, Tamil Nadu, West Bengal.

Elsewhere : Nepal, Pakistan, Sri Lanka.

Subfamily ANTHRACINAE Latreille

Remarks : The Anthracinae are the largest subfamily of the Bombyliidae in terms of numbers of species.

Key to the Tribes

1. R2+3 usually originating before the r-m crossvein; face rounded, not produced; femora without strong bristles below; body narrow, elongate to moderately broad ..... **Xeramoebini**

– R2+3 originating opposite the r-m crossvein or very close to it (if exceptionally, R2+3 originates before r-m crossvein face is prominent); body broad at least hind femora usually with a row of strong bristles below; abdomen usually broad, flattened 2

2. Antennae with scape and pedicel quadrate and of similar width; flagellum elongate; veins in Rs usually without recurrent appendices, mediotergite and laterotergite with hair; abdomen usually covered with adpressed scales of various colours, hairs fine, sparse 3

– Antennae remarkably compacted, flagellum terminating in a circlet of hairs, often onion-shaped, narrow part usually with a distinct suture; veins in Rs often with recurrent appendices; mediotergite and laterotergite bare; body usually broad with an ovate abdomen; usually with coarse hair and scales not adpressed, usually mostly black, white or silvery and dull ochreous to brown ..... **Anthracini**

3. Wing usually with interradial crossvein between R2+3 and R4 absent (2 submarginal cells), claws without a tooth at base; pulvilli sometimes present ..... **Villini**

– Wing usually with interradial crossvein between R2+3 and R4 present (3

submarginal cells); sometimes also cell r4 divided into two by a crossvein (4 submarginal cells); claws with a tooth at base ..... **Exoprosopini**

Tribe **Anthracini Latreille**

Remarks : The tribe Anthracini is readily recognized by the structure of the antenna. Most of the genera are difficult to determine on external characters, but recent studies on the male and female genitalia support the recognition of these genera.

Genus ***Anthrax*** Scopoli

1763. *Anthrax* Scopoli, *Ent. Carniolica* : 358.

Type-species : *Musca morio* L., misidentification, = *Anthrax* (Schrank).

Diagnosis : Antennae remarkably compacted, flagellum onion-shaped; wings usually with more or less extensive brown or black infuscation, seldom almost completely hyaline, never completely infuscated; small to large species, upto 15 mm.

Distribution : Cosmopolitan.

Key to the Species

1. A distinct round brown spot on front of vein R2+3 reaching upto R4+5 and a smaller indistinct spot on posterior cell 2(M1) present ..... ***distigma*** (Wiedemann)
- Hind margin of wing clear with no such spots ..... ***afra*** Fabricius

9. ***Anthrax afra*** Fabricius

1794. *Anthrax afra* Fabricius, *Ent. Syst.*, : 258.

Material examined : 2♂♂, Dehradun, dt. nil, coll : nil.

Distribution : India : Uttarakhand (Dehradun), Andaman, Bihar, Maharashtra, Madhya Pradesh, Orissa, Tamil Nadu, West Bengal.

Elsewhere : Myanmar, Sri Lanka.

10. ***Anthrax distigma*** (Wiedemann)

1828. *Anthrax distigma* (Wiedemann), *Aussereurop. Zweifl. Insekt.*, **1** : 309.

Distribution : India : Uttarakhand (Dehradun, Nainital, Tehri Garhwal), Andaman & Nicobar Islands Arunachal Pradesh, Bihar, Chandigarh, Karnataka, Meghalaya, Sikkim, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, Java, Myanmar, Philippines, SriLanka, Sulawesi, Seychylles, Australasian/Oceanian.

Tribe **Exoprosopini** Becker

Remarks : A recent cladistic analysis of a range of species of Exoprosopini, including all recognized genera and many from Africa and Asia representing Bezzi's and Hesse's species groups of Exoprosopa, was carried out by Lambkin (2001) in connection with a revision of the Australian Exoprosopini.

Key to the Genera

1. Wing with interradial crossvein present between R2+3 and R4, but r4 not divided into two by a crossvein (3submarginal cells) ..... ***Heteralonia*** Rondani
- Wing with interradial crossvein between R2+3 and R4 and cell R4 divided into two by a crossvein (4 submarginal cells) .... ***Ligyra*** Newman

Genus ***Heteralonia*** Rondani

1863. *Heteralonia* Rondani, *Dipt. Exotica revi et anno. Nov.non.des.*, : 57.

Distribution : Palaearctic, Afrotropical, Australasian/Oceanian.

Key to the Species

1. Dorsum with white scale-spots, wing with 4 spots, contiguous to the main expanse of colour ..... *maculiventris* Brunetti
- Dorsum without white scale spots, clear part of wing with several isolated dark spots... ..... *insulata* Walker

11. ***Heteralonia (Isotamia) insulata*** (Walker)

1852. *Anthrax insulata* Walker, *Insecta Saundersiana*, Diptera (Part 3) **1** : 172.

Material examined : 2♂♂, 2♀♀, Mussorie, Dehradun dist, 13.xi.2005, coll. B. Mitra.

Distribution : India : Uttarakhand (Dehradun, Nainital), Arunachal Pradesh, Assam, Bihar,

Chandigarh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Myanmar, Nepal, Sri Lanka.

**12. ***Heteralonia (Isotamia) maculiventris* (Brunetti)

1920. *Exoprosopa maculiventris* Brunetti, *Fauna. Brit. India,* Dipt., **1** : 200.

Distribution : India : Uttarakhand (Bageshwar), Karnataka, Punjab.

Elsewhere : Nil.

Genus ***Ligyra*** Newman

1841. *Ligyra* Newman, *Entomologist,* **1** : 220.

Type species : *Anthrax bombyliformis* Macleay.

Distribution : Cosmopolitan.

Key to the Species

1. Wings uniformly dark blackish brown without darker suffusions 2
– Wings pale grey with dark suffusions .... ***suffusipennis*** (Brunetti)
2. Median stripe of pubescence on venter white, antennae black .... ***tantalus*** (Brunetti)
– Median stripe of pubescence on venter yellow; 1st antennal joint reddish brown ... .***fuscipennis*** (Macquart)

13. ***Ligyra fuscipennis*** (Macquart)

1848. *Exoprosopa fuscipennis* Macquart, *Mem. soc. R. sci. Agric. Lille,* **2** : 193.

Distribution : India : Uttarakhand (Nainital), Andaman & Nicobar Islands, Sikkim, Tamil Nadu.

Elsewhere : Bhutan, Borneo, Cambodia, China, Indonesia, Malaya, Nepal; Australasian/Oceanian.

14. ***Ligyra suffiusipennis*** (Brunetti)

1909a. *Hyperalonia suffusipennis* Brunetti, *Rec. Ind. Mus.*, **2** : 462.

Distribution : India : Uttarakhand (Nainital, Dehradun), Bihar, Kerala, Karnataka.

Elsewhere : Sri Lanka.

15. ***Ligyra tantalus*** (Fabricius)

1794. *Anthrax tantalus, Ent. Syst.*, **4** : 260.

Distribution : India : Uttarakhand (Pithoragarh, Nainital), Arunachal Pradesh, Assam, Sikkim, Tamil Nadu.

Elsewhere : China, Malayasia, Taiwan, Thailand and Philippines; Palaearctic.

Tribe **Villini** Hull

Remarks : The key character separating the Villini from the Exoprosopini is the absence of a spine-like pulvillus.

Key to the Genera

1. Fore tibiae with short bristles, speculate; pulvilli absent; wing with at most a narrow basicostal infuscation, male often with a patch of silvery scales at its base; usually with extensive yellowish hair, especially on thorax; abdomen with a more or less distinctly banded pattern and one or more pairs of tufts of black scales at sides .... ***Villa*** Lioy
– Fore tibiae smooth or with a few weak bristles; pulvilli sometimes present; wing with an extensive dark pattern reaching the hind margin at base; body with extensive black hair; abdomen with at most two white scale bands, remainder black and without contrasting tufts of black scales at sides .. ..***Hemipenthes*** Loew

Genus ***Hemipenthes*** Loew

1869c. *Hemipenthes* Loew, *Berl. Entomol. Z.*, **13** : 28.

Type-species : *Musca morio* Linnaeus, 1758.

Distribution : Holarctic and Neotropical Regions.

16. ***Hemipenthes referens*** (Walker)

1852. *Anthrax referens* Walker, *Insecta Saundersiana*, **1** : 189.

Diagnosis : Head black, antenna black, flagellum onion-shaped with a long style, proboscis black withdrawn; thorax black, sides grey, with elongate brownish yellow scales, scutellum black with minute orange-yellow depressed scales; abdomen black, covered with yellowish grey scaly pubescence; wings pale grey with hind margin with deep blob like indentation; legs dark brown, tarsi blackish.

Distribution : India : Uttarakhand (Nainital), Assam, Himachal Pradesh, Meghalaya.

Elsewhere : Myanmar, Pakistan.

Genus *Villa* (Lioy)

1864. *Villa* Lioy, *Atti. Inst veneto. Sci.*, (3) **9** : 732.

Type-species : *Anthrax concinna* Meigen.

Distribution : Cosmopolitan.

Remarks : *Villa* is a large, cosmopolitan genus of mostly very similar looking species, some of which can only reliably be separated by differences in the genitalia.

Key to the Species

1. Legs mainly yellow, femora all yellowish.. ..... *aureohirta* (Brunetti)
– Legs all black 2
2. Abdomen uniformly densely pubescent, without obvious transverse band of scales 3
– Abdomen with transverse bands of yellowish, grey or white scales; sparse pubescence 4
3. Wings deep brownish black costa, larger species (14-16mm) .... *manifesta* (Walker)
– Wing less extensively brown, smaller species (10 ½-11mm) ..... *clara* (Walker)
4. Abdomen wholly without whitish scales ... . *transversa* (Brunetti)
– Abdomen with whitish, yellowish and blackish scales 5
5. Pubescence on sides of abdomen wholly snow-white except for a few bunches of scales on each side near the tip .... *aperta* (Walker)
– Pubescence on sides of abdomen never wholly white 5
6. Sides of abdominal 5th to & 6th segments deep black, 7th segment snow-white .... *panisca* (Rossi)
– Sides of abdominal 5th & 6th segments with numerous elongate, dark brown scales and long black bristles, 7th segment with only black scales ..... *fuscolimbata* (Brunetti)

17. *Villa aperta* (Walker)

1852. ***Anthrax aperta*** Walker, *Insecta Saundersiana*, **1** : 180.

Material examined : 1♂, Naukuchia tal, Nainital dist, 2.x.2003, coll. B. Mitra; 2♂♂, Chilianaula, Almora dist., 29.ix.2003., coll. B. Mitra; 1♂, 1♀, Dwarhat, Almora dist, 30.ix.2003; coll. B. Mitra.

Distribution : India : Uttarakhand (Almora, Nainital, Dehradun), Assam, Arunachal Pradesh, Himachal Pradesh, Meghalaya and UttarPradesh.

Elsewhere : Myanmar ?

**18. *Villa aureohirta* (Brunetti)

1909b. *Anthrax aureohirta* Brunetti, *Rec. Indian Mus.*, **2** : 223.

Material examined : 1♂, Dhubri, Dehradun dist., 28. iii.2003, coll. B.G. Kundu, 1♀, Haridwar dist., 22.xi.2005, coll. B. Mitra, 1♂ Askote, Pithoragarh dist., 23.iii.2003, coll. B. Mitra.

Distribution : India : Uttarakhand (Dehradun, Haridwar, Pithoragarh), West Bengal.

Elsewhere : Nil.

Remarks : First report from this state.

**19. *Villa clara* (Walker)

1852. *Anthrax clara* Walker, *Insecta Saundersiana*, **1** : 179.

Distribution : India : Uttarakhand (Nainital, Dehradun), Assam, Meghalaya.

Elsewhere : Nil.

**20. *Villa fuscolimbata* (Brunetti)

1917. *Anthrax fuscolimbata* Brunetti, *Rec. Indian Mus.*, **13** : 75.

Distribution : India : Uttarakhand (Dehradun), Himachal Pradesh, Tamil Nadu.

Elsewhere : Nil.

21. *Villa manifesta* (Walker)

1852. *Anthrax manifesta* Walker, *Insecta Saundersiana*, **1** : 178.

Distribution : India : Uttarakhand (Dehradun), Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya.

Elsewhere : Nepal, Pakistan, Thailand.

22. *Villa panisca* (Rossi)

1790. *Bibio paniscus* (Rossi), *Fauna Etrusca*, **2** : 256.

Material examined : 2♂, Chilianaula, Almora dist., 29.ix.2003, coll. B. Mitra.

Distribution : India : Uttarakhand (Almora, Nainital), Arunachal Pradesh, Himachal Pradesh, Tamil Nadu.

Elsewhere : Palaearctic.

*23.***Villa transversa** (Brunetti)

1920. *Lepidanthrax transversa* Brunetti, *Fauna. Brit. India*, **1** : 233.

Distribution : India : Uttarakhand (Dehradun)

Elsewhere : Nil.

Tribe **Xeramoebini** Hull
Genus ***Petrorossia*** Bezzi

1909. *Petrorossia* Bezzi, *Z. Syst. Hymenopt. Dipterol.*, **8** : 32.

Diagnosis : Body elongate, abdomen flattened, with hairs and sparse small scales; crossvein r-m before middle of discal cell; phallosome with epiphallus about equal in length to aedeagus and without spines on dorsal surface.

Distribution : Afrotropical, Palaearctic, Oriental, Australasian/Oceanian.

Key to the Species

1. Wings practically or absolutely clear..... 2
– Wings with darker bright yellowish brown basocostal band extending along the costa and downward, colour fading away from the 2nd basal cell ..... *limitarsis* (Brunetti)
2. Femora and tibiae of legs wholly yellow .. .. *claripennis* (Brunetti)
– Femora and tibiae of legs wholly black ....*nigrofemorata* (Brunetti)

24. ***Petrorossia claripennis*** (Brunetti)

1909b. *Argyramoeba claripennis* Brunetti, *Rec. Indian Mus.*, **3** : 218.

Distribution : India : Uttarakhand (Nainital), Karnataka, Punjab.

Elsewhere : Pakistan.

25. ***Petrorossia limitarsis* (Brunetti)

1909b. *Argyramoeba limitarsis* Brunetti, *Rec. Indian Mus.*, **3** : 217.

Distribution : India : Punjab, Uttarakhand (Hathikund, Garhwal).

Elsewhere : Nil.

26.*Petrorossia nigrofemorata* (Brunetti)

1909b. *Argyramoeba nigrofemorata* Brunetti, *Rec. Indian Mus.*, **3** : 219.

Distribution : India : Andaman & Nicobar Islands, Gujarat, Uttarakhand (Hathikund, Garhwal).

Elsewhere : Nil.

ZOOGEOGRAPHICAL REMARKS

A total of 26 species under 11 genera have been reported from the state of Uttarakhand. Of them 2 species are endemic to Uttarakhand (*) and 8 species are restricted in their distribution within India (**) (Table.1).

Among the 2 species of the genus *Geron* Meigen, only *G. argentifrons* Brunetti extend its distribution to Pakistan, Sri Lanka and Thailand of the Oriental Region. The genus *Systropus* Wiedemana with 9 Indian species is distributed mostly over the eastern and northeastern hills of India and only one species *Systropus (S) ophioneus* Westwood, found in Uttarakhand, has extended itself to Nepal in the Oriental Region. Both the 2 species of the genus *Bombomyia* Greathead reported from India are also known from Uttarakhand of which *B. tricolor* Guerin. Meneville is however more widely distributed and is found in Pakistan, Bangladesh, Sri Lanka and Indonesia(Java) in the Fareast. *Bombylisoma resplendens* (Brunetti), the only species from Uttarakhand (2 species from India) is found also in Nepal, Sri Lanka and Thailand of the Orient (Table.1).

Of the 3 species found in India belonging to the genus *Systoechus* Loew two species are reported from Uttarakhand of them *S. socius* walker has extended itself beyond Indian boundaries to Nepal, Pakistan and Sri Lanka and *S. nivalis* Brunetti is endemic to Uttarakhand.

The genus *Anthrax* Scopoli is undoubtedly a cosmopolitan genus with 9 Indian species of which 2 species are found in Uttarakhand. Of them, *A. distigma* is the most well distributed species

extending over the Oriental, Afrotropical, Australasian/ Oceanian Regions. The other species *A. afra* is also distributed over India and in Myanmar, SriLanka of the Oriental Region. *A. afra* though at present has a doubtful status , has been included in our report since 1 identified material (not verified by us) has been recorded from the entomological collection of N.R.S. Dehradun,Z.S.I.

The genus *Heteralonia* Rondari is the richest Indian genera with 20 Indian species mostly inhabiting the Indian plains. However, the genus is poorly represented in Uttarakhand with only 2 species, *H. insulata* (Walker) and *H. maculiventris* (Brunetti). The former more widespread, extending from Nepal through Sri Lanka to Myanmar eastwardly.

The genus *Ligyra* Newman is the most versatile Indian genera with all the 12 species well distributed in India and a few extending even upto the Andaman Islands. 3 species are reported from Uttarakhand and other than *L. suffusipennis* (Brunetta), rest have crossed the boundary of the Oriental Region.

The genus *Hemipenthes* Loew with 1 Indian species, *H. referens* (walker) is found mostly in the northeastern, and northwestern Hiamalayas including Uttarakhand and also distributed in the Pakistan and Myanmar other than India of the Oriental Region.

Villa Lioy is the second most versatile genus of India with 19 species distributed all over India and 7 species reported from Uttarakhand, and is hence the most widely distributed genera in Uttarakhand. Of the 7 species of the genus *Villa* Lioy, 3 species have restricted themselves within Indian limits and *V. transversa* (Brunetti) is endemic to Uttarakhand. *V. manifesta* (Walker) is found to extend itself from the Pakistan to Thailand through Nepal, while*V. panisca* (Rossi) is found only in India of the Oriental region and the Palaearctic countries.

The genus *Petrorossia* Bezzi has 10 moderately distributed species, 3 of which are found in Uttarakhand. Interestingly, the species *P. nigrofemorata* (Brunetti) is restricted in its distribution within India, found in the Uttarakhand and Andamans while *P. claripennis* (Brunetti) and *P.limitarsis* (Brunetti) are found to extend themselves to Pakistan.

SUMMARY

The Bombyliidae of Uttarakhand comprise of 26 species including 2 new records, assignable to 11 genera, 7 tribes, and 3 subfamilies. Generic and species composition of the 13 districts reveal that concentration is maximum in the district of Dehradun (9 genera, 15 species), followed by Nainital (8 genera, 12 species), Pithoragarh (6 genera, 6 species), Almora (2 genera, 3 species), Bageshwar and Haridwar (2 genera, 2 species), Udham Singh Nagar (1 genera, 2 species) and Tehri Garhwal (1 genera, 1 species) (Table 1 and map). Key to the subfamilies, tribes, genera, species, and diagnosis (wherever necessary) and distribution have been provided along with a brief zoogeographic discussion as an appendix.

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REFERENCES

Banerjee, D and Mitra, B. 2006. *In Fauna of Arunachal Pradesh, State Fauna Series,* **13**(2) : 283-295. Zoological survey of India, Kolkata.

Bowden, J. 1975. Family Bombyliidae *In* M.D. Delfinado and D. Hardy.,(eds.). A *Catalog Of Diptera of The Oriental Region,* **2** : 165-184. Univ. of Hawaii Press. Honolulu.

Brunetti, E. 1909a., Revised and annotated catalogue of Oriental Bombyliidae with descriptions of new species. *Rec. Indian Mus.*, **2** : 437-492.

Brunetti, E. 1912. New Oriental Diptera. I. *Rec. Indian Mus.*, **7** : 445-513.

Brunetti, E. 1920., *The Fauna of British India, including Ceylon and Burma, Diptera,Brachycera,* **2** : ix-401pp.Taylor and Francis, London.

Datta, M, Parui, P and Mukherjee, M. 1977. Insecta : Diptera, *In : Fauna of West Bengal, State Fauna Series,* 3(7). 1-76. Z.S.I., Kolkata.

Evenhuis, N.L. and Greathead, D.J., 1999. World Catalog Of Bee-Flies (Diptera : Bombyliidae). Backhuys Publishers, Leiden, 1-525.

Greathead, D.J and Evenhuis, N.L. 2001. Annotated keys to the genera of African Bombylioidea (Diptera : Bombyliidae; Mythicomyiidae). *African Invertebrates*, **42** : 105-224.

Hull, F.M.1973. Bee flies of the world. The genera of the family Bombyliidae. *Bull. U.S. Natl Mus.*, **286** : 1-687. Washington D.C., Smithsonian Institution Press.

Merle, P. Du.1975. Les notes et les stades pre-imaginaux des dipteres Bombyliidae : Revue bibliographique annotee. *Union Int.Sci., Bull. SROP. WPRS. Bull.*, 289pp.

Yeates, D.K. 1994. The cladistics and classification of the Bombyliidae (Diptera : Asiloidea). *Bull. Am. Mus. Nat. Hist.*, **219** 191p.

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Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 437-441.

INSECTA : DIPTERA : CALLIPHORIDAE

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INTRODUCTION

The family Calliphoridae is a cosmopolitan group of about 1000 species, predominantly tropical in distribution, closely related to Muscidae, Tachinidae and Sarcophagidae. Fabricius (1775, 1781-1805) was the first naturalist who initiated the work on Diptera fauna of India and it was he who described the species ***Musca jejuna*** in 1787 from Tranquebar (Tamil Nadu). This is the first described species from India on Calliphoridae. Later Senior -White, Aubertin and Smart 1940 published in "The Fauna of British India" (Volume IV) of Calliphoridae comprising of 97 species under 26 genera and 4 subfamilies in India. Recently Nandi (2004) published the Checklist of Calliphoridae (Diptera) of India where he has listed 112 species under 30 genera of 9 subfamilies.

The Calliphorids are generally ubiquitous. They fly mainly by day, though a number of specimens also were attracted by light. Adults are often attracted to sweet liquids, and can be collected at flowers, where they feed on nectar. They also feed on the liquid products of organic decomposition, which provide the proteins essential to the female for egg maturation. Some of the species of *Calliphora* and *Chrysomya* are of significant veterinary importance, causing the cutaneous myiasis of livestock known as 'fly strike' Larvae are scavengers or parasitic on insects, earthworms, snails, and other animals. Rhiniinae predaceous upon egg pods of grasshoppers; others capture and feed on winged termites and immature ants.

The newly formed state Uttarakhand (2002) was the part of erstwhile Uttar Pradesh and is lying in between 29° 5'- 31° 25' N latitudes and 77° 45'- 81° E longitudes. The entire region is mountainous with valleys in between the ridges. To the west, there is Dhauladhar range which bifurcates at Bander Poonch peak and rivers Tons and Yamuna separate Uttarakhand from Kinnaur, and Sirmour district of Himachal Pradesh. To the north is the International watershed (China) with 17 major passes with heights varying between 4000 m to 8000 m. The river Mahakali forms the natural boundary between Uttarakhand and Nepal. To the south is Terai , a belt about 15 to 20 km wide, made up of thick jungles, swamps and tall grasses which separates the region from the plains of Uttar Pradesh. The state is divided into 13 districts, namely Udham Singh Nagar, Nainital, Almora, Champawat, Bageshwar, Pithoragarh, Chamoli, Rudra Prayag, Uttarkashi, Tehri Garhwal, Pauri Garhwal, Haridwar, and Dehradun.

Recently, several collecting trips were conducted district-wise by the Diptera section (Bulganin Mitra and Party, 2003-2005) of Zoological survey of India, Kolkata in Uttarakhand in order to reveal the Calliphoridae fauna of the state. The dipteran family Calliphoridae, to which belong the familiar blowflies, bluebottles, and greenbottles, is represented in Uttarakhand by 11 species of 7 genera of which 3 species of the 2 genera are recorded for the first time from this state (marked with asterisk).

MATERIALS AND METHODS

The methods described by Datta *et al.* (1977) were employed here for collecting, killing and preserving adult blow flies. Genitalia characters were taken as the main criteria for identification of the species besides chaetotaxy.

MORPHOLOGY AND TERMINOLOGY

Morphology of the family Calliphoridae has been dealt by Senior -White, Aubertin and Smart (1940) in "The Fauna of British India"

SYSTEMATIC LIST

Subfamily AMENIINAE
Tribe **Catapicephalini**

1. *Catapicephala pattoni* Senior-White

Subfamily CALLIPHORINAE
Tribe **Calliphorini**

2. *Calliphora (Calliphora) vicina* Robineau-Desvoidy

Subfamily BENGALIINAE
Tribe **Bengalini**

3. *Bengalia jejuna* (Fabricius)

Subfamily CHRYSOMINAE
Tribe **Chrysomyini**

*4. *Chrysomya megacephala* (Febricius)

*5. *Crysomya pinguis* (Walker)

Subfamily RHINIINAE
Tribe **Rhiniini**

6. *Idiellopsis xanthogaster* (Wiedemann)

*7. *Stomorhina discolor* (Fabricius)

8. *Stomorhina procula* (Walker)

Tribe **Isomyiini**

9. *Isomyia delectans* Walker

10. *Isomyia gomenzmenoroi* (Peris)

11. *Isomyia pseudoviridana* (Peris)

SYSTEMATIC ACCOUNT

Subfamily AMENIINAE
Tribe **Catapicephalini**
Genus ***Catapicephala*** Macquart

1851. *Catapicephala* Macquart, *Mem. Soc. Sci. Agric. Lille.*, : 210.

Type species : *Catapicephala splendens* Macquart.

Diagnosis : Large, metallic colour; frons slightly protruding; eyes widely separated in both sexes; flagellum six to eight times as long as pedicel; dc 2 or 3 : 4; posthumerals 3, supra alar 1 : 3; posterior declivity with a tuft of bristles; males with somewhat elongated pulvilli, middle tibia in female with antero-dorsal bristles of varying number, posterior surface of tibiae with a ridge covering with numerous small stulae; subcostal sclerite of wing covered with soft curved pubescence; second,third and fourth abdominal segments with marginal macrochaetae.

1. ***Catapicephala pattoni*** Senior-White, Aubertin & Smart

1940. *Catapicephala pattoni* Senior-White, Aubertin & Smart, *Fauna Brit. India*, Dipt., **6** : 105.

Diagnosis : Eyes bare, separated from vertex by a distance equal to one-third total head-width or slightly less; parafrontalia, parafacialia, face and jowls covered with shining silver tomentum; frontal bristles widely spread; parafrontalia shining at vertex, with minute decumbent setulae outside the frontal series; parafacialia bare; antennae and palpi dark brown; thorax shining bluish-green, white-dusted anteriorly and along margins of dorsum; pleura lightly and unevenly dusted, pro-pleura bare; abdomen shining bluish-purple, thinly and unevenly covered with grayish dust which is concentrated in rather more definite patches on the venter; hypopygium inconspicuous; wings, yellowish hyaline, squama white, halteres yellowish-brown; legs dark-brown.

Distribution : India : Uttarakhand (Dehradun) and West Bengal.

Elsewhere : Nil.

Subfamily CALLIPHORINAE
Tribe **Calliphorini**
Genus ***Calliphora*** Robineau-Desvoidy

1830 *Calliphora* R & D, *Mem.Pres. div. Sav. Acad. Sci. Inst. Fr.*, : 433.

Type species : *Musca vomitoria* Linnaeus.

Diagnosis : Eyes approximated in males; arista long plumose; postsutural acrostichal varies from 2-3, postsutural dorsocentral always 3, propleuron and postalar declivity hairy; stem vein bare, lower squame bears long upstanding hairs on part of upper surface; third abdominal segment with only marginal bristles, fourth segment with both discal and marginal bristles.

Subgenus ***Calliphora*** Robineu-Desvoidy

Diagnosis : Body bluish black; presutural intraalar bristles present; lower squama entirely with hair on upper surface.

2. ***Calliphora vicina*** Robineau- Desvoidy

1830. *Calliphora vicina* Robineau- Desvoidy, *Mem. pres. div. Sav Acad Sci. Inst. Fr.*, **2**(2) : 435.

1826. *Calliphora erythrocephala* (Meigen) : Senior-White, Aubertin & Smart, *Fauna Brit. India*, Dipt., **6** : 33.

Diagnosis : Eyes in male separated at point of closest approximation by a distance equal to one and a half times width of third antennal segment,

in female equal to one-third width of head; frons black in male, narrowed at one point but not entirely obliterated; palpi orange; antennae dark brown; parafrontalia silver-grey; parafaciala and epistome reddish; jowls reddish to grey; thorax dull bluish-black lightly silver-dusted, a presutural bristle present; abdomen greenish-blue, irregularly silver dusted, the paralobes less highly chitinized than the mesolobe; wings hyaline, very slightly darkened at base, basicostal scale deep yellow to dark brown, subcostal sclerite covered with soft tawny ubescence, squama dark brown, lower lobe white-rimmed in certain lights; halters orange; legs black.

Distribution : India : Uttarakhand (Dehradun), Chandigarh, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Tamil Nadu, Uttar Pradesh, Sikkim, and West Bengal.

Elsewhere : China, Pakistan; Japan; Egypt; Europe; North America; Australia ; Nearctic and Neotropical regions.

Subfamily BENGALIINAE
Tribe **Bengalini**
Genus ***Bengalia*** Robineau- Desvoidy

1830. *Bengalia* Robineau-Desvoidy, *Mem. Pres. Div. Say. Acad. Sci. Inst. Fr.*, : 425.

Type-species : *Bengalia labiata* Robineau-Desvoidy.

Diagnosis : Medium to large flies with velvety brown colour; eyes widely separated in both sexes; antennal arista biplumose to tip; thorax with only prescutellar acrostichals, post sutural dorsocentrals varies from 2-4; scutellum with one apical pairs and two marginal pairs; mid femur usually with profuse bristles, front tibia sometimes with strong bristles, hind tibia may have profuse hair tuft; vein M strongly angled and meet costa before apex of wing, third vein usually spinulose up to r-m cross vein; abdomen with marginal macrochaetae on third and fourth segments.

3. ***Bengalia jejuna*** (Fabricius)

1794. *Musca jejuna* Fabricius, *Ent. Syst.*, **4** : 312.

Material examined : 3♂♂ 2♀♀, Bhowali, Nainital dist., 2.x.03, coll. B. Mitra.

Diagnosis : Head Parafrontalia somewhat paler, face, especially parafaciala, paler, frons slightly less than one-third of head-width, antennae with first two segments ochreous, third darker, palpi pale yellowish-white with black bristles; thorax scutellus and mesonotum ochreous-brown, with paler lateral margins varying greatly in width and distinctness, pleura paler; abdomen pale brownish-ochreous, hind margins of apparent second and third segments vary narrowly reddish-brown, of third and fourth very narrowly black; wings clear to slightly greyish, squamae yellowish-white with white cilia; legs ochreous-yellow, the apical darking of the tarsi less distinct than in jejuna.

Distribution : India : Uttarakhand (Dehradun, Nainital), Bihar, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Pondichery, Uttar Pradesh and West Bengal.

Elsewhere : Celebes; Malay Peninsula; Philippines; Sri Lanka.

Subfamily CHRYSOMYINAE
Tribe **Chrysomyini**
Genus ***Chrysomya*** Robineau-Desvoidty

1830. *Chrysomya* R-D, *Mem Pres Div Sav Acad Sci. Inst. Fr.*, : 444.

Type species : *Chrysomya regalis* Robineau-Desvoidy.

Diagnosis : Generally medium-sized files of metallic green, blue or purple colour; eyes large and bare, usually holoptic and upper facets enlarged in males but dichoptic and with small uniform facets in females; presutural acrostichal bristle absent; propleurom and prosternum hairy; supra-squamosal ridge usually with anterior parasquamosal tuft; subcostal sclerite hairy; tergum 5 with fine erect bristles on disc.

Key to the species

1. Parafacialia and jowls brilliant orange the latter clothed with golden hairs .... *megacephala* (Fabricius)

– Parafacialia never brilliant orange .... *pinguis* (Walker)

*4. ***Chrysomya megacephala*** (Febricius)

1794. ***Musca megacephala*** Fabricius, *Syst. Ent.*, **4** : 317.

Material Examined : 2♂♂, Sonari, Almora dist., 21.ix.03, coll. B. Mitra; 8♂♂ 2♀♀, Kanda,

Almora dist., 27.ix.03, coll. B. Mitra; 9♂♂ 6♀♀, Bhowali, Nainital dist., 2.x.03, coll. B. Mitra; 5♂♂ 3♀♀, Kardhara, Almora dist., 21.ix.03, coll. B. Mitra.

Distribution : India : Uttarakhand (Almora, Nainital), Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Jharkhand, Lakshadweep, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Cosmopolitan.

*5. ***Chrysomya pinguis*** (Walker)

1858. *Lucillia pinguis* Walker, *Trans. ent. Soc. Lond.* Zool., **4** : 213.

Material examined : 1♂, Gubar, Tehri Garhwal dist., 07. iv. 03, coll. B.G. Kundu.

Distribution : India : Uttarakhand (Tehri Garhwal), Andhra Pradesh, Arunachal Pradesh, Assam, Meghalaya, Himachal Pradesh, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, China, Hong-Kong, Java, Malaya, Sri Lanka, Thailand; Japan, Korea; Molluccus; Philippines.

Subfamily RHINIINAE
Tribe **Rhiniini**
Genus ***Idiellopsis*** Townsend

1917. *Idiellopsis* Townsend, *Rec. Indian Mus.*, **13** : 190.

Type-species : *Idiellopsis similis* Townsend.

6. ***Idiellopsis xanthogaster*** (Wiedemann)

1820. *Idia xanthogaster* Wiedemann, *Nov. Dipt. Gen.*, : 21.

Diagnosis : Frontal stripe dark brown to black, parafrontalia white, with shining black spots, male broadly subholoptic, female frons one-fifth of head-width, face shining black, parafacialia white, with shining black spots, a very large one just before lower margin, occiput on lower half thickly golden haired, palpi black; antennae brown; thorax throughout thickly golden–haired; dorsum and scutellum quite distinctly dark green, with black spots; abdomen reddish-orange, in male with a black median stripe, posterior half of third and fourth segments blackened; apical cell of wings closed, petiolate, squama deep yellow, basally yellow, a small apical infuscation; Legs brown to black, bases of tibiae and first tarsal joints paler brown.

Distribution : India : Uttarakhand (Nainital) and Assam, Bihar, Jharkhand, Sikkim.

Elsewhere : Java; Celebes; Kei Islands; Aru Islands; Australia; Solomon Islands; Arabia.

Genus ***Stomorhina*** Rondani

1861. *Stomorhina* Rondani, *Dipt.Ital. Prodr.*, **4** : 9.

Type-species : *Musca lunata* Fabricius.

Key to the species

1. Abdomen with definite yellow and black pattern ..... *discolor* (Fabricius)
– Abdomen yellow, through orange to brown usually darkened apically, without a definite pattern, sometimes with metallic reflection ..... *procula* (Walker)

*7. ***Stomorhina discolor*** (Fabricius)

1794. *Musca discolor* Fabricius, *Ent. Syst.*, **4** : 320.

Material Examined : 2♀♀ 5♂♂, Tanakpur, Champawat dist., 13.ix.04, coll. B, Mitra; 2♀♀ 2♂♂, Chaubatia, Almora dist., 29.ix. 03, coll. B. Mitra.

Distribution : India : Uttarakhand (Champawat, Almora), Arunachal Pradesh, Assam, Jharkhand, Chandigarh, Kerala, Manipur, Meghalaya, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka; Malaya; Java; Borneo; Nepal; Pakistan; Philippines; Hongkong; Buru Island; North Australia; New Caledonia; Fiji; Taiwan and Thailand.

Remarks : This species is reported for the first time from this state.

8. ***Stomorhina procula*** (Walker)

1849. *Idia procula* Walker, *List. Dipt. Colln Br. Mus.*, **4** : 808.

Distribution : India : Uttarakhand (Dehradun), Assam, Sikkim, Tamil Nadu, Arunchal Pradesh and West Bengal.

Elsewhere : Borneo; Philippines; China; Myanmar; Malaysia; Nepal; Australia; Buru Island.

Tribe **Isomyiini**
Genus ***Isomyia*** Walker

1860. *Isomyia* Walker, *J. Proc. Linn. Soc. Lond., Zool.*, **4** : 134.

Type-species : *Musca delectans* Walker.

Diagnosis : Eyes subholoptic in male; a single row of frontals in both sexes, ocellars strong and

proclinate; arista plumose or pubescent; outer post humeral and prostigmatic bristle present, presutural acrostichal and dorsocentrals prominent; first longitudinal vein at base above with row of black bristles.

9. *Isomyia delectans* Walker

1860. *Isomyia delectans* Walker, *J. Proc. Linn. Soc. Lond. Zool.*, **4** : 134.

Diagnosis : Eyes in male subholoptic, with uniform eye facets in female frons broad; face yellowish to brown with distinct carina; antennae blackish; scutum usually bright metallic green with reddish reflection, acr 3 : 4, dc 2 : 4; scutellum sometimes with cuperous reflection; mesopleuron with black bristles and soft grey hairs mixed on posterior margin being more prominent in female than male; femora metallic green to black tibiae and tarsi paler; basicostal scale of wing black and base of wing yellowish; abdomen green with red or cuprous reflection.

Distribution : India : Uttarakhand (Dehradun), Arunachal Pradesh and Himachal Pradesh.

Elsewhere : Celebes, Laos, Myanmar and Philippines.

10. *Isomyia gomenzmenoroi* (Peris)

1951. *Thelychaeta gomenzmenoroi* Peris , *Eos. Madr.*, **27** : 246.

Distribution : India : Uttar Pradesh, Uttarakhand (Dehradun).

Elsewhere : Nil.

11. *Isomyia pseudoviridana* (Peris)

1927. *Thelychaeta tibialis* Villeneuve, *Rev. Zool. Afa.*, **10** : 218.

1952. *Thelychaeta pseudoviridana* Peris, *Ann. Estac.exp. AulaDei*, **3** : 183.

Material examined : 1♂, Askote, Pithoragarh dist., 21. iii.05, coll. R.S. Mridha; 1♂, Kanda, Almora dist., 22.ix.03, coll. B. Mitra; 1♂, Gananath, Almora dist., 22.ix.03, coll. B. Mitra.

Diagnosis : Head : parafrontalia dark grey, parafacilia above concolorous, below ashy, with black hairs. Face dull testaceous. Antennae testaceous, apical half of third segment darkened; Thorax : green with some coppery reflexious, scutellum green. Mesopleura black-haired, Acrosticals 1 : 2, dorsocentrals 2 : 4; Abdomen : green; Wings : fuscous-yellow, vein III bristly on node only. IV evenly rounded, squamae yellowish; Legs : femora green, tibiae and tarsi yellowish.

Distribution : India : Uttarakhand (Nainital, Pithoragarh, Almora), Meghalaya, Tamil Nadu and Uttar Pradesh.

Elsewhere : Myanmar, Nepal.

SUMMARY

The Calliphoridae of Uttarakhand comprise of 11 species including 3 new records, assignable to 7 genera, 6 tribes, and 5 subfamilies. Species composition of the 13 districts reveal that concentration is maximum in the districts of Dehradun (6 species), followed by Nainital (4 species), Almora (3 species), Pithoragarh (1 species), Champawat (1 species) and Tehri Garhwal (1 species) (Map 1).

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REFERENCES

Delfinado, M. D. and Hardy, D. E. 1977. *A catalog of Diptera of the Oriental Region.* Vol. III. Suborder Cyclorrhapha. The University Press of Hawaii, Honolulu, 854 pp.

Datta, M, Parui, P and Mukherjee, M. 1977. Insects : Diptera, *In Fauna of West Bengal, State Fauna Series,* 3(7). 1-76. Z.S.I., Kolkata.

Senior-White, R.A., Aubertin, D. and Smart, J. 1940. *The fauna of British India including the remainder of the Oriental Region* : Family Calliphoridae, 6: XII + 288, Taylor & Francis Ltd., London.

Nandi, B.C. 2004. Checklist of Calliphoridae (Diptera) of India. *Rec. zool. Surv. India, Occ. Paper No.*, **231** : 1-47.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 443-455.

INSECTA : DIPTERA : SARCOPHAGIDAE

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INTRODUCTION

The family Sarcophagidae comprises a group of medium-sized to fairly large flies of 4 mm to 18 mm in length that are widely distributed all over the world (3000 described species, Nandi, 2002) except in the polar regions. Although the name would seem to indicate a habit of breeding in vertebrate carcasses, this is by no means typical for the family, which includes specialists ranging from inhabitants of pitcher plants to bat coprophages, crab saprophages, wasp nest inquilines, and insect parasitoids.

Carolus Linnaeus was first to described a single flesh fly species, *Musca carnaria*, and many species were added by productive older authors like J.W. Meigen, J.B. Robineau-Desvoidy and J. Macquart. The insight provided by Luis Pandellé, that the male terminalia of the Sarcophaginae provided the most reliable diagnostic characters, paved the way for major progress in flesh fly taxonomy.

As far as knowledge goes, Senior-White (1924) first revised the family Sarcophagidae from the Oriental region and described several new species. Later, Senior-White *et al.* (1940) published the comparative account of these flies where these flies were included under the subfamily Sarcophaginae of the family Calliphoridae.

Extensive faunistic explorations have been done in India during the last two decades. In comparison to other parts of India, the study of sarcophagid fauna of Uttarakhand is recent one. Nandi (1978 and1990) has studied and described some species from erstwhile Uttar Pradseh. Recently, several collection trips were organised by the Diptera section, Zoological Survey of India, Kolkata, in different areas of the Uttarakhand to collect and study the Diptera fauna of these areas (2001-2006).

The newly formed state Uttarakhand was the part of erstwhile Uttar Pradesh and it came into being in 2002. So Uttarakhand by name was never registered anywhere in literature before 2002. The state of Uttarakhand lies between 29° 5'- 31° 25' N latitudes and 77° 45'- 81° E longitudes, spreading over an area of 53, 483 sq kms (2001census), is about 9.62% of the Himalayan region in between 600m to 4000m altitude. It is divided into 13 districts, namely Udham Singh Nagar, Nainital, Almora, Champawat, Bageshwar, Pithoragarh, Chamoli, Rudra Prayag, Uttarkashi, Tehri Garhwal, Pauri Garhwal, Haridwar, and Dehradun.

This, communication reports 22 species under 10 genera of the family Sarcophagidae of which 3 species (marked with asterisks) are endemic to Uttarakhand. A comprehensive key to the tribes, subtribes, genera and species of Diptera of Uttarakhand are also given here. The taxonomical keys have been followed after Nandi (2002).

MATERIALS AND METHODS

The methods described by Datta *et al.* (1977) were employed here for collecting, killing and preserving adult flesh flies

MORPHOLOGY AND TERMINOLOGY

Morphology and terminology are as described by B.C. Nandi (2002) in the Fauna of India and the adjacent countries.

SYSTEMATIC LIST

Subfamily SARCOPHAGINAE Macquart

Tribe **Raviniini** Rohdendorf

1. *Ravinia pernix* (Harris)

Tribe **Protodexiini** Townsend

* 2. *Blaesoxipha (Blaesoxipha) rishikeshi* Nandi

Tribe **Sarcophagini** Macquart
Subtribe **Parasarcophagina** Rohdendorf

3. *Bercaea cruentata* (Meigen)
4. *Boettcherisca peregrina* (Robineau-Desvoidy)
5. *Fengia ostindicae* (Senior-White)
6. *Lioproctia (Lioproctia) annandalei* (Senior-White)
7. *Parasarcophaga (Liopygia) ruficornis* (Fabricius)
8. *Parasarcophaga (Liosarcophaga) dux* (Thomson)
9. *Parasarcophaga (Liosarcophaga) harpax* (Pandelle)
* 10. *Parasarcophaga (Liosarcophaga) sarupi* Nandi
11. *Parasarcophaga (s. str.) albiceps* (Meigen)
12. *Parasarcophaga (s. str.) hirtipes* (Wiedemann)
13. *Parasarcophaga (s. str.) macroauriculata* (Ho)
14. *Parasarcophaga (s. str) misera* (Walker)
15. *Parasarcophaga (s.str.) sericea* (Walker)
16. *Parasarcophaga (Thomsonea) argyrostoma* (Robineau-Desvoidy)
* 17. *Sarcosolomonia (Parkerimyia) kaushanensis* Nandi
18. *Sarcosolomonia (Parkerimyia) nathani* Lopes and Kano

Subtribe **Harpagophallina** Rohdendorf

19. *Iranihindia futilis* (Senior-White)
20. *Iranihindia martellata* (Senior-White)
21. *Iranihindia martellatoides* (Baranov)

Subtribe **Seniorwhiteina** Rohdendorf

22. *Seniorwhitea reciproca* (Walker)

SYSTEMATIC ACCOUNT

Subfamily SARCOPHAGINAE Macquart, 1843

Diagnosis : These flies are small to large in size and usually grayish to black in colour with three dark longitudinal stripes on thorax and checkered pattern on abdominal tergites.

Key to the Tribes

1. Phallic tube present; styli of glans absent; division of theca and paraphallus in penis not distinct ..... **Raviniini** Rohdendorf
– Phallic tube absent; styli of glans generally present or may be absent; division of theca and paraphallus in penis distinct 2
2. Lateral plate of paraphallus absent or feebly developed; inner forceps bent posteriorly ..... **Protodexiini** Townsend
– Lateral plate of paraphallus present and well developed; inner forceps straight or bent anteriorly ..... **Sarcophagini** Macquart

Tribe **Raviniini** Rohdendorf
Genus ***Ravinia*** Robineau-Desvoidy

1863. *Ravinia* Robineau-Desvoidy, *Hist. nat. Dipt. Paris*, **2** : 434.

Type-species : *Sarcophaga haematodes* Meigen, 1826 (=*Musca pernix* Harris, 1780).

Diagnosis : Third antennal segment about twice that of the second and reaching upto about lower margin of eye; parafacial broad and about two-fifths that of one eye; oral margin somewhat protruding forward; R1 usually bare, rarely setose; third abdominal segment without median marginal bristles; mid tibia without bristles on ventral surface; second genital segment reddish-orange.

1. ***Ravinia pernix*** (Harris)

1780. *Musca pernix* Harris, *Exp. Engl. Ins.*, 84.

1987. *Ravinia pernix* : Pape, *Fauna ent. scand.*, **19** : 42.

Material examined : 2♂♂ 3♀♀, Cantonment road, Almora dist., 18.ix. 03, coll. B. Mitra; 1♂ 5♀♀, Sonari, Binsar, Almora dist., 21.ix.03, coll.B.Mitra.

Diagnosis : Width of frons about four-fifths that of one eye; frontal vitta black,; parafrontal and parafacial black with silvery pollen; antennae dark brown; arista long, plumose along basal three-fifths; gena black, silvery pollen and with long hairs; palpi long and brownish to black; proboscis short and black; thorax blackish to brown with three black longitudinal stripes; wings hyaline with brown veins, basicostal scale light brown; squama white; haltere brown; legs black, fore femur with a pair of rows of long bristles along posterodorsal surface and a row of long bristles along posterior margin of ventral surface; abdomen black with golden checkered pattern; first genital segment reddish or brown with 6 marginal bristles; second

reddish-orange but without marginal bristles; inner forceps elongated and slightly curved at end; outer forceps slightly elongated with long hairs terminally.

Distribution : India : Uttarakhand (Almora, Dehradun, Nainital, Tehri Garhwal), Arunachal Pradesh, Bihar, Himachal Pradesh, Jammu & Kashmir, West Bengal.

Elsewhere : Bangladesh; Bhutan; Nepal; Pakistan; Afghanistan; Albania; Algeria; Arabia; Armenia; Austria; Azerbaijan; Azores; Belgium; Bulgaria; Byelorussia; Canary Islands; China; Cyprus; Czech Republic; Denmark; Egypt; Estonia; Finland; France; Germany; Great Britain; Greece; Gruzia; Hungary; Iran; Iraq; Ireland; Israel; Italy; Japan; Kazakhstan; Korea; Kyrgyzstan; Latvia; Lebanon; Libya; Lithuania; Malta; Moldova; Mongolia; Morocco; Norway; Poland; Portugal; Rumania; Russia; Saudi Arabia; Serbia; Slovakia; South China; Southern Spain; Sweden; Switzerland; Syria; Tajikistan; Tunisia; Turkmenistan; Ukraine; United Kingdom; Uzbekistan and Yemen.

Tribe **Protodexiini** Townsend
Genus ***Blaesoxipha*** Loew

1861. *Blaesoxipha* Loew, *Wien.ent. Mschr.*, **5** : 384.

Type-species : *Blaesoxipha grylloctona* Loew, 1861.

Diagnosis : Antennae is inserted at the middle of the eyes; numerous pre-and postsutural acrostichal bristles well developed; third antennal segment about twice that of the second; arista short, plumose; hind femur and tibia without setae but with long hairs; inner forceps bent angularly and mostly beset with short spines dorsally; genitalia characters are very variable.

2. ***Blaesoxipha (Blaesoxipha) rishikeshi*** Nandi

1990. *Blaesoxipha (Blaesoxipha) rishikeshi* Nandi, *J. Beng. nat. Hist. Soc.*, **9**(1) : 16.

Diagnosis : Width of frons about two-fifths that of one eye; frontal vitta black; parafrontal and parafacial black with silvery pollen; antennae brownish, arista long, plumose along basal three-fifth; facial ridge brownish with silvery pollen; vibrissae long; thorax black with three black longitudinal stripes; wings hyaline with brown veins; costal spines not stout; basicostal scale and squama white; haltere brown; legs black; fore femur with a pair of rows of bristles along posterodorsal surface and a row of bristles along posterior margin of ventral surface; abdomen black with silvery checkered pattern; sternites first to fourth with long hairs; fifthe sternite v-shaped, deeply cleft and with few bristles and hairs laterally on arms; first genital segment brownish black but without marginal bristles; apical plate of paraphallus almost straight and blunt at end; lateral plate of paraphallus well differentiated.

Distribution : India : Uttarakhand (Haridwar).

Elsewhere : Nil.

Tribe **Sarcophagini** Macquart
Key to Subtribes

1. Penis very large, slightly sclerotised and vesiculate; lateral plate of paraphallus ill-developed ..... **Seniorwhiteina** Rohdendorf
– Penis short, heavily sclerotised; lateral plate of paraphallus well developed 2
2. Apical part of paraphallus always large, clearly demarcated, sclerotised and often bearing many processes or protubearances; propleura sometimes setiferous; post abdomen sometimes light coloured; lateral plate of paraphallus usually well developed, often intricately constructed and erect; basal part of styli coiled ..... **Parasarcophagina** Rohdendorf
– Apical part of paraphallus with long, slender more or less cylindrical processes which are more delicate than basal part; propleura bare; post abdomen always black; lateral plate of paraphallus in the form of short hamate process; basal part of styli straight ..... **Harpagophallina** Rohdendorf

Subtribe **Parasarcophagina** Rohdendorf
Key to Genera

1. Upper part of propleura covered with black hairs, often rather densely so 2
– Upper part of propleura bare 4
2. Presutural ac bristles distinct; fourth abdominal sternite of male with a dark spots and short black bristles 3

- Presutural ac bristles wanting; fourth abdominal sternite of male without dark spots ..... ***Boettcherisca*** Rohdendorf

3. Paraphallus very massive and not claw-shaped; lateral plate of paraphallus blunt; styli of glans slender and long .... ***Fengia*** Rohdendorf

- Paraphallus very slender and claw-shaped; lateral plate of paraphallus short and extending towards each other; stylii of glans short ..... ***Sarcosolomonia*** Baranov

4. Paraphallus very large and longer than theca; lateral plate of paraphallus with a pair of very large sharp forward protruding processes; apical part of paraphallus small, but clearly demarcated, extending forward but without lateral process .... ***Bercaea*** Robineau- Desvoidy

- Paraphallus rarely longer than theca; lateral plate of paraphallus varied in structure and not clearly demarcated but with long lateral process; apical part of paraphallus well demarcated with slender process 5

5. Third abdominal tergite normally without long bristles in the middle of posterior margin; apical part of paraphallus always small ....***Parasarcophaga*** Johnston and Tiegs

- Third abdominal tergite with long erect bristles in the middle of posterior margin; apical part of paraphallus very large .... ***Lioproctia*** Enderlein

Genus ***Bercaea*** Robineau-Desvoidy

1863. *Bercaea* Robineau-Desvoidy, *Hist. nat. Dipt.* Paris, 2 : 549.

Type species : *Musca haemorrhoidalis* Fallen, 1817 (preoccupied) (= *Sarcophaga cruentata* Meigen, 1826.).

3. *Bercaea cruentata* (Meigen)

1826. *Sarcophaga cruentata* Meigen, *Syst. Beschr. europ. zweifl. Insekt*, **5** : 28; Kano and Shinonaga. 1994. *Jap. J. sanit. Zool.*, **45** : 270.

1986. *Bercaea cruentata* : Verves, *Cat. Palae. Dipt.*, **12** : 159; Pape.

1991. *Jap. J. Ent.*, **59**(1) : 213; Nandi., 1992. *J. Beng. Nat. Hist. Soc.*, **11**(2) : 35.

Material examined : 2♀♀ 2♂♂, Khirakot, Bageshwar dist., 25.ix.03, coll. B. Mitra.

Diagnosis : Width of frons about three-fifth that of one eye; frontal vitta black, its width at narrowest point of frons about twice that of each parafrontal; parafrontal and parafacial black with golden pollen, the former with short scattered black hairs, the latter with a row of 4-5 short black hairs near the eye margin; antennae dark brown; first segment black, second blackish, third dark brown with silvery pollen and about two and half times that of the second; arista long; plumose along more than basal half; facial ridge black with golden pollen; vibrissae long, post gena black; ocellar triangle black with long hairs ; palpi slender and black; proboscis black; thorax grey with yellowish pollen and three black longitudinal stripes; wings hyaline with brown veins; basicostal scale light brown; squama creamy white; haltere brown;legs black; fore femur with a pair of rows of long bristles along posterodorsal surface and a row of bristles along posterior margin of ventral surface; abdomen black with silvery checkered pattern; first genital segment light brown with 2-3 pairs of marginal bristles and long hairs; inner forceps long, curved, pointed at apex, slightly grooved posteriorly and with tuft of long hairs along basal half; outer forceps short and its apex rounded and hairy; anterior paramere wide, long and pointed at apex but without short hairs on outer side; posterior paramere short, pointed at apex and with 2 short subapical hairs; theca very short; paraphallus very long, heavily sclerotised but blunt at end, its lateral process short, curved and pointed; lateral plate of paraphallus forms a single pair of forwarding processes; styli of glans long and curved; ventral large and pointed at apex.

Distribution : India : Uttarakhand (Dehradun, Bageshwar),Arunachal Pradesh, Assam. Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, and West Bengal.

Elsewhere : Bhutan; Nepal; Pakistan; Afghanistan; Albania; Algeria; Angola; Argentina; Armenia; Australia; Austria; Azerbaijan; Azores; Belgium; Brazil; Botswana; Bulgaria; Byelorussia; California; Cameroon; Canada; Canary Islands;

China; Costa Rica; Cuba; Cyprus; Czech Republic; Denmark; Easter Islands; Egypt; Ethiopia; France; Georgia; Germany; Great Britain; Greece; Gruzia; Hawaiian Islands; Hungary; Illinois; Iran; Iraq; Ireland; Israel; Italy; Japan; Kazakhstan; Korea; Kyrgyzstan; Latvia; Lebanon; Libya; Lithuania; Luxembourg; Madagascar; Madeira Islands; Malta; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Morocco; Mozambique; Netherlands; Norway; Paraguay; Poland; Portugal; Réunion Island; Romania; Russia; Saudi Arabia; Serbia; Seychelles; Slovakia; Spain; St. Helena; Sweden; Switzerland; Syria; Tajkisthan; Texas; Tunisia; Turkey; Turkmenistan; Ukraine; United Kingdom; Uzbekistan and Yemen.

Genus ***Boettcherisca*** Rohdendorf

1937. *Boettcherisca* Rohdendorf, *Fauna USSR, Dipt.*, **19**(1) : 270.

Type species : *Myophora peregrina* Robineau-Desvoidy, 1830.

4. ***Boettcherisca peregrina*** (Robineau-Desvoidy)

1830. *Myophora peregrina* Robineau-Desvoidy, *Mem pres. div. Sav. Acad. Sci. Inst. Fr.*, (2)2 : 356.

1994. *Sarcophaga peregrina* : Kano and Shinonaga, *Jap. J. sanit. Zool.*, **45** : 263.

Material examined : 5♂♂ 2♀♀, Tanakpur, Champawat dist., 13.ix.04, coll. B. Mitra.

Diagnosis : Width of frons about two-fifths that of one eye; frontal vitta black, parafrontal and parafacial black with silvery to golden pollen, the former with short scattered black hairs, the latter with a row of black hairs, near the eye margin; antennae blackish-brown, first and second segments black, third brown with whitish pollen and about two and half times that of the second; arista long, plumose along basal two-thirds; facial ridge black with white pollen; vibrissae long, post gena black with numerous black hairs; palpi slender and dark brown; proboscis black; thorax blackish silvery to golden pollen and with three black longitudinal stripes; wings hyaline with brown veins; squama whitish; haltere brown; legs black; abdomen black with silvery chekered pattern; first genital segment black with black hairs, second blackish-brown with black hairs but without marginal bristles; inner forceps blunt at apex and with many lateral subapical spines; outer forceps almost triangular, broad at apex and with hairs along distal half; anterior paramere with pointed apex but without flap; posterior paramere slightly curved at apex with two subapical hairs; theca shorter than paraphallus, both are sclerotised; apical plate of paraphallus curved, pointed at apex and with a pair of long wide slender lateral processes; lateral plate of paraphallus well developed with a pair of short, two-pointed equal lateral processes; styli of glans with a median and two lateral processes; ventralia bilobed, spinous and with a membranous projection at the anterior margin of each lobe.

Distribution : India : Uttarakhand (Champawat, Dehradun), Andaman & Nicobar Islands, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Manipur, Meghalya, Nagaland, Orissa, Sikkim, Tamil Nadu, Tripura, West Bengal, Dadra & Nagar Haveli, Pondicherry.

Elsewhere : Bangladesh; Bhutan; Myanmar; Nepal; Sri Lanka; Australia; Bonin Islands; Borneo; Fiji; Gilbert Islands; Guam; Hainan Island; Hawaiian Islands; Indonesia(Java); Japan (including Ryukyu Islands); Kirbati; Korea; Madagascar; Malaysia; Mariana Islands; Mauritania; Mauritius; New Britain; New Zealand; Norfolk Island; Ogasawara (Gunto Island); Papua New Guinea; Polynesia (Society Islands); Samoa; Russia; Seychelles; Singapore; China; Taiwan; Thailand and Volcano Islands.

Genus ***Fengia*** Rohdendorf

1964. *Fengia* Rohdendorf, *Ent. Obozr.*, **43**(1) : 83; Fan, 1965, *Synan. flies China*, **15** : 247.

Type species : *Sarcophaga ostindicae* Senior-White, 1924.

5. ***Fengia ostindicae*** (Senior-White)

1924. *Sarcophaga ostindicae* Senior-White, *Rec. Indian Mus.*, **26**(3) : 233; Senior-White, Aubertin and Smart 1940, *Fauna Br. India, Dipt.*, **6** : 235.

1965. *Fengia ostindicae* : Rohdendorf, *Ent. Obozr.*, **44**(3) 695; Nandi, 1989, *J. Beng. nat. Hist. Soc.*, **8**(1) : 30.

Material examined : 1♂ 2♀♀, Kaulagarh, Dehradun dist., 20. xi.05, coll. B. Mitra.

Diagnosis : Width of frons about two-fifths that of one eye; frontal vitta brownish, its width at narrowest point of frons about more than twice that of each parafrontal; parafrontal and parafacial brownish-black with silvery pollen, antennae brownish-black; palpi slender; proboscis black; thorax black with three black longitudinal stripes; wings hyaline with brown veins; legs black; abdomen black with silvery checkered pattern; first genital segment brown, second brownish-black with short hairs; inner forceps elongated, curved at end and with numerous hairs on outer side apically; outer forceps oval with short hairs; anterior paramere beak-like, abruptly curved and with pointed at end; posterior paramere short, slender and gradually curved at end; theca shorter than paraphallus, both are sclerotised; apical plate of paraphallus wide, strongly sclerotised, blunt at end but without process; lateral plate of paraphallus slightly membranous and blunt at end; styli of glans slender, long, curved at end, without serration and crosses the apical plate of paraphallus; ventralia well developed, membranous, without serration and provided with lobes.

Distribution : India : Uttarakhand (Dehradun), Mizoram.

Elsewhere : China; Hainan Island and Taiwan.

Genus ***Lioproctia*** Enderlein

1928. *Lioproctia* Enderlein, *Arch. klassif. phylogen. Ent.*, **1**(1) : 26.

Type species : *Lioproctia aurifrons* Doleschall, 1858, sensu Enderlein, 1928 (=*Lioproctia enderleini* Kano and Lopes, 1970). 1959.

Type species : *Sarcophaga kappa* Johnston and Tiegs, 1921.

Sub genus ***Lioproctia*** Enderlein, 1928

6. ***Lioproctia (s. str.) annandalei*** (Senior-White)

1924. *Sarcophaga annandalei* Senior-White, *Rec. Indian Mus.*, **26**(3) : 233.

1995. *Lioproctia (s. str.) annandalei* : Nandi, *J. Beng. nat. Hist.Soc.*, **14**(1) : 53.

Diagnosis : Width of frons about three-fourths that of one eye; frontal vitta black, its width at narrowest point of frons about less than half that of each parafrontal; parafrontal and parafacial black with silvery pollen, the former with short scattered hairs, the latter with a row of hair near the eye margin; antennae brownish-black and reaching up to about 0.85 distance to vibrissae, first and second segments blackish-brown, third brown with silvery pollen and about four times that of the second; arista long, plumose along basal three-fifths; facial ridge black with silvery pollen; vibrissae long, distance between vibrissae less than twice that of one parafacial width; frontal bristles 13, posterior 3 reclinate, anterior 4 below base of antennae and reaching up to about two-thirds of second antennal segment, rest cruciate and directed forwards; gena black with brownish hairs; post gena black with short silvery hairs; ocellar triangle black with long hairs; outer vertical bristle short, inner vertical well developed, post vertical half the length of inner vertical; ocellar and postocellar bristles short; postocellar less than half of inner vertical; a row of regular postocular setae besides postocular cilia, rest of the area with long silvery hairs; palpi long, black; proboscis short and black; thorax greyish with three black longitudinal stripes; wings hyaline with brown veins; basicostal scale yellowish; squama white; haltere brown; legs black; abdomen black with silvery checkered pattern; first genital segment grey, second brownish-black but both without marginal bristles; inner forceps curved with scattered short spines on much of its distal half and with dense hairs along basal half; outer forceps almost triangular; anterior paramere wide, slightly grooved at distal end and with lateral wide process on the inner margin and short hairs on the outer margin; posterior paramere almost straight, sharply pointed at end and with 1 long and 1 short hair; theca almost equal to paraphallus, both are sclerotised; apical plate of paraphallus without groove, slightly curved, blind, almost obtuse at the apex and mostly membranous; lateral plate of paraphallus sclerotised with 2 short unequal pointed processes; styli of glans long, stout and wide at end; ventralia membranous, small and bilobed.

Distribution : India : Uttarakhand (Dehra Dun), Bihar, Gujarat, Tamil Nadu, and West Bengal.

Elsewhere : Sri Lanka.

Genus ***Parasarcophaga*** Johnston and Tiegs

1921. *Parasarcophaga* Johnston and Tiegs, *Proc. R. Soc. Qd.*, **33**(4) : 86.

Type species : *Sarcophaga omega* Johnston and Tiegs, 1921 (= *Sarcophaga sericea* Walker, 1852).

Key to the Subgenera

1. Apical plate of paraphallus with clearly separate median portion and a pair of lateral process ..... ***Thomsonea*** Rohdendorf
- Apical plate of paraphallus with almost no median section and without a pair of lateral process 2
2. Lateral plate of paraphallus in the form of lamellate hook-shaped process 3
- Lateral plate of paraphallus in the form of unpaired pedunculate process .... ***Parasarcophaga*** Johnston & Teigs
4. Lateral plate of paraphallus rudimentary; posterior part of penis membranous owing to division along median line of basal part of paraphallus; lateral processes of apical part of paraphallus with sharp teeth extending forward .....***Liopygia*** Enderlein
- Lateral plate of paraphallus well developed; posterior part of penis invariably sclerotised; lateral processes of apical part of paraphallus without teeth extending forard .....***Liosarcophaga*** Enderlein

Subgenus ***Liopygia*** Enderlein, 1928

7. ***Parasarcophaga (Liopygia) ruficornis*** (Fabricius)

1794. *Musca ruficornis* Fabricius, *Ent. Syst.*, 4 : 314.

1963. *Parasarcophaga (Liopygia) ruficornis* : Rohdendorf, *Stuttg. Beitr. Naturk.*, 124 : 9; Nandi, 1992, *J. Beng. nat. Hist. Soc.*, 11(2) : 36.

Material examined : 4♂♂ 1♀, Khatima, Udham Singh Nagar dist., 29.ix.04, coll. B. Mitra.

Diagnosis : Width of frons about two-fifths that of one eye; frontal vitta black; antennae orange; arista long, plumose along basal half; palpi slender, proboscis short and brownish-black; thorax black, silvery pollen and with three black longitudinal stripes; wings hyaline with brown veins; squama whitish; haltere brown; legs balck; abdomen black with silvery checkered pattern; first genital segment blackish with 3 pairs of marginal bristles, second with black hairs but without any marginal bristles, penis with membranous bulbous portion in between theca and paraphallus; inner forceps densely covered with long hairs and ending in an acute point at the end; outer forceps somewhat oval; anterior paramere bent, pointed at end and with short hairs along posterior margin; posterior paramere curved, pointed at end and with 1 short hair, theca shorter than paraphallus, both are sclerotised; apical plate of paraphallus not sclerotised but composed of two plates, one of which with a backwardly projecting spines; lateral plate of paraphallus small and serrated anteriorly; styli of glans well developed, divided into a pointed membranous portion and another having a rosette-like structure; ventralia bulbous , much sclerotised at end and with a long stalk and a subbasal spinous portion.

Distribution : India : Uttarakhand (Udham Singh Nagar, Dehradun), Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Delhi,Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Meghalaya, Madhya Pradesh, Mizoram, Maharashtra, Manipur, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu, West Bengal, Dadra and Nagar Haveli, Pondicherry and Lakshadweep.

Elsewhere : Bangladesh; Bhutan; Nepal; Pakistan; Sri Lanka; Borneo; Botswana, Brazil; Canada; Guam; Hainan Island; Hawaiian Islands; Japan (including Ryukyu Islands); Korea; Madagascar; Malaysia; Mariana Islands; Moluccas Islands; Myanmar; Nigeria; Panama; Papua New Guinea; Philippines; Saudi Arabia; Singapore; Socotra Island; South Africa; Taiwan; Thailand; Uganda; USA; Western Samoa and Zaire.

Subgenus ***Liosarcophaga*** Enderlein, 1928

Key to the Species

1. Ventralia strongly curved; lateral plate of paraphallus wide and blunt at end .... *sarupi* Nandi
- Ventralia almost straight; lateral plate of paraphallus narrow and pointed at end ... 2
2. Posterior paramere widened at subterminal end; ventralia and lateral plate of paraphallus almost uniform throughout and elongated ..... *harpax* (Pandelle)

- Posterior paramere widened medially; ventralia and lateral plate of paraphallus widened medially and abruptly pointed .... *dux* (Thomson)

8. *Parasarcophaga (Liosarcophaga) dux* (Thomson)

1869. *Sarcophaga dux* Thomson, *K. sevenska Vetensk Akad. fregatten Eugenies resa omkring jorden*, 2(1) : 534; Kano and Shinonaga, 1994, *Jap.J.sanit. Zool.*, 45 : 259.

1977. *Parasarcophaga (Liosarcophaga) dux* : Nandi, *Rec. zool. Surv. India*, 73 : 214; Nandi 1992. *J. Beng. nat. Hist. Soc.*, 11(2) : 37.

Material examined : 3♂♂ 2♀♀, Tanakpur, Champawat dist., 13.ix.04, coll. B. Mitra; 1♂ 2♀♀, Kalika, Pithoragarh dist., 26.ix.04, coll. B. Mitra.

Distribution : India : Uttarakhand (Champawat, Pithoragarh, Dehradun), Andaman & Nicobar Islands, Assam, Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Madhya Pradesh, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Bangla Desh; Bhutan; Nepal, Pakistan; Myanmar; Sri Lanka; Albania; Australia; Austria; Azerbaijan; Azores; Bismarck Archipelago; Bonin Islands; Borneo; Bulgaria; Cape Verde Islands; Caroline Islands; China; Czech Republic; Denmark; Egypt; Fiji; Finland; France; Germany; Great Britain, Greece; Gruzia; Guam; Hainan Islands; Hawaiian Islands; Hungary; Indonesia (Irian Jaya); Israel; Italy; Japan; Kazakhstan; Kirbati; Madagascar; Malta; Mariana Islands; Micronesia; Mongolia; New Guinea; Niue; Palau; Philippines; Poland; Pitcairn Islands; Romania; Russia; Serbia; Singapore; Slovakia; South Korea; Spain; Sweden; Switzerland; Taiwan; Tajikistan; Thailand; Ukraine.; Uzbekistan; Wake Islands and Western Samoa.

9. *Parasarcophaga (Liosarcophaga) harpax* (Pandelle)

1896. *Parasarcophaga harpax* Pandelle, *Revta Ent.*, 15 : 189.

1962. *Parasarcophaga harpax* : Park, *Korean J. Zool.*, 5(2) : 3, Kano, Field and Shinonaga, 1967, *Fauna Japonica*, Sarcophagidae : 52; Mihalyi, 1979, *Fauna Hung. Dipt.*, 15(16) : 131.

Distribution : India : Andhra Pradesh, Bihar, Orissa, Uttarakhand (Haridwar), West Bengal.

Elsewhere : Bangladesh; Sri Lanka; Austria; Azerbaijan; Bulgaria; Byelorussia; China; Czech Republic; Fiji; France; Germany; Gruzia; Guam; Hawaiian Islands; Hungary; Japan; Kazakhstan; Korea; Moldova; Mongolia; Namibia; New York; Philippines; Poland; Romania; Russia; Samoa; Serbia; Singapore; Slovakia; Taiwan; Tajikistan and Ukraine.

*10. *Parasarcophaga (Liosarcophaga) sarupi* Nandi

1979. *Parasarcophaga (Liosarcophaga) sarupi* Nandi, *Orient. Insects*, 13(1-2) 191; Nandi, 1992, *J. Beng. Nat. Hist. Soc.*, 11(2) : 37.

Distribution : India : Uttarakhand (Bageshwar, Nainital), Meghalaya, Mizoram.

Elsewher : Nil.

Subgenus ***Parasarcophaga*** Johnston & Tiegs, 1921

Key to the Species

1. Hind tibia with bristles on anteroventral surface in addition to long villosity 3
- Hind tibia without bristles on anteroventral surface in addition to long villosity 2
2. Body colour greyish; apical plate of paraphallus slender and sharply pointed at end ..... *sericea* (Walker)
- Body colour brown; apical plate of paraphallus broad and blunt at end .... *hirtipes* (Wiedemann)
3. Apical plate of paraphallus long and sharply pointed at end; inner forceps moderately stout and broad 4
- Apical plate of paraphallus short and almost blunt at end; inner forceps long and slender ..... *misera* (Walker)
4. Middle part of inner forceps without protuberance but with spines at the inner surface of subapical end .... *albiceps* (Meigen)
- Middle part of inner forceps with large protuberance and spines at the inner surface of subapical end .... *macroauriculata* (Ho)

11. ***Parasarcophaga (s. str.) albiceps*** (Meigen)

1826. *Sarcophaga albiceps* Meigen, *Syst. Beschr. zweifl. Insekt.*, **5** : 22, Kano and Shinonga, 1994, *Jap. J. sanit. Zool.*, **45** : 256.

1992. *Parasarcophaga (s. str.) albiceps* : Nandi, *J. Beng. Nat. Hist. Soc.*, **11**(2) : 38.

Material examined : 3♂♂ 4♀♀, Kanda, Bageshwar dist., 29.ix.03, coll. B. Mitra.

Distribution : India : Uttarakhand (Dehradun, Bageshwar), Andaman & Nicobar Islands, Assam, Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Bangladesh; Bhutan; Nepal, Pakistan; Myanmar; Sri Lanka; Albania; Armenia; Australia; Austria; Azerbaijan; Belgium; Borneo; Bulgaria; Byelorussia; China; Czech Republic; Finland; France; Germany; Great Britain, Greece; Gruzia; Hawaiian Islands; Hungary; Indonesia (Java); Ireland; Israel; Italy; Japan; Kazakhstan; Kore; Latvia; Malaysia; Moldova; New Britain; New Guinea; Norway; Philippines; Poland; Pitcairn Islands; Romania; Russia; Serbia; Singapore; Slovakia; Solomon Islands;Sweden; Switzerland; Taiwan; Thailand; Turkey; Ukraine and United Kingdom.

12. ***Parasarcophaga (s. str.) hirtipes*** (Wiedemann)

1830. *Sarcophaga hirtipes* Wiedemann, *Aussereurop. zweifl. Insekt.*, **2** : 361.

1972. *Sarcophaga (Parasarcophaga) hirtipes* : Zumpt, *Explor. Parc natn. Virunga*, **101** : 79.

Distribution : India : Uttarakhand (?), Andaman & Nicobar Islands; Andhra Pradesh, Bihar, Delhi, Gujarat, Karnataka, Kerala, Madhya Pradesh, Punjab, Maharashtra, Rajasthan, Tamil Nadu, West Bengal.

Elsewhere : Bangladesh; Pakistan; Afganisthan; Algeria; Angola; Arabia; Azerbaijan; Botswana; Bulgaria; China; Egypt; Gambia; Guinea; Iran; Iraq; Israel; Jordan; Kazakhstan; Kenya; Kyrgyzstan; Lebanon; Liberia; Morocco; Namibia; Russia; Saudi Arabia; Senegal; South Africa; Sudan; Syria; Tajikistan; Tanzania; Turkey; Turkmenistan; Uganda; Uzbekistan; Zaire; Zambia and Zimbabwe.

13. ***Parasarcophaga (s. str.) macroauriculata*** (Ho)

1932. *Sarcophaga macroauriculata* Ho, *Bull. Fan meml Inst.Biol.*, **3**(1) : 347; Kano and Shinonaga, 1994, *Jap. J. sanit. Zool.*, **45** : 259.

1967. *Parasarcophaga macroauriculata* : Kano, Field and Shinonaga, *Fauna Japonica*, Sarcophagidae : 45.

Distribution : India : Manipur, Meghalaya, Nagaland, Sikkim, Uttarakhand (Bageshwar) and West Bengal.

Elsewhere : Nepal; Pakistan; China; Japan; Korea and Russia.

14. ***Parasarcophaga (s.str.) misera*** (Walker)

1849. *Sarcophaga misera* Walker, *List. dipt. Br. Mus.*, **4** : 829; Kano and Shinonaga, 1994. *Jap. J. Sanit, Zool.*, **45**; 257.

1979. *Parasarcophaga (s. str.) misera* : Lopes and Kano, *Revta bras. Biol.*, **39**(2) : 309; Nandi, 1992, *J. Beng. Nat. Hist. Soc.*, **11**(2) : 38.

Distribution : India : Uttarakhand (Dehradun), Andaman & Nicobar Islands, Assam, Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa,Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh; Bhutan; Myanmar; Nepal; Pakistan; Sri Lanka; Afghanistan; Australia; Bonin Islands; Borneo; Caroline Islands; China; Hainan Island; Indonesia (Irian Jaya, Maluku); Iran; Japan (including Ryukyu Islands); Kiribati; Korea; Malaysia; Mariana Islands; Marshall Islands; New Caledonia, New Guinea; New Hebrides; Papua New Guinea; Philippines; Samoa; Singapore; South Korea; Sumatra; Taiwan and Thailand.

15. ***Parasarcophaga (Parasarcophaga) sericea*** (Walker)

1852. *Sarcophaga sericea* Walker, *Ins. Saunders. Dipt.*, **4** : 326; Kano and Shinonaga,1994. *Jap. J. sanit. Zool.*, **45** : 258.

1979. *Parasarcophaga (s. str.) sericea* : Lopes and Kano, *Revta bras. Biol.*, **39**(2) : 307, Verves, 1986, *Cat palae. Dipt.*, **12** : 171; Lopes, 1989 *Cat. Dipt. Aust. and Oceanian Regions*, **86** : 728; Nandi, 1992, *J. Beng. nat. Hist. Soc.*, **11**(2) : 38.

Material examined : 5♂♂, Kanda, Bageshwar dist., 27.ix.03, coll. B. Mitra.

Distribution : India : Uttarakhand (Bageshwar, Dehradun), Andaman & Nicobar Islands, Assam, Andhra Pradesh, Bihar, Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Bangla Desh; Bhutan; Myanmar; Nepal; Pakistan; Sri Lanka; Australia; Borneo; Caroline Islands; China (Kwangtung); East Indies; Guam; Hainan Island; Indonesia; Irian Jaya; Korea; Malaysia; Mariana Islands; Marshall Islands; Micronesia; Papua New Guinea; Philippines; Pitcairn Islands; Russia; Singapore; Society Islands; Taiwan, Thailand and Western Samoa.

Subgenus ***Thomsonea*** Rhodendorf, 1937

16. ***Parasarcophaga (Thomsonea) argyrostoma*** (Robineau-Desvoidy)

1830. *Myophora argyrostoma* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.*, (2)2 : 340.

1978. *Parasarcophaga argyrostoma* : Draber-Monko, *Fragm. faun. Warsz.*, **19**(7) : 201; Mihalyi, 1979, *Fauna Hung. Dipt.*, **15**(6) : 129.

Diagnosis : Width of frons about half that of one eye; frontal vitta black, antennae black, dark brown, silvery pollen, first and second segments reddish-brown, third brownish-black and about two and half times that of the second; arista long, plumose along basal two-thirds; genae black with black hairs; thorax grey black with three black longitudinal stripes; wings hyaline with brown veins; R1 bare; legs black; abdomen black with grey checkered pattern; median marginal bristles on second and third abdominal tergites absent, fifth sternite Y-shaped with wide transparent window and strong marginal spines laterally and short hairs terminally on arms; first and second genital segments black with short hairs but without marginal bristles; ventralia bilobed and well developed.

Distribution : India : Uttarakhand (Dehradun) Gujarat, Haryana and Rajasthan.

Elsewhere : Pakistan; Afghanistan; Albania; Argentina; Armenia; Australia; Austria; Azerbaijan; Azores; Belgium; Bermuda; Brazil; Bulgaria; California; Canada; China; Cuba; Cyprus; Czech Republic; Denmark; Egypt; France; Germany; Great Britain; Greece; Gruzia; Hawaiian Islands; Hungary; Iran; Iraq; Israel; Italy; Kazakhastan; Kyrgyzstan; Marshall Islands; Moldova; Mongolia; Poland; Portugal; Romania; Russia; Saudi Arabia; Serbia; Slovakia; South Africa; Spain; St. Helena; Syria; Tajikistan; Texus; Tunisia; Turkey; Turkmenistan; Ukaraine; United Kingdom; USA; Uzbekisatan and Wake Island.

Genus ***Sarcosolomonia*** Baranov

1934. *Sarcosolomonia* Baranov *Zagreb Vet.Arch.*, **8**(4) : 173.

Type species : *Sarcosolomonia tulagiensis* Baranov, 1938.

Subgenus ***Parkerimyia*** Lopes and Kano,1969

Key to the Species

1. Ventralia square-shaped and single .... *kaushanensis* Nandi
– Ventralia elongated and trilobed..... ..... *nathani* Lopes and Kano

17. ***Sarcosolomonia (Parkerimyia) kaushanensis*** Nandi

1990. *Sarcosolomonia (Parkerimyia) kaushanensis* Nandi, *J. Beng. nat. Hist. Soc.*, **9**(1) : 22.

Distribution : India : Uttarakhand (Bageshwar).

18. ***Sarcosolomonia (Parkerimyia) nathani*** Lopes and Kano

1969. *Sarcosolomonia (Parkerimyia) nathani* Lopes and Kano, *Pacif. Insects*, **11**(1) : 184; Lopes, Kano, Shinonaga and Kurahashi, 1977, *Cat. Dipt. Orient. Region*, **3** : 575; Nandi, 1990, *J. Beng. nat. Hist. Soc.*, **9**(1) : 24.

1984. *Sarcophaga nathani* : Sugiyama and Kano, *Jap. J. Sanit. Zool.*, **35**(4) : 350.

Distribution : India : dMadhya Pradesh , Orissa, Tamil Nadu, Uttarakhand (Haridwar) and West Bengal.

Subtribe **Harpagophallina** Rhondendorf

Genus *Iranihindia* Rohdendorf

1961. *Iranihindia* Rohdendorf, *Stuttg. Beitr. Naturk.*, **58**(3) : 2; Nandi, 1979, *Orient. Insects*, **13**(1-2) : 201.

Type species : *Sarcophaga futilis* Senior-White, 1924.

Diagnosis : Third antennal segment long and about 3 times or more than that of the second; upper part of propleura bare; *dc* 5+5 (posterior 3 post *dc* short); setae on middle legs well developed; abdominal tegites with long hairs or with short and stout bristles; fifth sternite with window; genital segments without bristles; inner forceps deeply cleft in the middle, bearing large hump at the base and with spines apically; theca shorter than paraphallus; apical plate of paraphallus long with a pair of posteriorly bent armature-shaped membranous and transparent processes, the basal process simple and flap-like; lateral plate of paraphallus with 3 short sharp hooks and processes; styli of glans long and extending distally; ventralia short and serrated.

Key to the Species

1. Third abdominal tergite with strong marginal bristles; styli of glans long and blunt 2
– Third abdominal tergite without or with weak median marginal bristles; styli of glans short and pointed ..... (Senior-White)
2. Styli of glans long and slender .... *martellatoides* (Barranov)
– Styli of glans short, not very slender .... *futilis*(Senior-White)

19. *Iranihindia futilis* (Senior-White)

1924. *Sarcophaga futilis* Senior-White, *Rec. Indian Mus.* **26**(3) : 246; Senior-White, Aubertin and Smart, 1940, *Fauna Br. India, Dipt.*, **6** : 257.

1961. *Iranihindia futilis* : Rohdendorf, *Stuttg. Beitr.Naturk.*, **58** : 2; Nandi, 1979, *Orient. Insects*, **13**(1-2); 206; Nandi, 1992, *Hexapoda*, **4**(1) : 76.

Distribution : India : Uttarakhand (Dehradun), Assam, Andhra Pradesh, Bihar, Chhatishgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra,Mizoram, Orissa, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Myanmar; Pakistan; Sri Lanka.

20. *Iranihindia martellata* (Senior-White)

1924. *Sarcophaga martellata* Senior-White, *Rec. Indian Mus.*, **26**(3) : 247; Senior-White, Aubertin and Smart, 1940, *Fauna Br. India, Dipt.*, **6** : 258; Kano and Shinonaga, 1994, *Jap. J. sanit. Zool.*, **45** : 268.

1961. *Iranihindia martellata* : Rohdendorf, *Stuttg, Beitr. Naturk.*, **58**(3) ; 2 Nandi, 1979. *Orient. Insects*, **13**(1-2) : 202.

Distribution : India : Uttarakhand (Dehra Dun), Andhra Pradesh, Assam, Bihar, Chhatisgarh, Gujarat, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Nagaland, Mizoram, Orissa, Tamil Nadu, Tripura, West Bengal.

Elsewhere : Nepal and Sri Lanka.

21. *Iranihindia martellatoides* (Baranov)

1931. *Sarcophaga martellatoides* Baranov, *Konowia*, (2) **10** : 14; Senior-White, Aubertin and Smart, 1940, *Fauna Br. India, Dipt.*, **6** : 259.

1961. *Iranihindia martellatoides* : Rohdendorf, *Stuttg. Beitr. Naturk*, **58**(3) : 2; Nandi, 1979. *Orient. Insects*, **13** (1-2) : 209; Nandi, 1992, *Hexapoda*, **4**(1) : 77.

Distribution : India : Uttarakhand (Dehradun), Bihar, Madhya Pradesh, Orissa, Uttar Pradesh, West Bengal.

Elsewhere : Sri Lanka.

Genus ***Seniorwhitea*** Rohdendorf, 1937.

1937. *Seniorwhitea* Rohdendorf, Fauna *USSR, Dipt.*, **19**(1) : 297; Lopes, 1964. *Mems Inst. Oswaldo Cruz*, **62**(2) 162. Type species : *Sarcophaga orientaloides* Senior-White, 1924 (= *Sarcophaga reciproca* Walker, 1856).

Diagnosis : Antennae long, third segment long, slender and about two and half to three times that of the second; arista long, plumose along basal half; R1 bare; ac 0+1; postsutural *dc* 4 or 5; inner forceps long and pointed with a preapical tuft of hairs; propleura bare; paraphallus with distinct theca; apical plate of paraphallus extensively membranous or with a membranous cylindrical apical process and always with conspicuous projections; lateral plate of paraphallus ill-developed, chitinous and well pigmented; ventralia small and chitinous, styli of glans directed anteriorly; genital segments without bristles; penis very large, slightly sclerotised and vesiculate.

22. *Seniorwhitea reciproca* (Walker)

1856. *Sarcophaga reciproca* Walker, *J. Proc. Linn. Soc. Lond., Zool.*, **1** : 22.

1984. *Harpagophalla reciproca* : Sugiyama and Kano, *Jap. J. sanit. Zool.*, **35**(4) : 349.

Diagnosis : Width of frons about one-third that of one eye; frontal vitta black, slightly diverging below; antennae brown, first segment brownish-black, second black and reddish at tip, third brown with silvery pollen and about three times that of the second; arista long, plumose along basal two-thirds; thorax grey with three black longitudinal stripes; wings hyaline with brown veins; R1 bare; legs black; abdomen black with silvery checkered pattern; fifth sternite v shaped with short hairs laterally and short spines apically on arms; first genital segment brownish-black with short hairs, second black with long hairs.

Distribution : India : Uttarakhand (Dehradun) Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Bhutan; Myanmar; Nepal; Pakistan; Sri Lanka; China; France; Hainan Island; Hawaiian Islands; Indonesia; Laos; Malaysia; Singapore; Taiwan and Thailand.

SUMMARY

The Sarcophagidae of Uttarakhand are represented by 22 species which is approximately 13.86% of the Indian sarcophagid fauna. The district of Dehradun can boast of harbouring the highest number of species (68.18%) as well as the highest number of genera (80%) probably because of the high densityof human population and habitation. Bageshwar follows second with 27.27% of the species and 30% of the genera. The district of Champawat harbours 13.63% species and 30% of the genera followed by Nainital and Haridwar with 9.09%of the species and 20% of the genera. All the three districts of Almora, Udham Singh Nagar Tehri Garhwal and Pithoragarh hosts 4.15% of the species and 10%of the genera of Uttarakhand Sarcophagidae. (Map 1.)

Of the 13 districts of the state, 9 districts harbour the Sarcophagids with Dehradun showing the maximum diversity, and the sarcophagids go unrepresented in the districts of Chamoli, Rudraprayag, Pauri Garhwal, and Uttarkashi. Distribution records of these 22 species shows that 3 species *Blaesoxipha (B)rishikeshi* Nandi, *Sarcosolomonia (Parkerimyia) kaushanensis* Nandi and *Parasarcophaga (Liosarcophaga) sarupi* Nandi is endemic to the state. *Ravinia pernix* (Harris) and *Bercaea cruentata* (Meigen) are reported mostly from the north, north west and north east and eastern India but are not recorded from the southern India. Contrastingly both species are quite well distributed over the Oriental and Palaearctic regions, the latter actually being cosmopolitan in distribution. *Boettcherisca peregrina* (Robineau-Desvoidy) is well distributed all over India as well as in the Oriental, Autralasian, Palaearctic and Afrotropical regions. *Fengia ostindicae* (Senior-White), is distributed over the north east hills and northwest Himalayas while *Lioproctia (Lioproctia) annandalei* (Senior-White) over the eastern and western India but both are restricted within the Oriental region. Almost all the species of the genus *Parasarcophaga* barring one (endemic to Uttarakhand) are well distributed over India and all the zoogeographic regions. All the three species of the genus *Iranihindia futilis* (Senior-White), *Iranihindia martellata* (Senior-White) and *Iranihindia martellatoides* (Baranov) are well distributed in India but are limited to the Oriental region, while *Seniorwhitea reciproca* (Walker) is well distributed in India as well as in the Oriental region and parts of Palaearctic region.

Withal the present communication reports 22 species under 10 genera belonging to 1 subfamily, 3 tribes and 3 subtribes of the family Sarcophagidae from the newly born state of Uttarakhand. Keys to the tribes, subtribes, genera,subgenera, and species as well as diagnosis (wherever relevant) have been included along with

the detailed distribution records of the 22 species in the states of India as well as in the different zoogeographical regions and a map detailing the distribution of the species have also been appended.

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REFERENCES

Datta, M, Parui, P and Mukherjee, M. 1977. Insects : Diptera, pp. 1-76. *In Fauna of West Bengal, Stae Fauna Series,* **3**(7). Z.S.I., Kolkata.

Nadi, B.C. 1978. Flesh flies (Diptera : Sarcophagidae) in the collection of Forest Research Institute, Dehradun, India. *Orient. Insects,* **12**(3) : 377-386.

Nandi, B.C. 1990a. Sarcophagid flies (Diptera : Sarcophagidae) from Uttar Pradesh, India. *J. Beng. nat. Hist. Soc.,* **9**(1) : 15-20.

Nandi, B.C. 2002. Sarcophagidae. *Fauna of India and adjacent countries,* **10** : 1-608. Zoological Survey of India.

Senior-White, R.A. 1924. A revision of the subfamily Sarcophaginae in the Oriental Region. *Rec. Indian Mus.,* **26**(3) : 193-283.

Senior-White, R.A., Aubertin, D and Smart, J. 1940. Diptera VI. Family Calliphoridae. *In* : Sewell, R.B.S. (ed.). *The Fauna of British India, including the remainder of the Oriental region,* London, **6** : 1-288.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 457-477.

INSECTA : DIPTERA : SYRPHIDAE

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INTRODUNTION

Flower Flies or hover flies belong to the family Syrphidae are abundant everywhere except in arid areas of the Old World and in the extreme southern latitudes, although flower flies range to the highest latitudes in the north, they are absent from subantarctic islands and Antarctica. Their size ranges from 4 mm to over 25 mm and their coloration from bright yellow or orange to dull dark black or gray with a few iridescent forms. Because of this variety it is why this group is so attractive to work on and is studied very well over the past centuries.

The economic importance of flower flies is great. These flies are pollinators of major significance. In some agro ecosystems, such as orchards, they out perform native bees in pollinating the fruits. Immature stages (eggs, maggots & puparia) are found in a diverse array of habitats. Larvae of the subfamily Syrphinae are predaceous on soft-bodied arthropods, although some may occassionally be scavangers. Those of Eristalinae can predaceous (pipizines), saprophagous in litter and dead wood (most milesiines), coprophagous (some rhingiines and milesiines), mycetophagous (some rhingiines), phytophagous (as borers in tubers, stems, and wood, miners in leaves; most rhingiines and merodontines), aquatic filter feeders (the rat-tailed maggots, mainly eristalines, some milesiines) or inquilines in social insect nests of termites, wasps, and bees (some volucellines and merodontines).

The newly formed state of Uttarakhand comprises of 9.62% of the Himalayan region and lying in between 29° 5'- 31° 25' N latitudes and 77° 45'- 81° E longitudes, spreading over an area of 53, 483 sq kms (2001census). It is divided into 13 districts, namely Udham Singh Nagar, Nainital, Almora, Champawat, Bageshwar, Pithoragarh, Chamoli, Rudra Prayag, Uttarkashi, Tehri Garhwal, Pauri Garhwal, Haridwar, and Dehradun, spread over two of the five traditional divisions of the Himalayas, Kurmachala and Kedara representing Kumaon and Garhwal respectively.

The first species of syrphid were scientifically described by Linnaeus in 1758. Currently there are around 6,000 different hoverfly species described around the world, and in India 264 species and 5 subspecies under 62 genera of 2 subfamilies are reported (Datta, 2003).

The present report accounts for 52 species of syrphids belonging to 35 genera and 15 tribes under 2 subfamilies of which 13 species under 10 genera are been recorded for the first time from the state of Uttarakhand (marked with asterisk).

MATERIALS AND METHODS

Adult syrphid flies can effectively be collected by employing methods prescribed by Datta (1998) were adopted here.

MORPHOLOGY

Head variable, usually as broad as or a little broader than thorax, often with epistoma produced downward, and sometimes forward; three ocelli always present; eyes large, bare or pilose, usually holoptic in males, always dichoptic in females; in females frons broader and lateral margins straight; frons never excavated, often swollen, sometimes with a short or long process which bears the antennae; antennae short or elongate, approximate at their bases, composed of three segments (or joints), usually with a bare, pubescent, or plumose dorsal arista, rarely with a terminal style; face (front of head between mouth and antennae and limited on sides by compound eyes and cheeks) broad, bare, pollinose, or pilose, sometimes excavated in profile beneath antennae and projecting below, or with a distinct tubercle or

carina; frontal lunule absent or rudimentary; oral opening large, proboscis usually short (long in *Rhingia*); thorax rather large and robust, moderately arched, rarely with bristles; scutellum large, usually convex, often translucent, rarely with spines on border; wings comparatively large, marginal (R1) cell open or closed, third (R_{4+5}) vein straight or dipped into apical (R_5) cell, never branched, fourth (M_{4+5}) vein terminated in third at or near its tip, three posterior cells present (R_5 or apical, $1M_2$ or discal, and Cu_1), basal (R, 2M, and 1A) cells long, anal (1A) cell always long and closed before margin of wing, between third and fourth longitudinal veins and nearly parallel to them, a strong fold or spurious vein nearly always present and characteristic of the family, not found in members of any other family; squamae (also called alulae, calpyters, or post-alar membranes) small to moderately large, with forked and fan-like ciliation; plumulae (a pair of elongated, fringed, filamentous projections from upper margin of pteropleura beneath squamae) peculiar to Syrphidae, although sometimes lacking; legs weak to moderately strong, occasionally very strong, never elongate; abdomen variable in shape, composed of five or six visible segments, rarely only four, generally thinly pilose or bare, sometimes with thick pile; hypopygium rarely prominent, although often large.

SYSTEMATIC LIST

Subfamily SYRPHINAE

Tribe **Syrphini**

*1. *Asarkina (Asarkina) ericetorum* (Fabricius)
2. *Betasyrphus serarius* (Wiedemann)
3. *Dasysyrphus brunetti* (Herve-Bazin)
4. *Epistrophe (Epistrophe) aequalis* (Walker)
5. *Epistrophe (Epistrophe) grisocincta* (Brunetti)
*6. *Episyrphus balteatus* (De Geer)
*7. *Ischiodon scutellaris* (Fabricius)
*8. *Metasyrphus (Metasyrphus) corollae* (Fabricius)
*9. *Metasyrphus (Metasyrphus) latifasciatus* (Macquart)
*10. *Scaeva selenitica* (Meigen)
*11. *Sphaerophoria indiana* Bigot
12. *Syrphus bazini* Brunetti
*13. *Syrphus fulvifacies* Brunetti
14. *Syrphus isaaci* Bhatia
*15. *Syrphus nitens* Zett

Tribe **Bacchini**

16. *Baccha (Allobaccha) apicalis* Loew
17. *Baccha (Allobaccha) nigricosta* Brunetti
18. *Baccha (Baccha) maculata* Walker

Tribe **Melanostomatini**

19. *Melanostoma orientale* (Widemann)
20. *Melanostoma univittata* (Wiedemann)
21. *Platycheirus himalayensis* Brunetti

Tribe **Chrysotoxini**

22. *Chrysotoxum convexum* Brunetti

Tribe **Paragini**

23. *Paragus (Pandasyophthalmus) atratus* de Meijere
24. *Paragus (Pandasyophthalamus) rufiventris* Brunetti.

Subfamily MILESINAE

Tribe **Cheilosini**

25. *Cheilosia himalayensis* (Bruentti)
26. *Rhingia laticincta* Brunetti
27. *Rhingia semicinerea* Brunetti

Tribe **Callicerini**

28. *Callicera robusta* Coe

Tribe **Volucellini**

29. *Volucella flavoscutella* Sack
30. *Volucella pelucens* (Linnaeus)

Tribe **Chrysogasterini**

31. *Sphegina (Sphegina) tricoloripes* Brunetti
32. *Sphegina (Asiosphegina) bispinosa* Brunetti

Tribe **Spheginobacchini**

33. *Spheginobaccha macropoda* (Bigot)

Tribe **Sericomyini**

34. *Pararctophila oberthuri* Herve-Bazin

Tribe **Eumerini**

35. *Eumerus sexvittatus* Brunetti

Tribe **Cerioidinae**

36. *Ceriana compacta* (Brunetti)

37. *Monoceromyia crux* (Brunetti)
38. *Sphiximorpha fulvescens*(Brunetti)

Tribe **Eristalini**

*39. *Eristalinus (Eristalinus) arvorum* (Fabricius)
40. *Eristalinus (Eristalinus) quinquestriatus* (Fabricius)
41. *Eristalinus (Eristalodes) paria* (Bigot)
42. *Eristalis(Eristalis) tenax* (Linnaeus)
*43. *Eristalis (Eoseristalis) cerealis* Fabricius
44. *Eristalis (Eoseristalis) himalayensis* Brunetti
*45. *Phytomia (Dolichomerus) crassa* (Fabricius)

Tribe **Milesini**

46. *Criorhina imitator* Brunetti.
47. *Lycastris albipes* Walker
48. *Milesia ferruginosa* Brunetti.
*49. *Syritta orientalis* Macquart
50. *Syritta pipiens* Linnaeus
51. *Temnostoma nigrimanus* Brunetti
52. *Xylota ornata* (Brunetti)

SYSTEMATIC ACCOUNT

Key to the Subfamilies

1. Head fitting close to thorax, and humeral calli of the latter bare of hairs; abdomen in both sexes with at least five visible not-transformed segments, in a few cases more than five; spiracle of third abdominal segment located in middle of pleuron ..... SYRPHINAE

– Head not fitting closely to thorax, and humeral calli of the latter pilose; abdomen of males with not more than four visible not-transformed segments, of females not more than five; spiracle of third abdominal segment located at or near anterior margin of pleuron ..... MILESIINAE

Subfamily SYRPHINAE

Key to the Tribes

(Modified after Vockeroth, 1969)

1. Tergite 1 well-developed and distinctly extended well beyond scutellum; scutellum at its posterior margin inconspicuously or strongly denticulate; abdomen robust and usually oval ..... **Paragini**

– Tergite 1 small and practically covered by scutellum (excepting some Bacchini with petiolate abdomen); scutellum posteriorly smooth and not denticulate; abdomen usually slender 2

2. Antenna porrect, elongate and occasionally longer than head; abdomen very strongly convex dorsally ..... **Chrysotoxini**

– Antenna drooping and usually short; abdomen scarcely convex 3

3. Abdomen distinctly petiolate; anterior flat portion of mesopleuron at its posterodorsal corner with a few distinct erect and coarse hairs metasternum bare; face usually flat and with very weak tubercle ..... **Bacchini**

– Abdomen usually equilateral or oval; mesopleural hairing, if present different or disposed otherwise; metasternum bare or haired; face neither distinctly produced nor narrowed below but usually with well developed tubercle 4

4. Face and scutellum entirely black; anterior flat portion of mesopleuron with only microscopic pubescence; aedeagus undivided, strongly swollen basally and slender tube-like apically ..... **Melanostomatini**

– Face and scutellum usually yellow or yellowish brown; mesopleural hairing variable; aedeagus nearly always two segmented, with complex associated structures ..... **Syrphini**

Tribe **Syrphini**

Key to the Genera

(Modified after Vockeroth, 1969)

1. Mesopleuron at its anterior flat portion with long, fine, erect or suberect hairs at least posterodorsally; male terminalia with broad and somewhat flat surstylus, superior lobe with a short tooth apically ..... ***Episyrphus*** Matsumura & Adachi

– Mesopleuron at its anterior flat portion with only microscopic pubescence or pollinose 2

2. Metasternum haired 3

– Metasternum bare 7

3. Face produced rather strongly forward below and oral opening more than 3-4 times as long as broad; hair tuft present in front of and just below neutral end of metathoracic spiracle (on mesokatepimeron) and a second tuft of lower end of spiracle posteroventrally (on metaepimeron) .... ***Asarkina*** Macquart

– Face usual or moderately produced forward below and oral opening usually below 3 times as long as broad; hypopleuron bare below metathoracic spiracle and infront of its lower end 4

4. Eye entirely or predominantly bare or with short sparse hairs 5

– Eye wholly and distinctly hairy; wing membrane trichose all over ....***Dasysyrphus*** Enderlein

5. Abdomen strongly margined from middle of tergite 2 to end of tergite 5, male terminalia small but never inconspicuous, retracted under apex of abdomen .... ***Metasyrphus*** Matsumura

– Abdomen unmargined or with only a trace of margin on tergite 4 6

6. Male terminalia greatly enlarged, globose, cerci almost always entirely surrounded by tergite I ..... ***Sphaerophoria*** Lep. & Serv.

– Male terminalia small and inconspicuous, if enlarged than tergite 9 much narrower than pre-abdomen ..... ***Epistrophe*** (Walker)

7. Eye with long dense hairs, at least as much as anterior half 8

– Eye bare or with very short hairs (as in some syrphus) 9

8. Wing membrane almost densely and uniformly trichose at least beyond level of end of spurious vein; male eye without distinctly demarked area of larger facets above ..... ***Betasyrphus*** Matsumura

– Wing membrane with very sparse microtrichia scattered over entire surface, male eye with distinctly demarked area of larger facets above ..... ***Scaeva*** Fabricius

9. Antennal segment 3 twice as long as broad, subacute apically; sternopleuron at its upper margin with distinct yellow spot; with vein R4+5 ending well before wing apex lower lobe of squama with only microscopic pile; hind trochanter in males with spine like process ventrally ..... ***Ischiodon*** Sack

– Antennal segment 3 short, oval and broadly rounded apically; sternopleuron without any yellow spot at its upper margin; wing vein R4+5 ending at wing apex; lower lobe of squama with abundant coarse, long erect yellow hairs above; hind trochanter unarmed ..... ***Syrphus*** Fabricius

Genus *Asarkina* Macquart

1842. *Asarkina* Macquart, *Dipt. exot.*, 2(2) : 77 (137).

Type species : *Scaeva rostrata* Wiedemann.

Sub genus *Asarkina* Macquart

Diagnosis : Mesonotum with dense anterior collar of long erect hairs; vein R_{4+5} distinctly dipped into cell R_{4+5}, surstylus strongly convergent and nearly transverse in position.

*1. ***Asarkina (Asarkina) ericetorum*** (Fabricius)

1781. *Syrphus ericetorum* Fabricius, *Spec. Insect.*, 2 : 425.

Material examined : 1♂, 2♀♀, Sonari, Almora dist., 21.ix. 03, coll. B. Mitra; 1♂, 1♀, Kardhara, Almora dist, 21.ix.03, coll. B. Mitra; 1♂, Gananath, Almora dist., 22.ix.03, coll. B. Mitra; 1♀, Gonab, Almora dist., 24.ix.03, coll. B. Mitra.

Diagnosis : Male frons bright sulphur yellow with long black erect pubescence, a semi-circular shining blackish brown spot on upper side of small antennal prominence; female frons at vertex about one-ninth of head rather rapidly widening to double that width at level of antennae, antennae brownish orange; thorax and scutellum covered with dense bright yellow pubescence; abdomen broad, flat orange yellow, 1st segment with broad, black median stripe, rest of the segment with extreme anterior margin and hind margin black; legs yellow; wings pale yellowish grey; halteres orange.

Distribution : India : Uttarakhand (Almora), Arunachal Pradesh, Assam, Chandigarh, Gujarat, Jammu & Kashmir, Manipur, Meghalaya, Sikkim, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Other parts of the Oriental Region; Africa; Australia; Fiji, Moluccas, New Guinea and Samoa.

Genus ***Betasyrphus*** Matsumura

1917. *Betasyrphus* Matsumura, *Ent. Mag. Kyoto*, **2** : 143.

Type-species : *Syrphus serarius* Wiedemann.

2. ***Betasyrphus serarius*** (Wiedemann)

1930. *Syrphus serarius* Wiedemann, *Aussereurop. Zweifl. Insekt.*, **2** : 128.

Diagnosis : Eye densely haired, face orange with blackish tinge; antenna black, base of antennal segment 3 dull orange; mesonotum shining black, yellow haired anteriorly and black haired posteriorly at wing-base along lateral margin, scutellum dull yellow with yellow hairs basally and rest black; lower lobe of squama with few erect, fine, white hairs above; grayish pollinose abdominal markings, aedeagus in male terminalia tubular, not produced apically and not with setulae anteriorly; aedeagal base with 2 long distinct tooth like processes on each side antero-ventrally.

Distribution : India : Uttarakhand (Garhwal, Almora, Dehradun), Arunachal Pradesh, Assam, Bihar, Karnataka, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and West Bengal.

Elsewhere : Other parts of the SE Asia, Australia, Japan, Korea and New Guinea.

Genus ***Dasysyrphus*** Enderlein

1938. *Dasysyrphus* Euderlein, *Sber. Ges.naturf. Ferunde Lerl.*, **1937** : 208.

Type species : *Scaeva albostriata* Fallen.

3. ***Dasysyrphus brunetti*** (Herve-Bazin)

1924. *Syrphus brunetti* Herve-Bazin, *Annls Soc. ent. Fr.*, **92** : 290 (*Syrphus*; n. name for *albostriatus* of Brunetti. Not Fallen).

Material examined : 1 ♂, Basuli, Almora dist., 23.ix.03, coll. B. Mitra.

Diagnosis : Frons in ♂ mainly occupied by large shining black antennal prominence, face bright chrome yellow with a distinct black median stripe enclosing the shining central bump; antennae black; in ♀ frons from vertex to base of antennae shining black with a broad transverse grey space across the middle; thorax shining aeneous black, a pair of inconspicuous short grey stripes anteriorly; scutellum brownish yellow with long black; pubescence; legs orange-yellow, basal half of anterior femora and more than basal half of hind femora black; wings pale yellowish grey; halteres orange; abdomen black, 2nd segment with a pair of large yellow oval spots placed across center, near sides, 3rd segment with a sinuate narrow yellow band, 4th segment similar to 3rd, pubescence following ground colour.

Disribution : India : Uttarakhand (Almora, Dehradun), Himachal Pradesh and West Bengal.

Elsewhere : Nepal.

Genus ***Epistrophe*** Walker

1852. *Epistrophe* Walker, *Insecta Saundersiana*, **3** : 242.

Type-species : *Epistrophe conjungens* Walker = *Syrphus grossulariae* Meigen.

Subgenus ***Epistrophe*** Walker (S. Str.)

Diagnosis : Eyes bare or with short hairs above; face usually entirely yellow, at most indistinctly darkened medially; metasternum haired or bare; abdominal tergite 4 with undivided or partly divided yellow band, in male terminalia antero-ventral process of aedeagal base vertical, ending in a pair of distinct teeth.

Key to the Species

1. Eyes pubescent, no facial black stripe, but central bump may be black, abdominal bands entire; all femora with pale yellow pubescence ..... *griseocincta* Brunetti
– Eyes bare, a black facial stripe, a pair of spots on 2nd segment, 2nd and 3rd abdominal bands entire, hind legs with conspicuous pubescence ..... *aequalis* Walker

4. ***Epistrophe (Epistrophe) aequalis*** (Walker)

1852. *Xylota aequalis* Walker, *Insecta saundersiana* **1** : 226.

1975. *Epistrophe (Epistrophe) aequalis* (Walker) : Knutson Thompson & Vockeroth, *A Catalog of Diptera of the Oriental Region* **2** : 314.

Distribution : India : Uttarakhand (Garhwal) and Punjab.

Elsewhere : Nil.

5. *Epistrophe (Epistrophe) griseocincta* (Brunetti)

1923. *Syrphus griseocinctus* Brunetti, *Fauna Br. India*, Dipt., **3** : 77.

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Tripura and Western Himalaya.

Elsewhere : Nil.

Genus *Episyrphus* Matsumura & Adachi

1917. *Episyrphus* Matsumura & Adachi, *Ent. Mag. Kyoto*, **2** : 134.

Type species : *Musca balteata* De Geer.

*6. *Episyrphus balteatus* (De Geer)

1776. *Musca balteata* De Geer, *Mem. pour Serv. Hist. Ins.*, **6** : 116. 1975.

Material examined : 1♂, 1♀, Tilodh, Uttarkashi dist., 1.iv.03, coll. B.G. Kundu; 1♂, 3♀♀, Mando, Uttarkashi dist., 1.iv.03, coll. B.G. Kundu; 3♂♂, 1♀, Maneri, Uttar Kashi dist., 2.iv.03, coll. B.G. Kundu; 9♂♂, 1♀, Jathpur, Uttarkashi dist.; 2.iv.03, coll. B.G. Kundu; 8♂♂, Bhatwari, Uttarkashi dist., 3.iv.03, coll. B.G. Kundu;16♂♂, 8♀♀, Gangotri, Uttarkashi dist., 4.iv.03, coll. B.G. Kundu; 1♂, Ganghani, Harsil, Uttarkashi dist., 5.iv.03, coll. B.G. Kundu; 9♂♂, 5♀♀, Guhar, Tehri Garhwal dist., 7.iv.03, coll. B.G. Kundu; 2♂♂, Nagini, Chamba, Tehri Garhwal dist., 8.iv.03, coll. B.G. Kundu; 1♂, Shyampur, Dehradun dist., 9.iv.03, coll. B.G. Kundu; 6♀♀, Dhubri, Dehradun dist., 20.iii. 03, coll. B.G. Kundu; 1♀, Gananath, Almora dist., 22.ix.03, coll. B. Mitra; 7♂♂, 3♀♀, Dhubri, Dehradun dist., 28.iii.03, coll. B.G. Kundu; 17♂♂, 5♀, Chandipur, Dehradun dist., 29.iii.03, coll.B.G. Kundu; 1♀, Jathpur, Uttarkashi, 2.iv.o5 coll. B. Mitra; 1♂, 1♀, Dhalani, Dehradun dist., 27.iii.05, coll. B. Mitra; 2♀♀, Tehri Garhwal, 3.iv.01, coll. R.S. Bisht.

Diagnosis : Eyes bare; face orange with orange hairs, base of antenna with a black dot above; mesonotum black, with a narrow median and 2 lateral grayish stripes; posterior margin of wing with a series of sclerotized dots; abdomen liner, orange, tergites 3 and 4 mostly yellow with narrow sub-basal and broad apical black bands; surstylus in male terminalia straight, not more than twice as long as broad; superior lobe stout, with ventro-laterally directed tooth apically; distal portion of acdeagus not expanded apically.

Distribution : India : Uttarakhand (Uttar Kashi, Dehradun, Almora, Tehri Garhwal), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura and West Bengal.

Elsewhere : China, Malay and other parts of the Oriental region; Australia, Bonin Islands and Palaearctic Region.

Genus *Ischiodon* Sack

1913. *Ischiodon* Sack, *Ent. Mitt.*, **2** : 5.

Type-species : *Ischiodon trochanterica* Sack (= Scaeva *scutellaris* Fabricius).

*7. *Ischiodon scutellaris* (Fabricius)

1805. *Scaeva scutellaris* Fabricius, *Syst. Antliat.*, : 252.

Material examined : 1♀, Tehri Garhwal dist, 10 xi.01, coll. R.S. Bisht, 1♀ Gangotri, Uattarkashi dist., 4.iv.03 coll. B.G. Kundu, 1♂, Gubar, North Tehri, Tehri Garhwal dist., 7.iv.03. coll. B.G. Kundu.

Diagnosis : Eye bare; wing with vein R_{4+5} upcurved apically and ending well before wing-apex; hind femur with a sub-apical black ring; surstylus in male terminalia elongate, broadened beyond base, dorsally curved and serrate, ventrally straight and smooth; aedeagal base very large and strongly sclerotized.

Distribution : India : Uttarakhand (Uttarksahi, Tehri Garhwal), Andhra Pradesh, Assam, Chandigarh, Delhi, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Java, Philippines, Taiwan and other parts of the S.E. Asia; Australia, Hawaii, Japan and Micronesia.

Genus *Metasyrphus* Matsumura

1917. *Metasyrphus* Matsumura, *Ent. Mag. Kyoto*, **2** : 147.

Type-species : *Scaeva corollae* Fabricius.

Subgenus *Metasyrphus* Matsumura

Diagnosis : Wing with vein R_{4+5} straight or nearly so; sternite 9 in male terminalia without lateral and dorso-lateral grooves.

Key to the Species

1. A pair of spots on 2nd segment; 2nd and 3rd abdominal bands entire; hind femora wholly black in ♀ and three fifth black in ♂ at base ..... *latifasciatus* (Macquart)

– Abdomen with 3 pairs of spots passing over lateral margin; hind femora two-third at base black, rest orange in both sex..... .....*corollae* (Fabricius)

*8. *Metasyrphus (Metasyrphus) corollae* (Fabricius)

1794. *Scaeva corollae* Fabricius, *Ent. Syst.*, **4** : 306.

Material examined : 1♀, Tilodh, Uttarkashi dist., 1.iv.03, coll. B. G. Kundu; 1♂, Tehri Garhwal dist, 10.iv.01, coll. R.S. Bisht.

Distribution : India : Uttarakhand (Uttarkashi, Tehri Garhwal), Meghalaya and West Bengal.

Elsewhere : Other Asian countries including Taiwan; North Africa and Palaearctic Region.

*9 *Metasyrphus (Metasyrphus) latifasciatus* (Macquart)

1829. *Syrphus latifasciatus* Macquart, *Ins. Dipt. N. Fr.* **4** : 94(242).

Material examined : 1♀, Dhubri, Dehradun dist., 28.iii.03, coll. B.G. Kundu; 1♂, Jathpur, Uttarkashi, 2.iv.03, coll. B.G. Kundu.

Distribution : India : Uttarakhand (Dehradun, Uttarkashi), and Himachal Pradesh.

Elsewhere : Europe to North America.

Genus *Scaeva* Fabricius

1805. *Scaeva* Fabricius, *Syst. Antliat.*, : 248.

Type-species : *Musca pyrastri* Linnaeus.

*10. *Scaeva selenitica* (Meigen)

1822. *Syrphus seleniticus* Meigen, *Syst. Bschr Europ. Zweift Insekt.*, **3** : 304.

1975. *Seaeva selenitica* (Meigen) : Knutson, Thompson & Vockeroth, *A Catalog of Diptera of the Oriental Region*, **2** : 318.

Material examined : 2♀♀, Tehri Garhwal, 22. xi.01, coll. R.S. Bisht.

Diagnosis : Eyes densely haired, sparser posteriorly; antennae black except yellowish segment 1 and base of 3; mesonotum shining black with dense yellowish brown hairs, wing clear; leg predominantly bright yellow; hind tibia with a dark brown ring; abdomen black, tergites 2-4 each with a pair of bright yellow spots being lunulate on 3-4.

Distribution : India : Uttarakhand (Dehradun, Tehri Garhwal), Arunachal Pradesh, Himachal Pradesh, Meghalaya and Sikkim.

Elsewhere : Cambodia, China, Laos and Vietnam; Europe.

Genus *Sphaerophoria* Lep. & Serv.

1828. *Sphaerophoria Lepeletier and Serville, Encycl. meth (Ins.).*, **10** : 513 (as subgenus of *Syrphus* F.)

Type-species : *Musca scripta* Linnaeus.

*11. *Sphaerophoria indiana* Bigot

1884. *Sphaerophoria indiana* Bigot, *Annls Soc. ent.* Fr., (6)4 : 99.

1915. *Sphaerophoria nigritarsis* Brunetti, *Rec. Indian Mus.*, **11** : 216 (as form).

Material examined : 1♂, Mayawati, Champawat dist., 17.ix.04, coll. B. Mitra.

Diagnosis : Face entirely yellow, without median stripe; frons in females with a broad black median stripe; mesonotum black, with 2 more or less distinct grayish submedian stripes; scutellum bright yellow; subscutellar fringe absent; legs entirely yellow; abdomen predominantly bright yellow except blackish tergite 1 and a median yellow band on tergite 2, tergite 9 in male terminalia sclerotized between cerci and its posterior margin.

Distribution : India : Uttarakhand (Champawat), Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : China and Sri Lanka; Korea and eastern part of the erstwhile U.S.S.R.

Genus *Syrphus Fabricius*

1775. *Syrphus* Fabricius, *Syst. Ent.*, : 762.

Type-species : *Musca ribessi* Linnaeus.

12. *Syrphus bazini* Brunetti

1915. *Pipizella rufiventris* Brunetti, *Rec. Indian Mus.*, **11** : 202.

1925. *Syrphus bazini* Brunetti, *Rec. Indian Mus.*, **27** : 75.

Diagnosis : Frons shining blue-black, a broad grey dust band from eye to eye across middle of frons; antennae black, 3rd joint large and elongate; arista black; eyes brown with short grey pubescence; face yellowish with a black, narrow median stripe; thorax aenous-black, shining with yellowish grey pubescence; scutellum darker in middle with pale yellow pubescence; legs brownish yellow except coxae, basal half of anterior femora and basal three-fourths of hind femora black, under side of hind tarsi with golden-brown pubescence; wings clear, subcostal cell pale yellowish; abdomen reddish yellow, a moderately narrow band on hind borders of 2nd and 3rd segments, apical half of 4th and all the 5th segment black, dorsum of abdomen with pale yellowish grey pubescence which is longer and thicker about the sides of 2nd segment.

Distribution : India : Uttarakhand (Bageshwar).

*13 *Syrphus fulvifacies* Brunetti

1913. *Syrphus fulvifacies* Brunetti, *Rec. Ind. Mus.* **8** : 161.

Material examined : 2♀♀, Sonari, Almora dist. 21.ix.03, coll. B. Mitra; 1♀, Gananath, Almora dist., 22.ix.03, coll. B. Mitra; Gonab, Almora dist., 24.ix.03, coll. B. Mitra, 2♂♂, Tehri Garhwal, 10.xi.01, coll. R. S. Bisht.

Diagnosis : Eyes bare; vertex to base of antennae bears black hairs, in ♂ a semicircular shining black space above antennae, antennae dull black, underside of third segment reddish; mesonotum blackish with pale brownish yellow hairs; scutellum yellow with long black hairs; basal half of anterior femora, the other two pairs except at tip all black, all tibiae black except their basal third yellow; wings clear; abdomen black ovate, second segment with a pair of elongate spots, 3rd and 4th segments with a yellow band in the middle, 5th segment yellow at posterior margin.

Distribution : India : Uttarakhand (Almora, Tehri Garhwal), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir.

Elsewhere : China, Jawa, Laos, Nepal, Philippines.

14. *Syrphus isaaci* Bhatia

1933. *Syrphus isaaci* Bhatia, *Indian J. Agric. Sci.*, **2** : 566.

Material examined : 1♀, Tehri Garhwal, 22.xi.01, coll. R. S. Bisht.

Distribution : Uttarakhand (Tehri Garhwal), Assam, Bihar, Uttar Pradesh.

Elsewhere : Nepal.

*15. *Syrphus nitens* Zett

1964. *Callicera robusta* Coe, *Bull. Br. Mus. Nat. Hist., (Ent.)* **15** : 286.

1928. *Volucella flavoscutella* Sack, *Entomologist's Mon. Mag.*, **64** : 107.

Materials examined : 1♂1♀, Bhatwari, Uttarkashi dist, 3.iv.03, coll. B.G. Kundu; 2♂♂, Jathpur, Uttarkashi dist, 2.iv.03, coll. B.G. Kundu; 1♀2♂♂, Mandu , Uttarkashi dist, 1.iv.03, coll. B.G. Kundu; 5♂♂, 3♀♀; Gangotri, Uttarkashi dist, 4.iv.03, coll. B.G. Kundu; 1♂ Dhubri, Dehradun dist, 20.iii.03, coll. B.G. Kundu;

Distribution : Uttarakhand (Uttarkashi, Dehradun).

Tribe **Bacchini**

Genus ***Baccha Fabricius***

1805. *Baccha* Fabricius, *Syst. Antliat.*, : 199.

Type-species : *Syrphus elongatus* Fabricius.

Diagnosis : Small to large (3-20 mm), dark, light, or metallic-colored species; head large and round, broader than thorax; face and frons narrow, face narrowed below, usually tuberculate; antennae short, third joint rounded or oval; arista toward base, slender, bare; eyes bare, holoptic in male, narrowly dichoptic in female; thorax short, metasternum bare; wings often with dark brown or blackish markings; legs simple, very slender, hind femora elongate, but not thickened, hind metatarsi elongated and thickened; abdomen slender, usually three or four times as long as thorax, usually petiolate, sometimes spatulate, second segment very slender, third gradually widening to tip of fourth segment, remaining segments less robust.

Key to the Subgenera

1. Humerous with a row of hairs behind or almost half haired ..... ***Allobaccha*** Curran

– Humerous bare entirely ..... ***Baccha*** Fabricius

Sub genus ***Allobaccha*** Curran

1928. *Allobaccha* Curran, *Jfed Malay St. Mus.*, **14** : 251(as subgenus *Baccha* F.

Type-species : *Baccha rubella* van der Wulp.

Key to the Species

1. Antennal process well developed; abdomen metallic aeneous black with golden yellow markings forming an inverted-V at least on tergite 4 ..... *apicalis* Loew

– Antennal process nearly absent, face without a tubercle, abdonal segment 1 semicircular like scutellum and without prominent yellow hairs but long black hairs laterally on segments 2 and 3 .....*nigricosta* Brunetti

16. ***Baccha (Allobaccha) apicalis*** Loew

1858. *Baccha apicalis* Loew, *Wien ent. Mschr.*, **2** : 106.

1893. *Baccha pulchrifrons* Austen, *Proc. zool. Soc. Lond.*, **1893** : 139.

Distribution : India : Uttarakhand (Nainital), Bihar, Goa, Meghalaya, Uttar Pradesh, and West Bengal.

Elsewhere : Java, Malaya, Philippines, Sri Lanka and Taiwan; Bonin Islands and Japan.

17. ***Baccha (Allobaccha) nigricosta*** Brunetti

1908. *Baccha nigricosta* Brunetti, *Rec. Indian Mus.*, **2** : 50.

Distribution : India : Uttarakhand (Nainital), Bihar, Meghalaya and Uttar Pradesh.

Elsewhere : Pakistan.

Subgenus ***Baccha*** Fabricius

18. ***Baccha (Baccha) maculata*** Walker

1852. *Baccha maculata* Walker, *Insecta Saundersiana*, **1** : 223.

Diagnosis : Antenna bright yellow; antennal process shining black in male, bluish black in female; humerus and a short longitudinal stripe on mesopleura in front of wing-base cupreous in male, yellowish in female; leg predominantly yellowish, hind femur with a sub-apical brownish ring and hind tibia with an indistinct dark median band; abdomen mainly shining brown, sometimes with pale spots.

Distribution : India : Uttarakhand (Nainital), Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Java, Kalimantan, Malayasia, Nepal, Philippines, Taiwan; Japan and Korea.

Tribe **Melanostomatini**

Key to the Genera

1. Males devoid of dilated fore tarsi; surstylus usually not bifid; superior lobe usually triangular .....***Melanostoma*** Schiner

– Males with dialated fore tarsi; surstylus bifid; superior lobe sickle-shaped .... ***Platycheirus*** Lep. & Serv

Genus ***Melanostoma*** Schiner

1960. *Melanostoma* Schiner, *Wien. ent. Mschr.*, **4** : 213.

Type-species : *Musca mellina* Linnaeus.

Key to the Species

Face with two distinct small bumps .... *orientale* (Wiedemann)

Face nearly flat forming a single angle only on lower end..... *univittata* (Wiedemann)

19. ***Melanostoma orientale*** (Widemann)

1824. *Sysphus orientalis* Wiedemann, *Analecta Ent.*, : 36.

Material examined : 1♀, Dhubri, Dehradun dist., 20.iii.03 coll. B.G. Kundu 1♀, Maneri, Uttarkashi dist., 2.iv.03, coll., B.G. Kundu 1♀, Gangnani, Harsil, Uttarkashi dist., 5.iv.03, B.G. Kundu; 1♂ 2♀♀, Tehri Garhwal, 10.iv.01, coll. R.S. Bisht; 1♀, Tehri Garhwal, 20.iv.01, coll. R.S. Bisht.

Distribution : India : Uttarakhand (Dehradun, Uttarkashi, Tehri Garhwal, Nainital), Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram Punjab, Sikkim, Tamil Nadu, Tripura, and West Bengal.

Elsewhere : Bhutan, Nepal, Pakistan, Sri Lanka and other parts of the Oriental and Palaearctic Regions.

20. ***Melanostoma univittata*** (Wiedemann)

1824. *Syrphus univittatus* Wiedemann, *Analecta Ent.*, : 36.

Material examined : 2♂♂ 2♀♀, Tehri Garhwal dist., 10.vi.2001. coll. R. S. Bisht.

Distribution : India : Uttarakhand (Tehri Garhwal, Nainital, Dehradun), Assam, Bihar, Karnataka, Kerala, Manipur, Meghalaya, Sikkim, Tamil Nadu, Tripura, and West Bengal.

Elsewhere : East Malayasia, Myanmar, Nepal, Sri Lanka, Sumatra and other parts of SE Asia; Australia and Palaearctic Region.

Genus ***Platycheirus*** Lepeletier & Serville

1828. *Platycheirus* Lepeletier and Serville, in Latreille *et al.*, *Encycl Meth.*(Ins.) **10**(2) : 513.

Type species : *Syrphus scutatus* Meigen.

21. ***Platycheirus himalayensis*** Brunetti

1915. *Platycheirus himalayensis* Brunetti, *Rec. Indian Mus.*, **11** : 209 (as variety of manicatus Meigen, 1822).

Diagnosis : In male, antenna entirely black; face very conspicuously produced to a distance equal to or more than greatest width of eye in profile; mesonotum black with greenish tinge; fore femur broadly, hind femur narrowly, basal half of fore tibia and first 3 segments of mid tarsus orange; fore tarsus with first 2 segments remarkably dialated, segment 1 three times as wide as apex of tibia and both 1 and 2 at least three times as wide as 3 narrow remaining segments; abdominal spots bright yellow.

Distribution : Uttarakhand (Garhwal), Sikkim.

Elsewhere : Nepal.

Tribe **Chrysotoxini**
Genus ***Chrysotoxum*** Meigen

1803. *Chrysotoxum* Meigen, *Magazin Insektkde*, **2** : 275.

Type-species : *Musca bicincta* L.

Diagnosis : Rather large flies with semi-circular head as broad as thorax, eye haired; frons and face prominent; long antennae placed in between produced frons and face, arista sub-basal, bare; mesonotum finely punctate, with a pair of faint grayish stripes anteriorly in addition to yellowish lateral lines; leg predominently yellowish; wing yellowish, anteriorly; abdomen mainly ovate, finely punctate and usually with a pair of curved yellow spots on tergites 2-5.

22. ***Chrysotoxum convexum*** Brunetti

1915. *Chrysotoxum convexum* Brunetti, *Rec. Ind. Mus.*, **11** : 249.

Diagnosis : Frons with yellowish grey dust, antennal prominence shining black with black hairs, antennae black, arista reddish brown on basal portion; face bright yellow with a broad median black stripe; a black band from the corner of the eye to the mouth border; a fringe of yellow hairs along posterior orbit of eye; thorax shining black with black pubescence, a pair of narrow yellowish grey median stripes on anterior border; scutellum bright yellowish orange on anterior and hind margin, the rest shining black; abdomen black, hind margin of 2nd, 3rd and 4th segments brownish-orange which extends forwards the center nearly to the middle of the disc, a pair of elongate triangular yellow spot placed at the middle of the sides of the 2nd segment also reaching the middle of the disc, a pair of wide yellow spot extending from the hind corner of the 3rd segment to the anterior margin where their ends nearly meet; 4th segment similar, 5th yellowish orange, a narrow median line from anterior margin forking and not reaching the apex; legs, coxae black with black hair, fore femora yellow, basal half black, other femora reddish- brown, middle pair broadly and hind pair very narrowly black at basé, tibiae and tarsi orange yellow; wings grey anterior margin brownish yellow, halteres yellow.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

Tribe **Paragini**
Genus ***Paragus*** Latreille

1804. *Paragus* Latreille, *Nouv. Dict. Hist. Nat.*, **24** : 94.

Type-species : *Syrphus bicolor* F.

Diagnosis : Small, rather short, dark species; perhaps the smallest syrphid fly; rarely any light coloration; head broader than thorax, hemispherical, somewhat flattened; face short, weakly produced below, slightly tuberculate, may be pale yellow; antennae short, with third segment as long or longer than first two together; arista before middle, bare; eyes pilose, narrowly contiguous in male; marginal cell open, third vein straight, anterior cross-vein near base of discal cell, apical cross-vein sinuate, terminating in third vein in nearly a right angle, at a considerable distance before the tip; legs rather short, mainly short haired, anterior femora with longer hairs on postero-ventral side, hind femora with longer hairs on antero-ventral side, hind metatarsi a little thickened; abdomen bent down apically, more or less reddish, hypopygium small.

Subgenus ***Pandasyophthalmus*** Stuckenberg

1954. *Pandasyophthalmus* Stuckenberg, *Revue Zool. Bot. Aft.*, **49** : 100.

Type-species : *Paragus longiventris* Loew.

Diagnosis : Eye with unicolours pile. Spurious vein long, extending beyond discal (r-m) cross vein.

Key to the Species

1. Abdomen bluish black anteriorly and bright reddish brown posteriorly .... *rufiventris* Brunetti
– Abdomen shining black, punctate .... *atratus* de Meijere

23. ***Paragus (Pandasyophthalmus) atratus*** de Meijere

1906. *Paragus atratus* de Meijere, *Nova Guinea*, **1** : 85.

Distribution : India : Uttarakhand (Nainital) and West Bengal.

Elsewhere : Jawa, Malaya, Sumatra, Sumbawa and Timor, New Guinea.

24. ***Paragus (Pandasyophthalamus) rufiventris*** Brunetti

1913. *Paragus rufinentris* Brunetti, *Rec. Indian Mus.*, **8** : 157.

1975. *Paragus (Pandasyophthalmus) tibialis rufiventris* Brunetti : Knutson, Thompson and Vockeroth. *A catalog of Diptera of the Oriental region*, **2** : 328.

1983. *Paragus (Pandasyophthalmus) rufiventris* Brunetti : Datta and Chakraborti, *Rec. Zool. Surv. India*, **81** : 245.

Distribution : India : Uttarakhand (Nainital), Assam, Bihar, Jammu & Kashmir, Sikkim, Tripura and West Bengal.

Elsewhere : Bhutan, Nepal, Pakistan and Sri Lanka.

Subfamily MILESINAE
Tribe **Cheilosini**
Key to the Genera

1. Face produced strongly forward to a porrect snout; costa and third vein (R_{4+5}) ending well beyond wing apex ....***Rhingia*** Scopoli
– Face without a snout; costa and third vein (R_{4+5}) ending at or before wing apex ....***Cheilosia*** Meigen

Genus ***Cheilosia*** Meigen

1822. *Cheilosia* Meigen, *Syst. Beschr.europ.zweifl. Insekt.*, **3** : 296.

Type-species : *Eristalis scutellatus* Fallen.

25. ***Cheilosia himalayensis*** (Brunetti)

1915. *Erizona himalayensis* Brunetti, *Rec. Indian Mus.*, **11** : 217.

Diagnosis : Eye with thick, dark brown pubescence, eye-margins slightly raised extending along the lower inner orbit of the eyes, bearing a different pubescence from that of the face; antenna black, arista black, 3rd joint dull; thorax shining black with a slight aenous tinge; prothorax covered with brownish-yellow, thick pubescence, rest of the dorsum covered with black pubescence; scutellum with long thick black pubescence, posterior margin with a fringe of short yellowish hairs; wings grey, a broad brownish infuscation from round the stigmatic region across the middle of the wing; legs black, with short black pubescence, underside of femora with long hairs; abdomen shining black, 3rd and 4th segments dull aenous, pubescence of abdomen all yellow or orange-red except at sides of 3rd and 4th segments.

Distribution : India : Uttarakhand (Kumaon, Garhwal).

Elsewhere : Nil.

Genus ***Rhingia*** Scopoli

1763. *Rhingia* Scopali, *Ent. Carniolica* : 358.

Type-species : *Conops rostrata L.*

Diagnosis : Small to medium-sized species; color black to reddish-brown, rarely with brownish-orange spots on abdomen; easily distinguished by long, porrect epistomal snout; antennae short, inserted considerably above middle; arista longer than antennae, slightly pubescent, almost bare; eyes bare, holoptic for a long distance in male, well separated in female; thorax rectangular, nearly square; costa and end of R_{4+5} characteristically drawn far down below apex of wing; abdomen short, wide, rather convex.

Key to the Species

1. 2nd, 3rd, and 4th abdominal segments mainly yellowish, with black elongate spots towards

each side on hind margin, a vertical long black spot on the dorsum of each segment forms a sort of longitudinal dorsal stripe... ..... *laticincta* Brunetti

– 2nd abdominal segment mainly orange, 3rd and 4th abdominal segments a little shining, greenish-aenous; hind corners of 2nd segment black; hind margin indefinitely blackish; 3rd segment with distinct; broad blackish hind margin; 4th segment with indistinct black hind margin .... *semicinerea* Bruentti

26. *Rhingia laticincta* Brunetti

1907. *Rhingia laticincta* Brunetti, *Rec. Indian Mus.*, **2** : 58.

Distribution : India : Uttarakhand (Dehradun), Himachal Pradesh, Punjab, Sikkim and West Bengal.

Elsewhere : Nil.

27. *Rhingia semicinerea* Brunetti

1923. *Rhingia semicinerea* Brunetti, *Fauna Brit. India*, Diptera, **3** : 134.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Tribe **Callicerini**
Genus *Callicera* Panzer

1809. *Callicera* Panzer, *Fauna Germanica* **104** : 17.

Type-species : *Bibio aenea* Fabricius.

28. *Callicera robusta* Coe

1964. *Callicera robusta* Coe, *Bull. Br. Mus. Nat. Hist., (Ent.)***15** : 287.

Distribution : India : Uttarakhand (Nainital), Northeast India.

Tribe **Volucellini**
Genus *Volucella* Geoffroy

1762. *Volucella* Geoffrey, *Hist. Insect Paris.*, **2** : 540.

Type-species : *Musca pellucens* Linnaeus.

Diagnosis : Very large genus containing bare to very pilose species varying from very small to large (6-16 mm); head broader than thorax, produced downward and rarely forward, conical, pointed at tip; front sometimes swollen and inflated; face usually concave above, with either a large rounded tubercle below, or a rounded protuberant bulge, merging into epistoma; antennae small, third segment elongate, sometimes narrowed medially, arista always plumose; eyes pilose, sometimes bare in female, holoptic in male; dorsum of thorax with a pair of yellow stripes in most species, scutellum large, usually translucent, both thorax and scutellum with numerous bristles; marginal cell closed, anterior cross-vein usually towards base of discal cell and rectangular, third vein straight; legs simple; abdomen short, wide, oval, convex, inflated, slightly longer than thorax, often nearly circular.

29. *Volucella flavoscutella* Sack

1928. *Volucella flavoscutella* Sack, *Entomologist's mon. Mag.*, **64** : 107.

Distribution : India : Uttarakhand (Kumaon).

Remarks : Literature not available.

30. *Volucella pellucens* Linnaeus

1758. *Musca pellucens* Linnaeus, *Syst. Nat. Ed.*, **10** : 595.

Diagnosis : Eyes with dense black pubescence in male, bare in female; antennae dull orange, arista orange; thorax shining black, brownish along sides; margin of scutellum with black bristles; wings pale orange on about basal half, a distinct blackish cloud across middle and at tip, hind margin clear; legs black, base of anterior tarsi brownish orange, pubescence short black; abdomen short-ovate, shining black, 2nd segment all yellowish-white except a narrow brownish median stripe, broadened at base, pubescence following ground colour except hind margin of 2nd segment, black.

Distribution : India : Uttarakhand (Kumaon)

Elsewhere : Europe, in Asia into Japan, Oriental region.

Tribe **Chrysogasterini**
Genus *Sphegina* Meigen

1822. *Sphegina* Meigen, *Syst. Beschr. Europ zweifl. Insekt.*, **3** : 193.

Type-species : *Milesia clunipes* Fallen.

Diagnosis : Head semicircular, wider than thorax; eyes bare, separated in both sexes; face without central knob, upper mouth edge much

enlarged, antennae short 3rd joint ovate, dorsal arista slightly pubescent; thorax subquadrate with short pubescence; scutellum bare with a pair of subapical marginal bristles; legs slender, hind femora very much thickened and very spinose below, hind tibiae curved, basal joint of hind tarsi dialated; wings with normal venation except that the apical portion of the 4th and 5th veins are turned sharply upwards and somewhat rectangular at the bend; squama small with fringes; abdomen much narrowed at base, about twice as long as thorax, more or less club shaped.

31. *Sphegina(Sphegina) tricoloripes* Brunetti

1915. *Sphegina tricoloripes* Brunetti, *Rec. Indian Mus.*, 11 : 225.

Diagnosis : Vertical triangle indistinct; frons and face blackish-grey; upper mouth border well produced, proboscis long, brownish yellow, antennae blackish, antennal 3rd joint produced slightly above; thorax blackish, two well separated, grayish, narrow stripes from anterior margin to scutellum, scutellum shining black with a pair of apical bristles legs, front and middle pair, base and tip of femora, basal half of tibiae and the metatarsi yellow, hind pair enlarged the basal fourth of hind femora bright lemon yellow, the remaining proximal half black and distal half reddish brown, extreme tip black, under side with several rows of very short spines and a row of about 8 or 9 longer ones, tibiae curved pale yellow, apical half black, tarsi all black, metatarsi enlarged and lengthened; wings pale grey; abdomen reddish brown, much contracted at base, widening from middle 2nd segment to tip of 3rd, thence gradually narrowing, a few long whitish hairs at sides at base of abdomen, the rest bare; halteres yellow.

Distribution : India : Uttarakhand (Nainital) and Himachal Pradesh.

Elsewhere : Nil.

Subgenus *Asiosphegina* Stackelberg

1953. *Asiosphegina* Stackelberg, *Trudy. zool. Inst. Akad. Nauk. USSR.*, 13 : 376.

Type-species : *Sphegina sibirica* Stackelberg.

32. *Sphegina (Asiosphegina) bispinosa* Brunetti

1915. *Sphegina (Asiosphegina) bispinosa* Brunetti, *Rec. Indian Mus.*, 11 : 223.

Diagnosis : Eyes bare and separated in both sexes; antennae with first two joints black, 3rd joint and arista dark brown, finer pubescence; occiput black, concaves shining; thorax blackish, shining; scutellum concolorous with some microscopic pale hairs towards hind margin; fore pair of legs brownish yellow, femora and tibiae darker except at base and tip, middle legs similar, hind legs shining black, femora and tibiae both narrowly orange at base, with a narrow ring at the middle, 2 or 3 long hairs on upper side of hind femora near tip and a row of small spines below, in female anterior legs all yellowish except tips of tarsi; wings yellowish grey, very iridescent; stigmatic region, anterior cross vein, base of discal cell, tips of 2nd and 3rd veins and outer side of 1st posterior cell narrowly brown infuscate; anterior cross vein just before middle of discal cell; 2nd segment of abdomen twice as wide as third, in male 1st segment with a short tooth like process on each side, just behind the halter, and three prominent black bristles, the front on the smallest; last segment with about seven long strong, black bristles on hind margin.

Distribution : India : Uttarakhand (Nainital)

Elsewhere : Nil.

Tribe **Spheginobacchini**
Genus *Spheginobaccha* de Meijere

1908. *Spheginobaccha* de Meijere, *Tijdschr. Ent.*, 51 : 327.

Type-species : *Sphegina macropoda* Bigot.

Diagnosis : Eye pilose or bare; face with weak tubercle; occiput produced on upper half, with a deep crease on upper two-thirds; antennal arista bare; scutellum without a rim and hair fringe, mesopleuron at its anterior portion bare; metathoracic spiracular hair patch absent; metasternum pilose; wing with vein R_{4+5} straight, apical cross-vein directed outward, a distinct spur on vein M_{1+2} and marginal cell open at margin; hind femur with ventral spines.

33. *Spheginobaccha macropoda* (Bigot)

1833. *Sphegina macropoda* Bigot, *Annls. Soc. ent. Fr.*, (6)3 : 331.

Diagnosis : Eye pilose, anterior ocellus not sunken into a cleft and divided; wing with basal cell 2 microtrichos on apical third; abdominal

pattern always with more extensive dark areas except 2 pairs of yellow lateral spots on tergite 2 and 3 , and 1 pair of silvery spots on 4; sternite in male genitalia pilose on dorsolateral surface posteriorly; superior lobe apically like a hook.

Distribution : India : Uttarakhand (Dehradun) Arunachal Pradesh, Meghalaya, Sikkim and West Bengal.

Elsewhere : Oriental.

Tribe **Sericomyini**
Genus ***Pararctophila*** Herve-Bazin

1914. *Pararctophila* Herve-Bazin, *Insecta,* **41** : 152.

Type-species : *oberthuri* Herve-Bazin.

34. ***Pararctophila oberthuri*** Herve-Bazin

1914. *Paractophila oberthuri* Herve-Bazin, *Insecta,* **41** : 153.

1915. *Arctophila simplicipes* Brunetti, *Rec. Indian Mus.*, **11** : 247.

Diagnosis : Frons blackish-aeneous, with a transverse groove at base of antennal prominence, all covered with long yellowish hairs; face blackish with whitish tomentum and some long soft white hairs along inner orbit of eyes, a bare irregular median stripe on face; antennae dark brown, 3rd joint with grayish tomentum, arista brownish yellow with 16 or 17 long hairs on upper side and about 12 shorter hairs on apical half of under side; thorax black, barely shining with a pair of narrow median grayish stripes and a narrower one between them, the whole dorsum and scutellum covered with thick long yellow pubescence; legs black, tarsi reddish, femora covered with black pubescence but with a few fine longer hairs below; wings grey, a moderately wide dark brown band from middle of anterior margin to a little beyond the 4th longitudinal vein; abdomen shining black with thick yellow pubescence on anterior corners and bright red pubescence on major part of last segment, rest covered with black pubescence and longer on hind border and sides; halteres blackish.

Distribution : India : Uttarakhand (Garhwal, Kumaon)

Elsewhere : North to Siberia to east to China.

Tribe **Eumerini**
Genus ***Eumerus*** Meigen

1822. *Eumerus* Meigen, *Syst. Beschr. europ. zweifl. Insekt,* **3** : 202.

Type-species : *Syrphus tricolor* Fabricius.

Diagnosis : Head broader than thorax; eyes more or less pubescent, some times bare, contiguous in male very narrowly, wide apart in female, face flat central knob absent, antennae variable, generally short but elongate, arista bare; thorax subquadrate, aeneous black with short pubescence; scutellum concolorous, margin occasionally serrulate; legs strong, hind femora thickened with short bristles below, hind tibiae usually slightly curved, hind metatarsi generally incrassate, sometimes the succeeding joints dilated; wings with marginal cell widely open, 3rd vein often sinuous, sometimes looped downwards into 1st posterior cell, which is closed some distance from border by the recurrent and angulated upturned tip of 4th vein, that usually bears a short appendix at the angle; abdomen longer than wide with short pubescence, tip blunted in ♂, pointed in ♀.

35. ***Eumerus sexvittatus*** Brunetti

1915. *Eumerus sexvittatus* Brunetti, *Rec. Indian Mus.*, **11** : 245.

Diagnosis : Eyes with sparse white pubescence, lower part of frons with yellowish grey hair, face with whitish grey hair, antenna black, 3rd joint large ovate, lower part white dusted; thorax black, very short yellowish brown hair covered all the dorsum and scutellum; abdomen black, 1st segment with a little aeneous tinge, 2nd, 3rd and 4th segment with a pair of diagonally placed whitish elongate spots, pubescence black on the black parts and yellowish on the spots; legs black with yellowish grey or whitish grey pubescence; basal half of anterior tibiae reddish borwn, middle tarsi reddish brown, except towards tips, hind femora and hind metatarsi incrassate; wings pale grey, a slight brownish suffusion across the middle of the wing; halteres yellow.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

Tribe **Cerioidinae**
Genus ***Ceriana*** Rafinesque

1794. *Ceria* Fabricius, *Ent. Syst.*, **4** : 277.

Type species : *Clauicoruis* Fabricius.

1815. *Ceriana* Rafinesque, *Analyse,* : 181.

Type species : *Ceria clauiceruis* Fabricius.

Diagnosis : Medium-sized, elongate flies; often with bright yellow markings on a black background; mostly bare; upper occiput swollen; face projecting downward, usually nearly straight in profile and retreating above epistoma; cheeks well developed; antennae porrect, first segment a little longer than second, third joint thickened basally, second thickened apically so that last two segments appear as one, last segment bearing a short, pointed, terminal, often pale, style; eyes bare; scutellum short, at least partially yellow; anterior border of wings brownish, third vein with short stump projecting into apical cell, but with almost no dip, third vein, apical cross-vein, and costa end at tip of wing, anterior cross-vein beyond middle of discal cell, oblique; femora considerably thickened, hind femora with stout setigerous bristles ventrally; abdomen but little constricted at base, greatest constriction just beyond base of second segment, abdomen elongate, very convex, subcylindrical.

36. ***Ceriana compacta*** (Brunetti)

1908. *Ceria compacta* Brunetti, *Rec. Ind. Mus.*, **2** : 95.

Diagnosis : Vertex black, a wide stripe below antennae and a transverse line just below the vertical black spot, rest of face red, antennal protuberance reddish-brown, antenna dark brown, 3rd joint black; few white hair behind the eyes and on lower part of the head; thorax wholly black except red shoulder-spots and a vertical red stripe on each side a little in front of the wings; scutellum entirely red; abdomen black, posterior margin of 2nd, 3rd and 4th segments with a thick but narrow red border; legs red, coxae, a narrow ring extending to about two-thirds of the length on the hind femora and a narrow ring at the base of four anterior femora and a ring. on the apical half of all the tibiae black; wings clear, brown from fore border to just beyond the 3rd longitudinal vein, including the whole of the lower basal cell; halteres yellowish-red.

Distribution : India : Uttarakhand (Dehradun)

Elsewhere : Nil.

Genus ***Monoceromyia*** Shannon

1922. *Monoceromyia* Shannon, *Bull. Brooklyn ent. Soc.*, **17** : 32.

Type-species : *Ceria tricolor* Loew.

37. ***Monoceromyia crux*** (Brunetti)

1915. *Ceria crux* Brunetti, *Rec. Indian Mus.*, **11** : 253.

Diagnosis : Head black; a bright yellow, moderate-sized, round-spot on each side of frons between base of antenna and eye, a broad yellow stripe on each side of face, beginning from just below the circular spot broadening rapidly thence gradually narrowing to a point at the mouth border; antennae black, 1st joint, as long as 2nd and 3rd together, reddish; brown on under side, apical style of 3rd joint conical with short narrow elongate tip; thorax black, a bright yellow spot on each humerus, a triangular one at each end of the transverse suture, a bright yellow vertical stripe on mesopleura and a round yellow spot on sternoploura, both stripe and spot nearly in a straight line; scutellum bright yellow, black at base; legs, coxae, hind femora blackish except at base tip and under-side, anterior legs ferruginous-brown traces of an indistinct blackish ring on all tibiae beyond the middle; wings grey anterior half from base to tip, basal half of 1st basal and whole of 2nd basal cell dark-brown; abdomen black, anterior corners of 1st segment with a round bright yellow spot, hind borders of 2nd, 3rd and 4th segments with a well-defined yellow band, 1st segments and the base of 2nd segment contracted; halteres bright yellow.

Distribution : India : Uttarakhand (Bageshwar).

Elsewhere : Nil.

Genus ***Sphiximorpha*** Rondani

1850. *Sphiximorpha* Rondani, *Annls. Soc. Ent. Fr.*, (2)**8** : 212.

Type-species : *Ceria subsessilis* Illiger.

38. ***Sphiximorpha fulvescens*** (Brunetti)

1915. *Ceria fulvescens* Brunetti, *Rec. Indian Mus.*, **11** : 251.

Diagnosis : Hinder orbit of eyes lemon yellow; front part of the head lemon yellow except for a broad median brown stripe, which extends to the mouth and is enlarged round the base of the antennae into a diamond shaped patch which occupies all the upper part except the narrow lemon yellow border immediately contiguous to the eyes; antennae, 1st joint reddish brown, 3rd joint brownish yellow the rest yellowish white; thorax

reddish brown; humeral calli lemon-yellow, a prealar lemon-yellow callus at each end of the transverse suture and the lemon-yellow coloured marks are placed as follows; two faint short lines from the anterior margin and short transverse similar marks placed longitudinally along the transverse suture, one on each side of the middle, an elongate triangular mark on hind margin of dorsum a narrow sub-lateral streak towards each side near the wings; a large round mark on each of the meso, sterno-and metapleurae; scutellum lemon yellow except centrally reddish brown; legs reddish-brown; wings pale yellowish; abdomen reddish-brown, a large triangular lemon-yellow spot on each side at the base of the strongly narrowd 2nd segment, posterior margin of the 2nd, 3rd and 4th segments yellowish; halteres with yellowish white stems and reddish-brown knobs.

Distribution : India : Uttarakhand (Nainital)

Elsewhere : Nil.

Tribe **Eristalini**

Key to the Genera

1. Eye bare; wing with normal submarginal cell (R3) due to normal length of anterior cross-vein (r-m); metathoracic spiracular pile-patch present ..... ***Phytomia*** Guerin-Meneville
- Eye at least partially pilose; if bare, then submarginal cell narrowed basally due to longer anterior cross-vein; metathoracic spiracular pile-patch usually absent 2
2. Antennal arista practically bare; if with microscopic pubescence at base, then abdominal tergites with transversely located spots ..... ***Eristalinus*** Rondani
- Antennal arista plumose at least on basal half; if bare, then eye invariably with 2 distinct bands of dense, dark coloured piles ..... ***Eristalis*** Latreille

Genus ***Eristalinus*** Rondani

1845. *Eristalinus* Rondani, *Nouvi Annali Sci. nat. Bologna*, 2(2) : 453.

Type-species : *Musca sepulchralis*, Linnaeus.

Key to the Subgenera

1. Eye with brown or black spots or with dark irregular markings; metathoracic spiracle at its front without any patch of hairs ..... ***Eristalinus*** Rondani
- Eye with distinct stripes; metathoracic spiracle at its front with a distinct patch of hairs ..... ***Eristalodes*** Mik

Subgenus ***Eristalinus*** Rondani

Key to the Species

1. Femora normally orange or brownish orange, tarsi of similar colour, a little darker apically ..... *arvorum* (Fabricius)
- Femora black, tarsi with tarsomeres 1 and 2 entirely and basally yellowish .... *quinquestriatus* (Fabricius)

*39. ***Eristalinus (Eristalinus) arvorum*** (Fabricius)

1787. *Syrphus arvorum* Fabricius, *Mantissa Insect*, 2 : 335.

Material examined : 1♂ 2♀♀, Ketchura, Champawat dist, 15.ix.04, coll. B. Mitra.

Distribution : India : Uttarakhand (Champawat), Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Orissa, Sikkim, Tripura and West Bengal.

Elsewhere : China and other parts of the S.E. Asia; Australia, Hawai, Japan and Micronesia.

40. ***Eristalinus (Eristalinus) quinquestriatus*** (Fabricius)

1794. *Syrphus quinquestriatus* Fabricius, *Ent. Syst.*, 4 : 289.

Distribution : India : Uttarakhand (Bageshwar) Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Nagaland, Orissa and West Bengal.

Elsewhere : China and other parts of the Oriental Region; Japan.

Subgenus ***Eristalodes*** Mik

1897. *Eristalodes* Mik, *Wien ent. Ztg.*, **16** : 114.

Type-species : *Eristalis taeniops* Wiedemann.

41. ***Eristalinus (Eristalodes) paria*** (Bigot)

1880. *Eristalomyia paria* Bigot, *Annls Soc. ent. Fr.*, (5)10 : 218.

1923. *Eristalis quinquelineatus* var. *Orientalis* Brunetti, *Fauna Br. India*, Dipt., 3 : 183.

Material examined : 1♀, Khardhara, Almora dist., 21.ix.2003, coll. B. Mitra, 1♂, Sonari, Almora dist., 21.ix.03, coll. B. Mitra; 1♂, Sharaghat, Almora dist., 23.ix.03, coll. B. Mitra.

Diagnosis : In ♂ eyes with six narrow, parallel longitudinal black stripes, vertical triangle black with black hairs, frontal triangle with yellow tomentum, face produced, central bump shining black, bare, the colour continued upwards into a short median stripes. A straight, broad, longitudinal, black bare stripe pointed at upper end, on each side of the central bump extending from base of antennae to below level of central bump, below which later is a transverse, very narrow, black line extending across the face nearly from eye to eye, with a second similar line just above the mouth-opening, antennae dark brown, lower part of 3rd joint and the arista orange bare; thorax yellowish grey dorsum with four black stripes; scutellum brownish yellow; legs mainly black, anterior femora narrowly orange at tips, hind femora pale at extreme tip, front tibiae on basal half middle pair nearly to tips, hind pair narrowly at base pale; wings clear, a minute brown spot at tip of auxiliary vein; abdomen, 1st segment dull yellowish, 2nd brownish yellow, anterior and posterior margin black which extended in middle in the form of a triangular spot, a narrow pale yellowish band across the middle, 3rd and 4th segment also with a pale yellowish band; 5th segment entirely black.

Distribution : India : Uttarakhand (Almora, Nainital, Bageshwar), Himachal Pradesh, Jammu & Kashmir, Karnataka, Manipur, Meghalaya, Mizoram, Tamil Nadu, Uttar Pradesh, and West Bengal.

Elsewhere : Java, Laos, Malyasia, Nepal, Sri Lanka, Taiwan, Japan and Moluccas.

Genus ***Eristalis*** Latreille

1804. *Eristalis* Latreille, *Nouv. Dict. Nat.*, **24** : 194.

Type-species : *Musca tenax* Linnaeus.

Key to the Subgenera

Meropleuron at its upper edge(barrette) pilose; antennal arista bare ..... ***Eristalis*** Latreille

Meropleuron entirely bare, antennal arista usually plumose on basal half ..... ***Eoseristalis*** Kanervo

Subgenus ***Eristalis*** Latreille

42. ***Eristalis (Eristalis) tenax*** (Linnaeus)

1758. *Musca tenax* Linnaeus, *Syst. Nat. Ed.*, **10** : 591.

Material examined : 1♀, Dhubri, Dehradun dist. 28.111.03 coll. B.G. Kundu; 1♀ Mando, Uttarkashi dist., 1.iv.03, coll. B.G. Kundu; 1♂, Tilodh, Uttar Kashi dist., 1.iv.03, coll. B.G. Kundu 6♂♂ 8♀♀, Maneri; 1♂, 2♀♀ Jathpur, Uttarkashi dist., 2.iv.03, coll. B.G. Kundu; 4♀♀, Bhatwari, Uttarkashi dist., 3.iv.03, coll. B.G. Kundu; 6♀♀, Gangotri, Uttarkashi dist., 4.iv.03, coll. B.G. Kundu 1♂, Sharaghat, Almora dist., 23.ix.03, coll. B. Mitra 1♂, 2♀♀, Jathpur, Uttar Kashi dist., 2.iv.05, coll. B. Mitra, 1♂,Tehri Garhwal, 22. ix. 01; 1♂, Tehri Garhwal, 3.xi.02, coll. R.S. Bisht.

Diagnosis : Eye brown-haired with 2 longitudinal bands of dense hairs antenna usually brownish black, arista bare, mesonotum shining brownish black; scutellum brownish yellow; subscutellar fringe absent legs black, knee and basal third of fore and basal half of middle tibiae yellow; wings grayish, brownish on anterior half, a small quadrate dark spot below tip of auxiliary vein; abdominal coloration yellow to black 2nd and 3rd segment with a basal black band joined by a median stripe to a similar band on hind margin, rest black.

Distribution : India : Uttarakhand (Dehradun, Uttarkashi, Almora, Tehri Garhwal), Arunachal Pradesh, Meghalaya, and Nagaland.

Elsewhere : Nearly cosmopolitan.

Subgenus ***Eoseristalis*** Kanervo

1938. *Eoseristalis* Kanervo, *Annls. Univ. fenn. abo.*, (A) **6** : 12.

Type-species : *Eristalis cerealis* Fabricius.

Key to the Species

1. Wing with a large brown suffusion filling about middle third of anterior half, abdomen more or less, blackish with no such distinct markings ..... *himalayensis* Brunetti

– Wing almost clear, abdomen yellow with 2nd and 3rd tergites with a pair of black triangular or oblong spots on anterior margins ..... *cerealis* Fabricius

*43. ***Eristalis (Eoseristalis) cerealis*** Fabricius

1805. *Eristalis cerealis* Fabricius, *Syst. Antliat.*, : 232.

Material examined : ♀ Tilodh, Uttarkashi dist., 1.iv.03, coll. B.G. Kundu, 2♂♂, 12♀ Gangotri,

Uttarkashi dist., 4.iv.03, coll. B.G. Kundu; 2♂♂, Nagini, Tehri Garhwal dist., 8.iv.03, coll B.G. Kundu; 1♂, Dhalam, Dehradun dist., 27.iii. 05, coll. B. Mitra.

Distribution : India : Uttarakhand (Tehri Garhwal, Dehradun, Uttarkashi), Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya, Mizoram, Nagaland, Sikkim and West Bengal.

Elsewhere : China, Myanmar and other parts of the Oriental region; Japan, Korea and Sakhalin.

44. ***Eristalis (Eoseristalis) himalayensis*** Brunetti

1880. *Eristalis ursinus* Bigot, *Annls Soc. Ent. Fr.*, (5)**10** : 215.

1908. *Eristalis (Eoseristalis) himalayensis* Brunetti, *Rec. Indian Mus.*, **2** : 70.

Material examined : 1♀ Khardhara, Almora dist., 21.ix.03. 1♂, Saraghat, Almora dist., 23. x .03; 1♂, Gonab, Almora dist; 24. ix. 03, all coll. B. Mitra.

Distribution : India : Uttarakhand (Almora, Nainital), Himachal Pradesh, Jammu & Kashmir, Sikkim and West Bengal.

Elsewhere : China, Myanmar and Nepal.

Genus ***Phytomia*** Guerin-Meneville

1834. *Phytomia* Guerin-Meneville, in Belanger, *Voyage Ind-Orient*; **7** : 509.

Type-species : *Eristalis chrysopygus* Wiedemann.

Subgenus ***Dolichomerus*** Macquart

1850. *Dolichomerus* Macquart, *Dipt-exot. Suppl.*, **4** : 131.

Type-species : *Syrphus crassus* Fabricius.

Diagnosis : Hind femur with a conspicuous subapical tooth on front side; scutellum with apical rim.

*45. ***Phytomia (Dolichomerus) crassa*** (Fabricius)

1787. *Syrphus crassus* Fabricius, *Mantissa Insect.*, **2** : 33.

1923. *Megaspis crassus* Fabricius : Brunetti, *Fauna Br. India, Dipt.*, **3** : 197.

Material examined : 1♀, Chambatia, Almora dist., 29.ix.03, coll. B. Mitra.

Diagnosis : Eye bare, antenna black; arista hairy except distal one-third; thorax and scutellum black, metathoracic spiracular patch present; wing clear, a dark brown streak from vein 2 to 4, enclosing anterior cross-vein, a dark spot over tip of vein 3; marginal cell peliolate; hind femur with a conspicuous basal tooth; abdomen shining black, tergites 2, 3 and 4 each with a deep impression of a large circle.

Distribution : India : Uttarakhand (Almora), Andhra Pradesh, Assam, Bihar, Goa, Karnataka, Kerala, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Laos, Malay, Nepal, Sri Lanka, Sulawesi and Thailand.

Tribe **Milesini**

Key to the Genera

1. Wing with marginal cell (R_1) open 2
– Wing with marginal cell closed with a long petiole ..... ***Milesia*** Latreille
2. Face tuberculate 3
– Face non-tuberculate 4
3. Proboscis very slender, conspicuously produced, twice as long as the very produced epistome; venation distinctly normal with subcostal cell bearing a row of seven or eight small transverse veins ..... ***Lycastris*** Walker
– Proboscis normal, never conspicuously slender nor extremely elongate, epistome very considerably produced; venation normal ..... ***Criorhina*** Meigen
4. Hind femora normal; thorax with conspicuous yellow markings apart from those of humeri ..... ***Temnostoma*** L & S
– Hind femora incrassate; thorax without yellow markings 5
5. Face subcarinate; hind femur conspicuously incrassate ..... ***Syritta*** L & S
– Face not carinate; hind femur much less conspicuously incrassate ..... ***Xylota*** Meigen

Genus ***Criorhina*** Meigen

1822. *Criorhina* Meigen, *Syst. Beschr. europ. zweifl Insekt.*, **3** : 236.

Type-species : *Syrphus asilicus* Fallen.

46. *Criorhina imitator* Brunetti.

1915. *Criorhina imitator* Brunetti, *Rec. Ind. Mus.*, **11** : 236.

Diagnosis : Eyes in ♂ not touching, fronto-antennal prominence moderately large, frons and face covered with yellowish-grey tomentum, antennal 1st and 2nd joints black, 3rd short and deep, reddish orange, arista black; thorax shinning black, anteriorly covered down to the suture with dense yellowish hair, narrowly the hind margin also, rest with dense black hairs; scutellum with very long dense yellowish pubescence; legs, femora black with long, dense yellow or black pubescence tibiae black but reddish brown basally and apically, middle pair of tibiae in ♂ ending in a slender, spine-like tooth; wings yellowish grey, abdomen, ground colour mainly black, the whole surface covered with long, dense, pubescence, the colour varies from yellowish or reddish to black; genitalia in ♂ conspicuous, curved well under venter.

Distribution : India : Uttarakhand (Garhwal) and Jammu & Kashmir.

Elsewhere : Nil.

Genus *Lycastris* Walker

1857. *Lycastris* Walker, *Trans. Ent. Soc. Lond.*, (n.ser.) **4** : 155.

Type-species : *Lycastris albipes* Walker.

47. *Lycastris albipes* Walker

1857. *Lycastris* Walker, *Trans. Ent. Soc. Lond.*, (n.ser.), **4** : 155.

Diagnosis : Eyes bare, contiguous in male for a very short space; antennae pale to very dark red-brown, arista bare; frontal extension and excessively produced rostrum varies from yellowish brown to wholly shining black, sometimes a lighter or darker stripes along sides of rostrum; thorax yellowish grey to nearly black; scutellum yellowish, thorax and scutellum with dense, long, bright yellow pubescence; wing grey, a brownish suffusion along the cross-veins in the middle of the wing over the anterior cross-vein and anterior part of the wing tip, supernumerary veinlets in subcostal cell about six in number; basal half of anterior femora black, hind femora black, tip pale yellow. Abdomen blackish, with an aenous, cupreous or blue tinge, the whole surface covered with dense yellow pubescence.

Distribution : India : Uttarakhand (Dehradun), Karnataka and West Bengal.

Elsewhere : Nil.

Genus *Milesia* Latreille

1804. *Milesia* Latreille, *Nouv. Dict. Hist. nat.*, **24** : 194.

Type-species : *Syrphus crabroniformis* Fabricius.

48. *Milesia ferruginosa* Brunetti.

1913. *Milesia ferruginosa* Brunetti, *Rec. Indian Mus.*, **9** : 268.

Diagnosis : Head yellowish brown. In ♂ vertical triangle elongate, orange brown, raised above level of eyes with black pubescence, frons and face bright-orange yellow, antennae and arista orange, in ♀ a large oval bright-yellow dusted spot on each side of middle of frons; thorax brownish-yellow, dorsum with three broad stripes not attaining anterior margin but the two outer stripes reaching posterior margin, whole dorsum with minute black or yellow pubescence, following ground colour; scutellum deep reddish, broadly black at base with long black hairs; legs femora reddish yellow or orange, basal half of posterior pair black, hind femora with a small yellowish tooth just beyond two-thirds of their length, pubescence covering most of the femur yellowish but some black longer hairs on under side; wings pale grey, divided at the spurious vein into a brown anterior half and a clear hinder half; halteres small, black. Abdomen, 1st segment entirely black, 2nd black with a narrow lemon yellow band a little beyond base, 3rd and 4th segment with a broad chrome-yellow band at base followed by a narrow black band, the remainder of each segment bright reddish yellow.

Distribution : India : Uttarakhand (Kumaon), Assam, Meghalaya, Sikkim and West Bengal.

Elsewhere : Myanmar.

Genus *Syritta* Lepeletier and Serville

1828. *Syritta* Lepeletier and Serville in Latreille, *et. al.*, *Encycl meth.* (Ins.) **10**(2) : 808.

Type species : *Musca pipiens* Linnaeus.

Key to the Species (Adopted from Brunetti, 1923)

1. Hind femora with a moderately narrow complete orange ring at base; a more or less

incomplete ring or streak of varying width on underside near middle; abdominal spots in male on 2nd and 3rd segments definitely separated by a moderate wide median black stripe ..... *pipiens* Linnaeus

– Hind femora normally wholly black, but sometimes very narrowly pale at extreme tip, and occasionally at extreme base; frequently with side wholly black and basal half below brownish or orange; abdominal spots in male on 2nd and 3rd segments normally united to form two complete bands or the dividing black line is very narrow or incomplete .... *orientalis* Macquart

*49. *Syritta orientalis* Macquart

1842. *Syritta orientalis* Macquart, *Dipt. Exot.*, **2**(2) : 76(136).

Material examined : 1♂, Gananath, Almora dist., 22.ix.03 coll B. Mitra; Kolidek, Lohaghat, Champawat dist., 19.ix.04, coll. B. Mitra.

Distribution : India : Uttarakhand (Almora, Champawat), Bihar, Himachal Pradesh, Pondichery, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, Jawa, Myanmar, Singapore and Sri Lanka.

50. *Syritta pipiens* (Linnaeus)

1758. *Musca pipiens* Linnaeus, *Syst. Nat. Ed.*, **10** : 594.

Distribution : India : Uttarakhand (Dehradun), Himachal Pradesh, Punjab, Uttar Pradesh and West Bengal.

Elsewhere : Nepal; Holarctic.

Genus *Temnostoma* Lepeletier & Serville

1828. *Temnostoma* Lepeletier & Serville, *Encycl. mith.*, (Ins,) **10** : 518.

Type-species : *Milesia bombylans* Fabricius.

51. *Temnostoma nigrimanus* Brunetti

1915. *Temnostoma nigrimanus* Brunetti, *Rec. Indian Mus.*, **11** : 246.

Diagnosis : Head wholly bright yellow, oral orifice, proboscis and a short black stripe reaching from lower corner of each eye half-way to end of snout black; antenna orange, 1st joint and basal half of 2nd black, arista dull orange; vertex reddish brown with long black hairs in front and brownish yellow hair behind; thorax shining black, a pair of narrow median grey stripes towards anterior margin, an elongate brownish orange spot just above and in front of the wing, a small oval bright lemon yellow spot on propleura, pubescence on dorsum thick, black; scutellum reddish brown, base black; a large bunch of long reddish-orange hair on mesopleura. Legs orange except a broad black stripe on under side of hind femora, a black streak on front side of middle femora; wings yellowish grey, abdomen black, 2nd segment with a reddish brown hind border and a narrow band in front of the middle, 3rd and 4th with similar orange band but the hinder band on 4th much wider, pubescence bright yellow.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Nil.

Genus *Xylota* Meigen

1822. *Xylota* Meigen, *Syst. Besch. europ. zweifl. Insekt.*, **3** : 211.

Type- species : *Musca sylvarum* Linnaeus.

52. *Xylota ornata* (Brunetti)

1915. *Merodon ornatus* Brunetti, *Rec. Indian Mus.*, **11** : 232.

Diagnosis : Vertex occupied by an elevated aeneous-black tubercle, bearing three reddish ocelli, frontal triangle small black with yellowish grey tomentum, eyes contiguous for one third of their height, face shining black; autennal 1st joint dark, 3rd with whitish dust arista bare; thorax, dorsum with three indistinct broad blackish stripes, a patch of white hair between the anterior pair of legs, immediately below the end of the transverse suture; abdomen black, shining, 2nd segment with two large yellowish spots, laterally covering the full length of the segment, 3rd also with similar pair of spots but narrower at the sides, the whole surface covered with bright yellow hairs; legs yellow hind femora entirely orange hind tibiae with a distinct sub-apical black band and an indistinct sub-basal band; wings yellowish grey; halters bright yellow.

Distribution : India : Uttarakhand (Nainital).

Elsewhere : Nil.

SUMMARY

The Syrphidae of Uttarakhand comprise of 52 species belonging to 35 genera under 13 tribes of

2 subfamilies of them 13 species are recorded for the first time from this state. Species composition of the 13 districts reveal that concentration is maximum in the district of Nainital (16 species) followed by Dehradun (15 species), Tehri Garhwal (10 species), Almora (10 species), Uttarkashi (8 species) Bageshwar (4 species) and Champawat (3 species) (Map.1). Distribution of species 4,5,21,22,25,29,30,34,46,48,51, are reported here as in the Fauna of British India and from other pertinent literatures. Key to the subfamilies, tribes, genera, species, and diagnosis (wherever necessary) and distribution have been provided.

ACKNOWLEDGEMENTS

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REFERENCES

BRUNETTI, E. 1907. Notes on the Oriental Syrphidae. Part I. *Rec. Indian Mus.*, **1**: 379-380.

BRUNETTI, E. 1908. Notes on the Oriental Syrphidae with descriptions of new species. Part I. *Rec. Indian Mus.*, **2** : 49-96.

BRUNETTI, E. 1915. Notes on the Oriental Syrphidae. Part I1. *Rec. Indian Mus.*, **II** : 201-257.

BRUNETTI, E. 1923. *The Fauna of British India including Ceylon and Burma.* Diptera: Pipunculidae, Syrphidae, Conopidae and Oestridae, **3** : xi+ 424pp. Taylor & Francis. London.

DATTA, M. 1998. Diptera : Syrphidae, *In* : *Fauna of Meghalaya. State Fauna Ser.*, **4**(6). 113-176. Zoological Survey of India, Kolkata.

DATTA, M. 2003. Diptera: Syrphidae, *In* : *Fauna of Sikkim. State Fauna Ser.*, **9**(3). 341-385. Zoological Survey of India, Kolkata.

MUKHERJEE, M, MITRA, B AND PARUI, P. 2006. *In* : *Fauna of Arunachal Pradesh* (Syrphidae : Diptera) *State Fauna Series. Zool. Surv. India,* **13** : 241-265.

MUKHERJEE, M. PARUI, P AND MITRA, B. On collection of Hover-flies (Syrphidae : Diptera) from Andhra Pradesh. *Rec. Zool. Surv. India.* (in Press).

MITRA, B, MUKHERJEE, M., GHOSH. S., BANERJEE, R., GOSWAMY, M. 2005. A Checklist of Hover flies (Insecta : Diptera : Syrphidae) of north east India. *Uttar Pradesh. J. Zool.* **25**(4): (in Press).

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 479-489.

INSECTA : DIPTERA : TACHINIDAE

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INTRODUCTION

Tachinidae are one of the most diverse and ecologically important families of the subdivision Calyptrate under the series Schizophora belonging to the infraorder Muscomorpha in the order Diptera. Tachinid adults are extremely diverse in appearance, minute to very large flies, often extremely bristly. As a group adults are readily characterized among calyptrates by the presence of meral bristles and a well-developed subscutellum. Nearly all adult tachinids have a distinct bend in M, a character they share with sarcophagids, oestrids, and calliphorids. Most sarcophagids, but few tachinids, have three prominent longitudinal dark stripes on the scutum; tachinids tend to have four stripes (i.e. the midline is pale) or none (Genus *Billaea* is notable exceptions). Most calliphorids have blue or green metallic bodies, but a few members of the family Tachinidae are as brilliantly metallic green as any calliphorid.

Adult Tachinidae are usually among the most active of insects, seldom remaining still long enough to be captured easily. This hyperactivity usually serves to distinguish them from adult sarcophagids, especially the Sarcophaginae, which they resemble to some extent; the latter are sedentary by comparison. Adult tachinids probably all require daily access to a source of sugar. Flowers, especially the plants of the family Asteraceae are visited by the large Tachinini, as well as by Phasiinae, and some Goniini. Adults mostly feed on liquids such as nectar and the honey dew of aphids and scale insects. As parasitoids, they are important natural enemies in most terrestrial ecological communities, particularly as natural enemies of Lepidopteran larvae, adults and larvae of Coleoptera.

There are 9899 described species of Tachinidae in the world (Irwin et al. 2003), but the actual size of the family is much larger because the Neotropical, Afrotropical, Oriental and Australasian regions contain large numbers of undescribed species. The number of tachinid genera recognized on a world basis is currently 1528, of which 725 species described under 264 genera (52 genera endemic) from the Oriental region. Over 200 species and more than 100 genera of 5 subfamilies have been recorded in India, making the tachinids one of the largest families of Calyptrate Diptera.

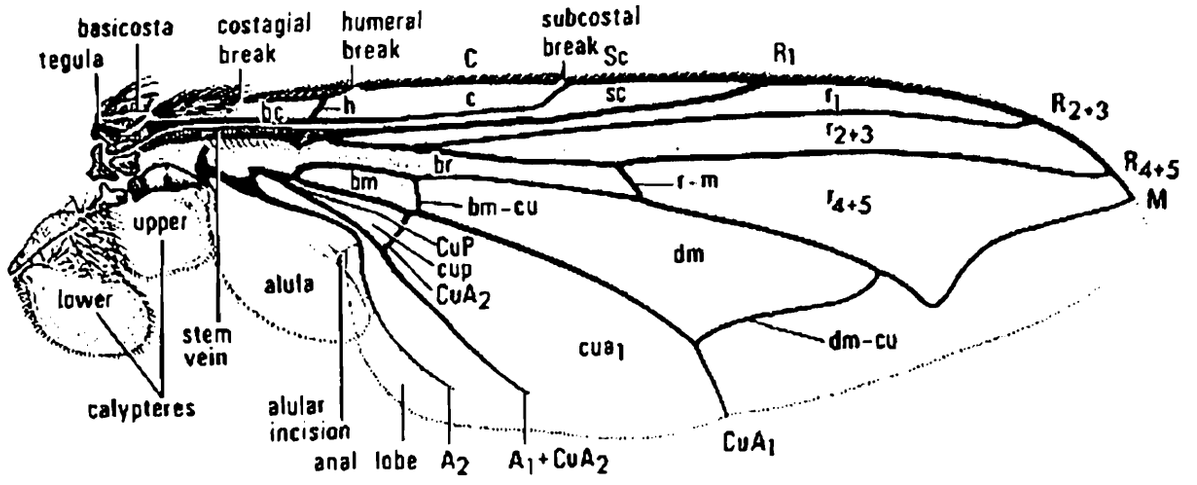
The present paper is based on the recent surveys in Uttarakhand by the scientists of the Diptera section of Zoological survey of India (2003-2005) as well as the previously published data. This report is as such the first consolidated report of the Family Tachinidae from the state of Uttarakhand after its separation from the state of erstwhile Uttar Pradesh (Uttarakhand, known as Uttaranchal from 2000-2006 became the 27th state of Republic of India separated on 9th November 2002). The present report accounts for 19 species of tachinid flies belonging to 19 genera and 4 subfamilies from the state of Uttarakhand. The document is also dealt with systematic account, valid scientific names, species diagnosis and zoogeographical remarks of the tachinid flies from the state of Uttarakhand.

MATERIALS AND METHODS

Adult tachinid flies were collected, set, pinned and processed by methods prescribed by Dutta & Mukherjee (1997).

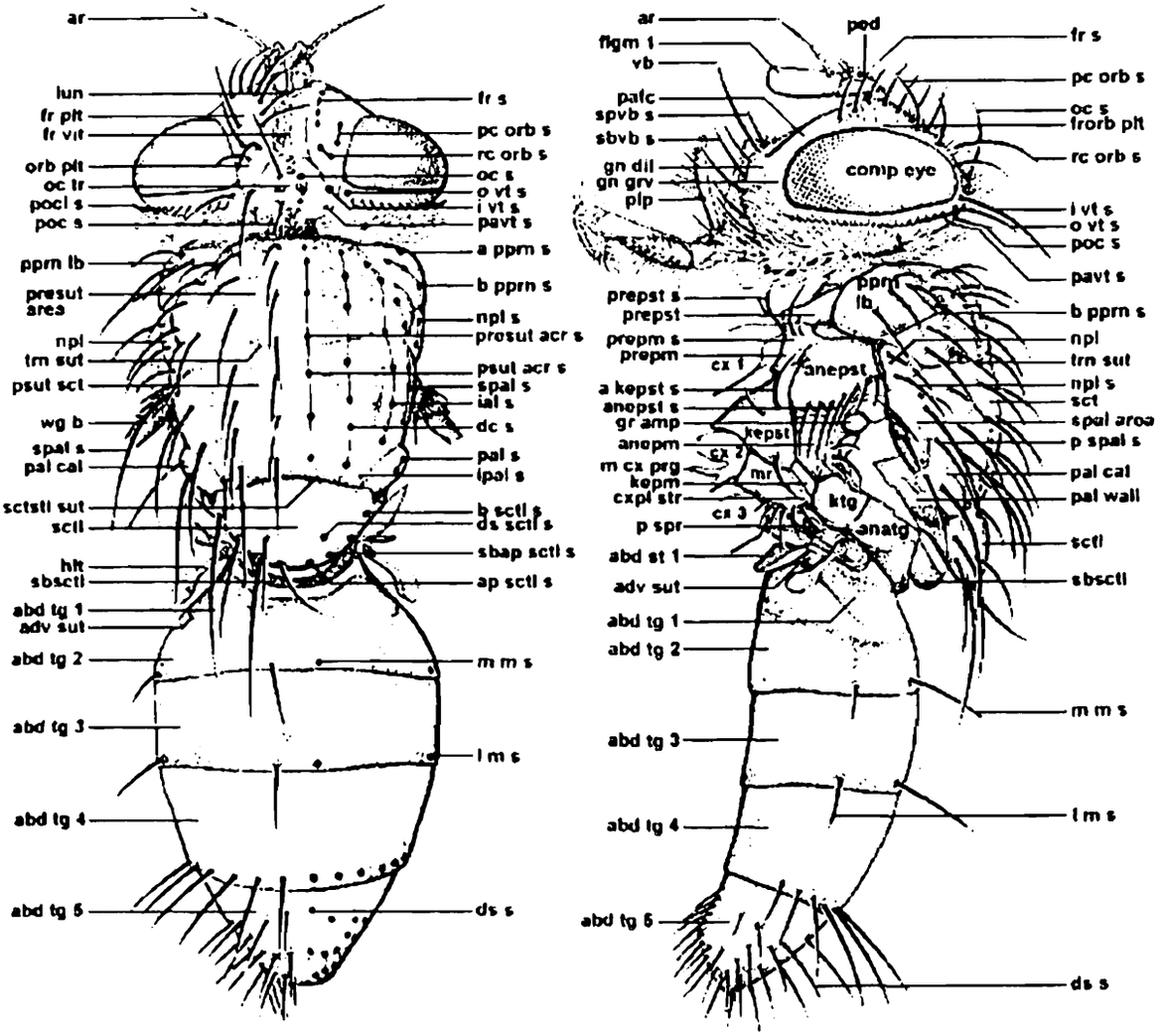
MORPHOLOGY

Lahiri (2000) in "Tachinidae (Diptera) fauna of Tripura" provided a general account of tachinid flies. Below are several illustrations from McAlpine et al. (1981) showing the morphological terms used for features of the wing and body of higher flies, including Tachinidae.



Wing of *Paralucilia wheeleri* (Hough) (Calliphoridae)

Source: James E. O'Hara(1998)



Dorsal and lateral views of body of *Exorista larvarum* (Linnaeus) (Tachinidae) Source : James E. O'Hara (1998)

abd st, abdominal sternite	ial s, intra-alar seta	pc orb s, proclinate orbital seta
abd tg, abdominal tergite	ipal s, intrapostalar seta	ped, pedicel
acr s, acrostichal seta	i vt s, inner vertical seta	plp, palpus
adv sut, adventitious suture	kepst, katepisternum	poc s, postocellar seta
a kepst s, anterior katepisternal seta	ktg, katatergite	pprn, postpronotum
anatg, anatergite	l m s, lateral marginal seta	pprn lb, postpronotal lobe
anepm, anepimeron	lun, lunule	prepm, proepimeron
anepst, anepisternum	m cx prg, mid coxal prong	prepm s, proepimeral seta
anepst s, anepisternal seta	m m s, median marginal seta	prepst, proepisternum
a pprn s, anterior postpronotal seta	mr, meron	prepst s, proepisternal seta
ap sctl s, apical scutellar seta	npl, notopleuron	presut acr s, presutural acrostichal seta
ar, arista	npl s, notopleural seta	presut area, presutural area of scutum
b pprn s, basal postpronotal seta	oc s, ocellar seta	p spal s, posterior supra-alar seta
b sctl s, basal scutellar seta	oc tr, ocellar triangle	p spr, posterior spiracle
comp eye, compound eye	orb plt, orbital plate	psut acr s, postsutural acrostichal seta
cx, coxa	o vt s, outer vertical seta	psut sct, postsutural scutum
cxpl str, coxopleural streak	pafc, parafacial	rc orb s, reclinate orbital seta
dc s, dorsocentral seta	pal cal, postalar callus	sbap sctl s, subapical scutellar seta
ds s, discal seta	pal s, postalar seta	sbsctl, subscutellum
ds sctl s, discal scutellar seta	pal wall, postalar wall	sbvb s, subvibrissal seta
flgm, flagellomere	pavt s, paravertical seta	sct, scutum
frorb plt, fronto-orbital plate	pc orb s, proclinate orbital seta	sctl, scutellum
fr s, frontal seta	ped, pedicel	sctsctl sut, scutoscutellar suture
fr vit, frontal vitta	plp, palpus	spal area, supra-alar area
gn dil, genal dilation	pocl s, postocular setae	spal s, supra-alar seta
gn grv, genal groove	pal wall, postalar wall	spvb s, supravibrissal seta
gr amp, greater ampulla	pavt s, paravertical seta	trn sut, transverse suture
hlt, haltere	pocl s, postocular setae	vb, vibrissa
kepm, katepimeron		wg b, wing base

SYSTEMATIC LIST

Subfamily PHASIINAE
Tribe CYLINDROMYIINI

1. *Hermya beelzebul* (Wiedemann)
2. *Lophosia excisa* Tothill

Subfamily DUFOURIINI
Tribe Dufouriini

3. *Anthomyiopsis nigra* (Baranov)

Subfamily TACHININAE
Tribe VORIINI

4. *Hystricovoria bakeri* Townsend

Tribe ERNESTIINI

5. *Janthinomyia felderi* Brauer & Bergenstamm

Tribe LINNAEMYINI

6. *Linnaemya omega* Zimin

Tribe TACHININI

*7. *Cuphocera varia* Fabricius
8. *Servillia ursinoidea* Tothill
9. *Tothillia asiatica* (Tothill)

Subfamily GONIINAE
Tribe SIPHONINI

10. *Ceromyia mallochiana* Gardner

Tribe CARCELIINI

11. *Carcelia (Carcelia) delicatula* (Mesnil)

Tribe STURMIINI

12. *Blepharella lateralis* Macquat
13. *Cadurcia lucens* Villeneuve
14. *Isosturmia chatterjiana* (Baranov)
15. *Thelairodrino gracilis* Mesnil

Tribe GONIINI

*16. *Pseudogonia rufifrons* Wiedemann
17. *Turanogonioa chinensis* (Wiedemann)

Tribe ERYCIINI

18. *Zenellia grisellina* (Gardner)
19. *Erycia nymphalidophaga* (Baranov)

SYSTEMATIC ACCOUNT

Key to the subfamilies

1. Prosternum setose ..... GONIINAE (Major part)
— Prosternum bare 2
2. Facial ridge strongly setose on their whole height ..... GONIINAE (part, only genus *Blepharella* (Macq.)
— Facial ridge bare but for a few hairs around vibrissae 3
3. Presutural intra-alar setae absent; 0-2 post intra-alar setae ..... PHASIINAE
— Presutural intra-alar setae present; 2 or 3 post intra-alar setae 4
4. Shining black forms with short legs (body < 6.00 mm); scutellum with very strong crossed or convergent apical setae besides one or two other marginals; female abdomen without exserted post abdominal structures ..... DUFOURIINAE
— Such combination of structures not present simultaneously ..... TACHININAE

Subfamily PHASIINAE

Diagnosis : Abdominal vestiture almost entirely hairs like; abdominal strernites fully exposed; one post *ia* or none; Pre-alar and second *sa* setae absent; bend of vein M evenly curved.

Tribe CYLINDROMYIINI

Diagnosis : Abdominal vestiture made of hairing and some differential setae; abdominal sternite 2-4 concealed or only partially exposed; usually two post *ia* setae, Pre-alar and second *sa* setae either both present; bend of vein M abruptly curved or angulate; abdomen usually elongate.

Key to the genera

1. Abdomen variably shaped, tergites without median discal setae, sternites 2-4 completely hidden; male sternite 5 with modified lateral lobes ..... ***Lophosia*** Meigen
— Abdomen fusiform, at least T_3 and T_4 tergites with erect median discal setae, sternites 2-4 partially exposed; male sternite 5 without modified loes ..... ***Hermya*** Robineau-Desvoidy

Genus *Hermya* Robineau-Desvoidy

1830. *Hermya* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.*, **2** : 293.

Type-species : *Hermya afra* Robineau-Desvoidy.

1976. *Hermya* Robineau-Desvoidy,Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent. Ent.*, **26**, (Suppl.) : 171.

1. *Hermya beelzebul* (Wiedemann)

1830. *Tachina beelzebul* Wiedemann, *Aussereurop. zweiflugel. Ins.*, **2** : 301.

Type-locality : Java.

1976 . *Hermya beelzebul* Wiedemann, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26**, (Suppl.) : 171.

Diagnosis : Medium size (8.00 mm). Glossy blackish brown; face, paraface, genae and parafrons shiny golden yellow; sides of thorax, surface of femora and abdomen laterally ashy white while front part of thorax and dorsum also appear similar from certain angle; antennae very long, third segment thrice as long as the remaining segments together and more than twice as long as the palpi; 2 pr.cl. orbitals; parafacial bare, 3 humerals situated in a curve; 3 sternopleurals arranged in a triangle; 3+3 ac, 3+3 dc and 0+2 ia; scutellar marginals total 3, apicals longest, crossing; T_{1+2} excavated at hind margin; wings (12.00mm) blackish brown except along hind margin being pale, almost colourless; epaulette creamy white.

Distribution : India : Uttarakhand (Almora dist), Assam, Sikkim, Himachal Pradesh, Tamil Nadu, West Bengal.

Elsewhere : China, Malayasia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam (North); Japan.

Genus *Lophosia* Meigen

1824. *Lophosia* Meigen, *Syst. Beschr. eur. zweifl. Ins.* **4** : 216.

Type-species : *Lophosia fasciata* Meigen

1976. *Lophosia* Meigen, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26**, (Suppl.) : 172.

2. *Lophosia excisa* Tothill

1918. *Lophosia excisa* Tothill, *Bull. ent. Res.* **9** : 58.

Type-locality : Dehra Dun.

1976. *Lophosia excisa* Tothill, Crosskey, *Bull. Brit. Mus. (nat. Hist.)Ent.*, 26, (Suppl.) : 173.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : Borneo, Formosa, Malaya, Philippines, Sumatra.

Subfamily DUFOURIINAE
Tribe DUFOURIINI
Genus *Anthomyopsis* Townsend

1916. *Anthomyopsis* Townsend, *Insecutor Inscit. menstr.*, **4** : 20.

Type-species : *Anthomyopsis cypseloides* Townsend.

1976 *Anthomyopsis* Townsend, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 175.

Diagnosis : Eyes bare. Scutellum with two pairs of marginal setae (basal and apical).

3. *Anthomyopsis nigra* (Baranov)

1938. *Plagioderophagus niger* Baranov, *Bull. ent. Res.*, **29** : 412.

Type-locality : Dehra Dun.

1976. *Anthomyopsis nigra* Baranov, Crosskey, *Bull. Brit. Mus. (nat. Hist.). Ent.*, (Suppl.) : 176.

Diagnosis : Arista pubescent. Abdominal T3 without median marginal setae. Wing with *m-cu* sigmoid and subequal in length to the section of *M* from *m-cu* to the bend.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : None.

Subfamily TACHININAE
Key to the tribes

1. Hind coxae with fine soft hairs on posterolateral surface ..... TACHININI

— Hind coxae bare on posterodorsal surface 2

2. Fore coxae haired on the whole (or almost the whole) of its inner surface ..... VORIINI

— Fore coxae bare on most of its inner anterior surface 3

3. Palpi fully developed and longer than third antennal segment. 3 or 4 *post dc;* M_2 appendix present or absent. Usually with metallic blue, green or violet colouring .... ERNESTIINI

— Palpi vestigial or absent. 3 *post dc*; M_2 appendix present. No metallic colouring .... LINNAEMYINI

Tribe VORIINI
Genus ***Hystricovoria*** Townsend

1928. *Hystricovoria* Townsend, *Philipp. J. Sci.*, **34**(1927) : 395.

Type-species : *Hystricovoria bakeri* Townsend.

1976. *Hystricovoria* Townsend, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 188.

Diagnosis : Parafacial bare without hairs or setae below the lowermost frontal setae. Arista thickened on more than half its length.

4. ***Hystricovoria bakeri*** Townsend

1928. *Hystricovoria bakeri* Townsend, Philipp. J.Sci., **34**(1927) : 395.

Type-locality : Philippines.

1976. *Hystricovoria bakeri* Townsend, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 188.

Diagnosis : Parafacial bare; eyes bare; facial ridges bare but for the small setullae near vibrissae; prosternum bare; M_2 appendix shorter than second section of M between m-cu and the bend.

Distribution : India : Uttarakhand (Dehra Dun district), Gujarat, Tamil Nadu.

Elsewhere : Philippines; Ethiopian Region; Western Australia.

Tribe ERNESTIINI
Genus ***Janthinomyia*** Brauer & Bergenstamm

1893. *Janthinomyia* Brauer & Bergenstamm, *Denkschr. Akad. Wiss., Wien*, **60** : 141.

Type-species : *Janthinomyia felderi* Brauer & Bergenstamm.

1976. *Janthinomyia* Brauer & Bergenstamm, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 203.

*5. ***Janthinomyia felderi*** Brauer & Bergenstamm

1893. *Janthinomyia felderi* Brauer & Bergenstamm, *Denkschr. Akad. Wiss., Wien*, **60** : 141.

Type-locality : India (Kumaon).

1976. *Janthinomyia felderi* Brauer & Bergenstamm, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 203.

Material studied : 2 exs, Ketchura, Champawat district, 15.ix 2004, coll B. Mitra; 1ex, Dhan, Champawat dist., 15.ix.2004, coll. B. Mitra.

Diagnosis : Medium size (12.00mm), metallic blue, palely so on genae, frons, vertex and behind head; face and frons silvery white; eyes hairy; proboscis shorter than head height; palpi clubbed, longer than third antennal segment; antenna with third segment the longest; ocellar setae strong; proclinate; humeral setae 3, arranged in a triangle; scutellar marginals total 5, of which the apicals are crossing and shorter than subapicals; 1 post humeral seta; 3 stpl; 4 post dc; excavation of T_{1+2} barely reaching the hind margin; T_3 and T_4 with large, posteriorly directed spines on mid dorsum and along posterior margin; bend of M without M_2 appendix; cell 5 open; setulae on R_{4+5} confined to basal node.

Distribution : India : Uttarakhand (Champawat district), Sikkim, West Bengal.

Elsewhere : China and Taiwan.

Tribe LINNAEMYINI
Genus ***Linnaemya*** Robineau-Desvoidy

1830. *Linnaemya* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.*, **2** : 52.

Type-species : *silvestris* Robineau-Desvoidy.

1976. *Linnaemya* Robineau-Desvoidy, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 203.

*6. ***Linnaemya omega*** Zimin

1954. *Linnaemya omega* Zimin, *Trudy zool. Inst. Leningr.*, **15** : 280.

Type-locality : China.

1976. *Linnaemya omega* : Crosskey, *Bull. Brit. Mus (nat. Hist.) Ent.*, (Suppl.) : 204.

Material examined : 8exs, Ketchura, Champawat district, 15.ix 2004, coll B. Mitra; 3exs. Chalthi, Champawat district, 16.ix 2004, coll B. Mitra.

Distribution : India : Uttarakhand (Champawat district).

Elsewhere : China, Myanmar.

Remarks : This species is reported first time from the state of Uttarakhand. Earlier report of this species is recorded as in 'India' (Crosskey, 1977).

Tribe TACHININI

Key to the genera

1. Veins R_1 and R_{4+5} setulose along almost their entire length ..... ***Tothillia*** Crosskey

   Veins R_1 and R_{4+5} totally bare except for the fine setulae at the basal node of R_{4+5} 2

2. Parafacial armed with two or more strong setae at its lower end. Palpi absent .... ***Cuphocera*** Macquart

   Parafacial uniformly haired. Palpi present ... . ***Servillia*** Robineau-Desvoidy

Genus ***Cuphocera*** Macquart

1835. *Cuphocera* Macquart, *Annls. Soc. Ent. Fr.*, (2)**3** : 267.

Type-species : *Micropalpus ruficornis* Macquart.

1976. *Cuphocera* Macquart : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.* (Suppl.) : 205.

*7. ***Cuphocera varia*** (Fabricius)

1794 *Musca varia* Fabricius, *Ent. Syst.*, **4** : 327.

Type-locality : 'Ind, Or'

1976 *Cuphocera varia* (Fabricius), Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 205.

Material studied : 2exs, Katchura, Champawat district, 15.ix.2004, coll B. Mitra; 4exs, Kardhara, Almora district, 21.ix.2003, coll. B. Mitra.

Diagnosis : Medium size (13.00mm). Head mostly shiny white but eyes, antennae and inter frons dark, brownish; thorax and abdomen blackish, sides of thorax, base of scutellum and sublateral patches on abdomen pruinosed; antennae failing short of epistome; 3 strong proclinate and 2 smaller reclinate orbitals; ocellar setae not prominent but postocular row of black setae quite prominent, 6 humerals of which 4 main anteriors situated in a curve; 4+3 ac, 4+4 dc and 1+2 ia setae; scutellar total 4, sub apicals converging, nearly twice as long as apicals which are crossing; about 6 subapical semi erect discal setulae setae, T_{1+2} excavated to hind margin, T_3 and T_4 with a pair of median marginals.

Distribution : India : Uttarakhand (Champawat district), Assam, Kerala, Tamil Nadu, Sikkim, West Bengal.

Elsewhere : Borneo, Myanmar, Celebes, Sri Lanka, China, Taiwan, Java, Malaya, Philippines, Sumatra; Moluccas, New Guinea, Queensland.

Remarks : This species is reported first time from the state of Uttarakhand.

Genus ***Servillia*** Robineau-Desvoidy

1830. *Servillia* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.*, **2** : 49.

Type-species : *Tachina ursina* Meigen.

1976. *Servillia* Robineau-Desvoidy, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 207.

8. ***Servillia ursinoidea*** Tothill

1918. *Servillia ursinoidea* Tothill, *Bull. Ent. Res.*, **9** : 50.

Type-locality : Kumaon.

1976. *Servillia ursinoidea* Tothill : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 209.

Distribution : India : Uttarakhand (Kumaon), Assam, West Bengal.

Elsewhere : China, Taiwan, Myanmar, Java, Nepal, Thailand.

Genus ***Tothillia*** Crosskey

1976. *Tothillia* Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 209.

9. ***Tothillia asiatica*** (Tothill)

1918. *Chaetoplagia asiatica* Tothill, *Bull. Ent. Res.*, **9** : 55.

Type-locality : Khati, Kumaon.

1976. *Tothillia asiatica Tothill* : *Crosskey, Mus. Bull. Brit. (nat. Hist.) Ent.*, (Suppl.) **26** : 104.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh.

Elsewhere : None.

Subfamily GONIINAE

Key to the tribes

1. Pre-alar seta short and weak, usually shorter than first *post ia* seta and much shorter than first *post dc* seta ..... SIPHONINI

— Pre-alar seta moderately or very strong in relation to the size in relation to other mesonotal setae, much longer than the first *post dc* seta 2

2. Ocellar setae reclinate (frons exceptionally broad, eyes bare, 3+4 *dc* setae ..... GONIINI

— Ocellar setae proclinate or absent 3

3. Eyes very large, occupying almost the whole side of the head, the gena reduced to a narrow steip below the eye that is not as deep as width of the third antennal segment..... CARCELLINI

— Eyes relatively smaller, genal depth usually at least as much as the width of the third antennal segment 4

4. Vibrissae situated at the level of epistome .. ERYCIINI

— Vibrissae situated above the level of epistome ..... STURMIINI

Tribe SIPHONINI

Genus ***Ceromya*** Robineau–Desvoidy

1830. *Ceromya* Robineau–Desvoidy, *Mem. Pres. Div. Sav. Acad. Sci. Inst. Fr.*, **2** : 86.

Type-species : *testacea* Robineau–Desvoidy.

1976. *Ceromya* Robineau–Desvoidy : Crosskey, *Bull. Mus. Brit (nat. Hist.) Ent.*, (Suppl.) : 212.

10. ***Ceromyia mallochiana*** (Gardner)

1940. *Ceromyia mallochiana* Gardner, *Indian J. Ent.*, **2** : 178.

Type-locality : Dehra Dun, India.

1976. *Ceromyia mallochiana* Gardner, Crosskey, *Bull. Mus. Brit (nat. Hist.) Ent.*, (Suppl.) : 213.

Distributiion : India : Uttarakhand (Dehra Dun district), Tamil Nadu, Orissa.

Elsewhere : China, Hong Kong, Malaya.

Tribe CARCELIINI

Genus ***Carcelia*** Robineau-Desvoidy

1830. *Carcelia* Robineau-Desvoidy, *Mem. Pres. Div. Sav. Acad. Sci. Inst. Fr.*, **2** : 86.

Type-species : *bombylans* Robineau–Desvoidy.

1976. *Carcelia* Robineau-Desvoidy : Crosskey, *Bul. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 228.

Subgenus ***Carcelia*** Robineau-Desvoidy

11. ***Carcelia (Carcelia) delicatula*** (Mesnil)

1968. *Parexorista delicatula* Mesnil, *Bull. Annls. Soc. R. ent. Belg.*, **104** : 173.

Type-locality : Dehra Dun.

1976. *Carcelia (Carcelia) delicatula* (Mesnil) : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 230.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : None.

Tribe STURMIINI

Key to the genera

1. Prosternum bare ..... ***Blepharella*** Macquart

— Prosternum setose 2

2. Four sternopleural setae; ocellar setae absent or very weak ..... ***Isosturmia*** Townsend

— Three sternopleural setae; ocellar setae strong 3

3. Second *sa* seta reduced, weaker than the *pra* seta ..... ***Cadurcia*** Villeneuve

— Second *sa* seta normal, strong or as strong as the *pra* seta ..... ***Thelairodrino*** Mesnil

Genus ***Blepharella*** Macquart

1851. *Blepharella* Macquart, *Mem. Soc. Sci. Agric. Lille*, **1850** : 176.

Type-species : *lateralis* Macquart.

1976. *Blepharella* Macquart : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 234.

*12. ***Blepharella lateralis*** Macquart

1851. *Blepharella lateralis* Macquart, *Mem. Soc. Sci. Agric. Lille*, **1850** : 176.

Type-locality : Pondicherry.

1976. *Blepharella lateralis* Macquart, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 234.

Material studied : 1ex, Sonari, Almora district, 21.ix.2003. coll B. Mitra.

Diagnosis : Medium size (12.00mm). Blackish; scutellum ferruginous; face, frons, fine basal rings on T_3 and T_4 and basal half of T_5 pruinosed; proboscis shorter than head height; palpi subequal to third antennal segment; antenna with third segment the longest; 4 humeral setae of which main three situated almost in a line, the fourth one placed a little forward; 3+3 acr, 3+4 dc, and 1+3 ia; 5 scutellar marginal setae; the apical short,

stumpy; subapical much longer, subparallel, their distance being shorter than the distance between one subapical and corresponding base; no scutellar discal setae; cell R_5 open; bend of vein M without appendix; setae on R_{4+5} confined to basal node, T_{1+2} excavated to hind margin.

Distribution : India : Uttarakhand (Almora district), Andhra Pradesh, Assam, Kerala, Mizoram, Karnataka, Pondicherry, Tamil Nadu.

Elsewhere : Sri Lanka, China, Taiwan, Java, Malaya, South Vietnam, Sumatra; New Gunea, Solomon Islands, Australia.

Remarks : This species is reported first time from the state of Uttarakhand.

Genus ***Cadurcia*** Villeneuve

1926. *Cadurcia* Villeneuve, *Revue Zool. afr.*, **14** : 244.

Type-species : *Masicera casta* Rondani.

1976. *Cadurcia* Villeneuve : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 236.

13. ***Cadurcia lucens*** Villeneuve

1926. *Cadurcia lucens* Villeneuve, *Revue Zool. afr.*, **14** : 244.

Type-locality : Nigeria.

1976. *Cadurcia lucens* Villeneuve : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 236.

Diagnosis : Black with shining thorax; abdomen extensively covered with white pollinocity on T4 and T5; ocellar setae strong; 3 stpl setae; eyes bare or almost so, mid tibia with one ad setae; second supra alar seta reduced and weaker than pre alar seta.

Distribution : India : Uttarakhand (Nainital district), Gujarat, Punjab.

Elsewhere : Indonesia; Nigeria, Southern Africa, Mauritius.

Genus ***Isosturmia*** Townsend

1927. *Isosturmia* Townsend, *Suppl. Ent.*, **16** : 67.

Type-species : *inverse* Townsend.

1976. *Isosturmia* Townsend : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 236.

14. ***Isosturmia chatterjiana*** (Baranov)

1934. *Sturmia chatterjiana* Baranov, *Vet. Arh.* **4** : 484.

Type-locality : Dehra Dun.

1976. *Isosturmia chatterjiana* (Baranov) : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 237.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : Sri Lanka, China, Hong Kong, Malaya, Nepal.

Genus ***Thelairodrino*** Mesnil

1954. *Thelairodrino* Mesnil, *Annls. Mus. r. Congo. Belg, ser.*, 4 (Zool.), **1** : 470.

Type-species : *Thelarosoma gracilis* Mesnil.

1976. *Thelairodrino* Mesnil : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 242.

15. ***Thelairodrino gracilis*** (Mesnil)

1952. *Thelairosoma gracilis* Mesnil, *Fliegen palaearkt. Reg.* **64g** : 219.

Type-locality : Dehra Dun.

1976. *Thelairodrino gracilis* Mesnil : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.* (Suppl.) : 242.

Distribution : India : Uttarakhand (Dehra Dun), Andhra Pradesh, Kerala., Maharashtra.

Elsewhere : None.

Tribe GONIINI

Key to the genera

1. Facial ridge conspicuously convex; genal and parafacial vestiture partly yellow .... ***Turanogonia*** Rohdendrof

— Facial ridge not noticeably conspicuously convex; genal and parafacial vestiture entirely black .... ***Pseudogonia*** Brauer & Begenstamm

Genus ***Pseudogonia*** Brauer & Begenstamm

1889. *Pseudogonia* Brauer & Begenstamm, *Denkschr. Akad. Wiss., Wien*, **56** : 100.

Type-species : *Gonia cinerascens* Rondani.

1976. *Pseudogonia* Brauer & Begenstamm : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 244.

*16. ***Pseudogonia rufifrons*** (Wiedemann)

1830. *Tachina rufifrons* Wiedemann, *Aussereurop. zweifl. Ins.*, **2** : 318.

Type-locality : China.

1976. *Pseudogonia rufifrons* (Wiedemann) : Crosskey, *Bull.Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 244.

Material studied : 2exs, Kardhara, Almora district, 21.ix.2005 coll B. Mitra; 2exs, Askote, Pitoragarh district, 23.ii.2005, coll B. Mitra; 1ex, Ketchura, Champawat district, 15.ix.2004, coll. B. Mitra; 1ex, Kandu, 22.ix.2003, coll. B. Mitra; 1ex, Gananath, 22.ix.2003, coll. B. Mitra.

Diagnosis : Medium in size (10.00mm). Black marked with pruinosed white on thorax and abdomen, face and frons shining silvery white. Frons very wide, its width more than the height of genae. Three humerals; four scutellars of which the sub apicals are the longest and the apicals are directed straight backwards; four stpl situated in curve.

Distribution : India : Uttarakhand (Pithoragarh, Champawat districts), Andhra Pradesh, Jammu and Kashmir, Kerala, Orissa, Punjab, Tripura.

Elsewhere : Myanmar, China, Taiwan, Java, Malaya, Pakistan, Philippines; South Palaearctic Region; Ethiopian Region; Japan, Molucca Islands, New Guinea, Solomon Islands; Australia.

Remarks : This species is reported first time from the state of Uttarakhand.

Genus ***Turanogonia*** Rohdendorf

1924. *Turanogonia* Rohdendrof, *Zool. Anz.*, **58** : 228.

Type-species : *Smirnovi* Rohdendorf.

1976. *Turanogonia* Rohdendorf : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 245.

17. ***Turanogonia chinensis*** (Wiedemann)

1824. *Gonia chinensis* Wiedemann, *Analecta ent.*, : 47.

Type-locality : China.

1976. *Turanogonia chinensis* (Wiedemann) : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 245.

Distribution : India : Uttarakhand (Dehra Dun district), Assam, Bihar, Tamil Nadu, Karnataka, Pondicherry, Punjab, Sikkim, West Bengal.

Elsewhere : China, Nepal, Pakistan, Philippines; U.S.S.R.; Japan.

Tribe ERYCIINI

Key to the genera

Eyes haired, hairing long, dense and conspicuous ..... ***Zenellina*** Robineau-Desvoidy

Eyes bare or with sparse hair ..... ***(?Erycia) nymphallidophaga*** Baranov

Genus ***Zenillia*** Robineau-Desvoidy

1830. *Zenillia* Robineau-Desvoidy, *Mem. Pres. Div. Sav. Acad. Sci. Inst. Fr.*, **2** : 152.

Type-species : *Musca libatrix* Panzer.

1976. *Zenillia* Robineau-Desvoidy : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 253.

18. ***Zenellia grisellina*** (Gardner)

1940. *Exorista grisellina* Gardner, *Indian J. Ent.*, **2** : 177.

Type-locality : Dehra Dun.

1976. *Zenellia grisellina* (Gardner) : Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) : 253.

Distribution : India : Uttarakhand (Dehra Dun district), Maharashtra.

Elsewhere : None.

Unplaced species of Eryciini

19. ***Erycia nymphalidophaga*** Baranov

1936. *Erycia nymphalidophaga* Baranov, *Ann. Mag. nat. Hist.*, (10)**17** : 112.

Type-locality : Dehra Dun.

1976. *Erycia nymphalidophaga* Baranov Crosskey, *Bull.Brit Mus. (nat. Hist.) Ent.*, (Suppl.) : 254.

Distribution : India : Uttarakhand (Dehra Dun district).

Elsewhere : Sri Lanka.

SUMMARY

A comprehensive account of the Tachinid fauna of Uttarakhand is dealt in this communication. Altogether 19 species under 19 genera of 4 subfamilies have been reported, of them 5 species are recorded for the first time (marked with

asterisks) from this State. Keys and diagnostic characters to the identification of subfamilies, tribes, genera and species are reported here. Among the 19 species are reported here, 2 species in Uttarakhand, 3 species in India, 5 species are restricted their distribution in the Oriental Region, and rest spread outside orient.

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REFERENCES

Crosskey, R.W. 1976. A taxonomic conspectus of the Tachinidae (Diptera) of the Oriental Region. *Bull. Brit. Mus. (nat. Hist.). Ent.,* **26** (Suppl.) : 1-357.

Crosskey, R.W. 1977. Family Tachinidae. *In* M.D.Delfinado and D.E. Hardy (eds). *A Catalogue of Diptera of the Oriental region.*, **3** : 586-697. Univ. Hawaii Press, Honolulu.

Datta, M. Parui, P amd Mukherjee, M. 1997. Insecta : Diptera. 1-76. *In Fauna of West Bengal, State Fauna Ser.,* **3**(7). Zoological Survey of India, Kolkata.

Irwin, M.E., Schlinger, E.I. and Thompson, F.C. 2003. Diptera, true flies. Pp. 692–702. *In* Goodman, S.M. and Benstead, J.P., *The Natural History of Madagascar.* University of Chicago Press, Chicago and London. 1728 pp.

Lahiri, A.R. 2003. Tachinidae : Diptera, 387-399. *In* : *Fauna of Sikkim, State Fauna Ser.,* **9**(3). Zoological Survey of India, Kolkata.

Lahiri, A.R. 2000. Tachinidae : Diptera, 271-281. *In* : *Fauna of Tripura, State Fauna Ser.,* **7**(3). Zoological Survey of India, Kolkata.

Lahiri, A.R. and Mitra, B. 2004. Tachinidae : Diptera, 127-159. *In* : *Fauna of Gujarat, State fauna Ser.,* **8**(Part-1) Zoological Survey of India, Kolkata.

McAlpine, J.F. 1981. Morphology and terminology-adults. Pp. 9-63. *In :* McAlpine, J.F., *et al.* (eds.), Manual of Nearctic Diptera. Volume 1. Agriculture Canada Monograph 28.

O'Hara, J.E. 2006. World Catalog of the Tachinidae (Diptera) and their regional occurrence, version 2.0. Pp. 1-70 www. Tachinidae morphology.htm. J.E.O'Hara. Tachinidae morphology. First published on the internet in 1998. Last update : 20th June, 2003.

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Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 491-499.

INSECTA : DIPTERA : TEPHRITIDAE

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INTRODUCTION

The family Tephritidae belongs to the suborder Brachycera, infra Order Muscomorpha (=Cyclorrhapha), section Schizophora and superfamily Tephritoidea (Mc Alpine, 1989). The Tephritidae, true fruit flies (although members of this family are commonly called fruit flies, the vast majority of the world's species are not frugivorous), are a family of attractive picture-winged flies. The members of this family are distributed throughout the world except the Polar Regions. They are almost all phytophagous, of them subfamily Dacinae are mostly pests of fruit, subfamily Tephritinae breeds on predominantly in flower heads and some are gall formers and stem borers. The Trypetinae have a wide range of biological associations.

The shape of the subcosta has generally been considered the best diagnositic character for adult fruit flies, but its form varies and in some taxa. In general, the members of the family are medium to large in size (Length 1 to 35 mm.).Body is variously colored but nonmetallic. Frons usually with both inclinate frontal bristles and 1-2 (rarely 3) orbital bristles; ocelli present; an episternum with vertical suture on posterior third; an epimeron with at least one seta medially and with greater ampulla usually well developed; wing usually patterned; costa with humeral and subcostal breaks; subcosta bent sharply forward subapically and usually weaker or fold like beyond the bend ; vein R1 densely setulose dorsally almost to base; female with ovipositor of piercing type, including a strongly sclerotized aculeus that telescopes into fused oviscape; and male with correspondingly long, coiled phallus, stored between genitalia and tergite 5 at rest and bearing a stout apical glans.

Fruit flies of most of the world's tropics are still poorly known and comparatively little biological data or host information is available for most of the fauna. Currently there are 4, 257 species of 471 genera described around the world, and 943 species of 155 genera from the Oriental Region (Thomson, 1998). In India, only 187 species of 70 genera of fruit flies are reported (Radhakrishnan, 1991).

Species of Tephritidae were among the first flies described by Linnaeus (1758), Fabricius and their contemporaries. Although the valid family name was not proposed until 1834 by Newman, fruit flies were recognized as a group as early as 1795 by Schrank (as "Bohrfliege") in his genus *Trupanea,* the earliest genus now placed in the Tephritidae (Thomson, 1998). So far knowledge goes Fabricius (1794) was the first man, who described fruit flies from the Indian subcontinent. In the year 1913, the first fruit fly was described from this state (Nainital district) by Bezzi. This was followed by the works of Hendel (1931), Munro (1938), Philip (1950), and Hardy (1973). Recently, Mitra and Bhattacharya (2006) reported 17 species of 13 genera of fruit flies of them, 5 species and 5 genera have been reported first time from this state.

However, the present paper is based on the recent surveys in Uttarakhand by the scientists of the Diptera section of Zoological Survey of India (2003-2005) and as well as the previously published data. This report is as such the first consolidated report of the Family Tephritidae from the state of Uttarakhand after its separation from the state of erstwhile Uttar Pradesh (Uttarakhand, known as Uttaranchal from 2000 2006 became the 27th state of Republic of India separated on 9th November 2002). The present report accounts for 20 species of fruit flies belonging to 16 genera and 10 tribes under 3 subfamilies along with their systematic account, valid scientific names, species diagnosis and zoogeographical remarks from the state of Uttarakhand.

MORPHOLOGY AND TERMINOLOGY

McAlpine (1981) proposed a morphological terminology for adult Diptera that is standardized with that of other insects and is well illustrated. A group of workers of Tephritidae proposed modifications to this terminology for more specific applications (Thomson, 1998).

MATERIALS AND METHODS

The methods described by Datta *et al.* (1977) were employed here for collecting, killing and preserving adult fruit flies.

SYSTEMATIC LIST

Subfamily DACINAE
Tribe DACINI

1. *Callantra brachycera* (Bezzi)
2. *Callantra sphaeroidalis* (Bezzi)
3. *Dacus (Afrodacus) aberrans pallescentis* Hardy
4. *Dacus (Bactrocera) paratuberculatus* (Philip)
5. *Dacus (Zeugodacus) scutellaris* (Bezzi)
6. *Dacus (Zeugodacus) tau* (Walker)

Subfamily TRYPETINAE
Tribe ACANTHONEVRINI

7. *Acanthonevra dunlopi* (van der Wulp)

Tribe ACIURINI

8. *Sphaeniscus atilius* (Walker)

Tribe ADRAMINI

9. *Meracanthomyia intermedia* Hardy

Tribe EUPHRANTINI

10. *Euphranta (Staurella) dissoluta* (Bezzi)

Tribe GASTROZONINI

11. *Acroceratitis plumosa* Hendel
12. *Chaetellipsis dispilota* Hardy

Tribe TRYPETINI

13. *Anomoia immsi* (Bezzi)
14. *Hemilea praestans* (Bezzi)
15. *Rhagoletis bezzianum* Hendel
16. *Vidalia trigenata* Munro

Subfamily TEPHRITINAE
Tribe PLATENSININI

17. *Platensina acrostacta* (Wiedemann)

Tribe TEPHRELLINI

18. *Indaciura xanthotricha* (Bezzi)

Tribe TEPHRITINI

19. *Campiglossa cribellata* Bezzi
20. *Elaphromyia pterocallaeformis* (Bezzi)

SYSTEMATIC ACCOUNT

Subfamily DACINAE
Tribe DACINI
Genus ***Callantra*** Walker, 1860

1. ***Callantra brachycera*** (Bezzi)

1916. *Mellesis brachycera* Bezzi, *Bull. ent. Res.*, **7** : 116.

Type-locality : Dehra Dun.

Diagnosis : Head entirely reddish yellow, bristles black like those of thorax and scutellum, frons narrower, occiput without pale border around the eyes, ocellar dot black, 3 pairs of lower fronto orbitals, lunula small, shining, reddish, antennae yellow, arista bare, palpi broad, yellow, with short hairs, proboscis dark brown, with yellowish pilose flaps; thorax reddish, densely punctulate, humeral calli are more reddish than yellow, and behind the suture there is a blackish patch on each side, suture is broadly interrupted in the middle and sutural calli reddish yellow, mesopleural stripe reddish yellow, sternopleura black, hypopleural spot double, halteres whitish; scutellum is less bright yellow; legs reddish, the basal half of hind femora and tarsi pale yellowish, pubescence pale yellowish, basal half of middle femora whitish; wings hyaline, fore border pale brownish to 3rd vein, apical spots grayish, with two dark stripes along the 3rd and 4th veins, 1st twice as broad as 2nd; anal cell without dark stripe, with a dark yellowish base; small cross-vein straight; abdomen elongate, pubescence yellowish and sericeous on posterior segments, very long at sides of 1st two segments, 1st segment reddish, 2nd segment bears a transverse ovate black spot near the base, 4th and 5th segments have a black spot like stripe on each side near the base, venter yellow.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

2. ***Callantra sphaeroidalis*** (Bezzi)

1916. *Mellesis sphaeroidalis* Bezzi, *Bull. ent. Res.*, **7** : 115.

Type-locality : Dehra Dun.

Diagnosis : Predominantly rufous species with black antennal furrows, frons with a small brown spot at base of each bristle; black bands across bases of abdominal terga 3 and 5, lateral margins of 5 narrowly black, tergal glands on 5th tergum rufous, faintly tinged with brown, sterna brown, tinged with rufous, 5th sternum in males slightly wider than long and gently concave on hind margin; hind femora, tibiae tinged with brown on their apices; epandrium longer than wide, surstyli short, straight sided, each produced into a narrow lobe at upper apex, female ovipositor short, basal segment shorter than 5th tergum, piercer slender, sharp-pointed at apex.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Pakistan, Thailand.

Genus ***Dacus*** Fabricius, 1805
Subgenus ***Afrodacus*** Bezzi

1924. *Afrodacus* bezzi, *Ann. S. Afr. Mus.*,**19** : 469.

Type-species : *Chaetodacus biguttulus* Bezzi

3. ***Dacus (Afrodacus) aberrans pallescentis*** Hardy

1955. *Dacus aberrans pallescentis* Hardy, *J. Kans. ent. Soc.*, **28**(1) : 5.

Type-locality : Ranikhet.

Distribution : India: Uttarakhand (Ranikhet).

Elsewhere : Nil.

Subgenus ***Bactrocera*** Macquart

1835. *Bactrocera* Macquart, *Hist. nat. Ins. Dipt.*, **2** : 452,453.

Type-species : *Bactrocera longicornis* Macquart.

4. ***Dacus (Bactrocera) paratuberculatus*** (Philip)

1950. *Strumeta paratuberculatus* Philip, *Indian J. Ent.*, **10**(1) : 31.

Type-locality : Dehra Dun.

Diagnosis : Frons parallel, yellowish brown, with three black lateral spots and a round black spot in the middle, two pairs of yellowish brown vertical bristles, lunula brown, face yellowish brown, occiput convex with two large black patches, bristles absent proboscis brown; thorax brownish-black, except for humeral and notopleural calli, scutellum and the two lateral stripes on postsutural disc, which are yellow, usual spots on pleurae yellow, mesopleurae, pteropleurae and sternopleurae black, chaetotaxy comprises one pair of anterior notopleurals, anterior supra-alars, prescutellars, two pairs each of posterior supra-alars and scapulars; scutellars two pairs, scutellum lemon yellow; legs yellowish-brown, hind tibiae and hind coxae black; wing with stigma yellow; without costal band, an isolated small brown apical spot at tip of R4-5, anal band light brown, r-m at 1/3 of discoidal cell, m not reaching the margin of wing, abdomen black, 1st tergite black, 2nd nearly so except for dark brown sides, 3rd tergite black and ciliated, interrupted in the middle by a dark brown patch. 4th and 5th tergites brown to black with 5th tergite shining on either sides, a median black longitudinal stripe on 4th and 5th tergites, sternites brown, a black spot on middle of 3rd and 4th sternites.

Distribution : India : Uttarakhand (Dehra Dun).

Elsewhere : Nil.

Subgenus ***Zeugodacus*** Hendel

1927. *Zeugodacus* Hendel, *in lindner, Fliegen palaearkt. Reg.* **49** : 26.

Type-species : *Zeugodacus caudatus* Fabricius.

5. ***Dacus (Zeugodacus) scutellaris*** (Bezzi)

1913. *Bactrocera scutellaris* Bezzi, *Mem. Indian Mus.*, **3** : 98.

Type-locality : Shillong, Siliguri, Kurseong, East Himalayas, Bhowali.

Material examined : 1♀, Kathgodam, Naini Tal Dist., 2.xii.1999, coll. B.C. Das.

Diagnosis : Three pairs of inferior fronto orbitals, facial spots small, slightly pointed on inner edges but not continuous; thorax black except yellow markings, mesonotum gray pubescent, 3 narrow sub shining vittae; scutellum prominent brown to black spots covering entire apex; femora yellow, broadly black at apices, basitarsi yellow, front and middle tibiae yellow, tinged with brown, hind tibiae black; wings hyaline, cubital streak is broad in males extending to wings margin;

abdomen black, tergal glands rufous, tinged with brown; ovipositor base black, almost equal in length to terga 4+5, 5th sternum of males twice wider than long and gently concave on hind margin, piercer short and thick.

Distribution : India : Uttarakhand (Bhowali), Assam, West Bengal.

Elsewhere : Myanmar, Thailand.

6. *Dacus (Zeugodacus) tau* (Walker)

1849. *Dasyneura tau* Walker, *List Dipt. Colln. Br. Mus.*, **4** : 1074.

Type-locality : Foochow, China.

Material examined : 1 ♀, Kalikamli, Haridwar Dist., 9.ix.2003, coll. B.G. Kundu; 1 ♀, Kathgodam, Nainital Dist., 2.xii.1999, coll. B.C. Das, 1 ♀, Kalika, Pithoragarh Dist., 26.ix.2004, coll. K.K. Bhattacharya.

Diagnosis : Facial spots oval extending to oral margin, frons usually with brownish discoloration in median portion and 1/3 to ¼ wider than long; thorax with conspicuous black markings in area between lateral and median postsutural yellow vittae, also area behind each humerus; femora yellow, front and hind tibiae tinged with brown; wings with a faint indication of a brownish discoloration in immediate area around vein Cu+1st A, costal cells hyaline, devoid of microtrichia except at apex of 2nd cell; abdomen largely yellow, fifth sternum of males 2 X wider than long, gently concave on hind margin and densely setose; surstyli are extended into long slightly curved lobes at upper apices, ovipositor base subequal to terga 4+5, usually flattened, piercer slender, gently tapered to a point at apex.

Distribution : India : Uttarakhand (Haridwar, Naini Tal, Pithoragarh).

Elsewhere : Widespread Oriental.

Subfamily TRYPETINAE
Tribe **Acanthonevrini**
Genus *Acanthonevra* Macquart, 1843

7. *Acanthonevra dunlopi* (van der Wulp)

1880. *Ptilona dunlopi* van der Wulp, *Tijdschr. Ent.*, **5** : 186.

Type-locality : Padang, Malaya.

Diagnosis : Thorax has a narrow pale brown vitta on each side of mesonotum from humerus to wing base and a faint streak of brown on each side over upper pleura; front femur has two irregularly placed posteroventral rows of black bristle like sitae in addition to the regular row of posteroventral bristles, front tibia with 2 or more rows of closely placed, short, bristly ventral setae; basal portion of wing largely hyaline, cells M and Cu brown only on apices, hyaline wedge from 2nd costal cell extending to upper apical portion of cell M, hyaline wedge in cell Sc just beyond subcostal vein extending to vein R2+3.

Distribution : India : Uttarakhand (Kumaon), Assam, West Bengal.

Elsewhere : Bangladesh, Indonesia, Myanmar, Thailand.

Tribe **Aciurini**
Genus *Sphaeniscus* Becker, 1908

8. *Sphaeniscus atilius* (Walker)

1849. *Trypeta atilius* Walker, *List Dipt. colln Br. Mus.*, **4** : 1021.

Type-locality : Foochow, China.

Material examined : 1 ♀, Jolly Grant, Dehradun Dist, 18.ix. 2000, coll. G.C. Sen.

Diagnosis : Wings predominantly dark brown with base hyaline, 1 hyaline wedge on anterior margin in middle of wing and 4 hyaline wedges on posterior margin of wing, vein R4+5 is bare and r-m crossvein is situated about its own length from m crossvein; surstylus is broad, equal in width to the epandrium and completely hides the 10th sternum, 6th tergum in females distinctly shorter than 5th; basal segment of ovipositor approximately equal in length to terga 5+6, piercer thickened at base, sharply tapered at apex, extended ovipositor.

Distribution : India : Uttarakhand (Dehradun).

Elsewhere : Widespread Oriental; Pacific, Japan, Korea, Moluccas.

Tribe **Adramini**
Genus *Meracanthomyia* Hendel, 1910

9. *Meracanthomyia intermedia* Hardy

1973. *Meracanthomyia intermedia* Hardy, *Pacif. Insects Monogr.*, **31** : 136.

Type-locality : Ranikhet.

Diagnosis : Head with three pairs of widely placed inferior fronto-orbitals and one pair of

superior fronto-orbitals; mesonotum is black with a prominent rufous vitta extending down median portion, with the suture and lateral margins of mesonotum behind suture broadly yellow with other yellow markings; legs entirely yellow except for the brown bases of middle tibiae; wings with a hyaline spot in each of apices of cells R5 and 2nd M2; abdomen entirely polished black, covered with pale setae and lightly gray pollinose on basal ½ to 2/3 of terga.

Distribution : India : Uttarakhand (Ranikhet).

Elsewhere : Nil.

Tribe **Euphrantini**

Genus ***Euphranta*** Loew, 1862

Subgenus ***Staurella*** Bezzi

1913. *Staurella* Bezzi, *Mem. Indian Mus.*, **3** : 121.

Type-species : *Musca crux* Fabricius.

10. ***Euphranta (Staurella) dissoluta*** (Bezzi)

1913. *Staurella dissoluta* Bezzi, *Mem. Indian Mus.*, **3** : 123.

Type-locality : Naini Tal.

Diagnosis : Unvarieguted pattern of much darker wings and by the crossed apical band being divided into two, small band on humeral cross vein little broader, the ^ shaped middle band has the same appearance, the greater branch being narrowly interrupted just above the 5th vein, at the tip are two cross bands, one on the posterior cross vein, extending from the hind margin to the 3rd vein, other is broader, beginning at the fore border before the tip of the second vein ending at the hind border after the end of the 4th vein, on the fore border a little beyond the stigma, is a brown spot, which reaches below the 2nd vein and sometimes the 3rd, the border of the posterior cross-vein is only blackish, without lighter margin; the body is a little more robust; abdomen is darkened; lower lamellae of male genitalia blackish.

Distribution : India : Uttarakhand (Naini Tal), Bihar.

Elsewhere : Nil.

Tribe **Gastrozonini**

Genus ***Acroceratitis*** Hendel, 1913

11. ***Acroceratitis plumosa*** Hendel

1913. *Acroceratitis plumosa* Hendel, *Supplta ent.*, **2** : 82.

Type-locality : Kankau, Formosa.

Material examined : 1 ♀, Kalikamli, Haridwar dist., 9.ix.2003, coll. B.G. Kundu.

Diagnosis : Mesonotum with entire median portion black, covered with gray pollen, lateral margins and prescutellar area broadly yellow, the black markings extend posteriorly as an arm on each side to a level slightly beyond the postalar bristles; scutellum with 3 large shining black spots and densely gray tomentose; r-m crossvein situated before middle of cell 1st M2; abdominal terga 2-5 with a submedian black transverse spot on each side; basal segment of ovipositor with a continuous black band around apex and with a black band over basal portion on dorsum, otherwise yellow.

Distribution : India : Uttarakhand (Haridwar).

Elsewhere : China, Formosa, Vietnam; Japan.

Genus ***Chaetellipsis*** Bezzi, 1913

12. ***Chaetellipsis dispilota*** Hardy

1973. *Chaetellipsis dispilota* Hardy, *Pacif. Insects Monogr.*, **31** : 180.

Type-locality : Ranikhet.

Diagnosis : Head entirely yellow except dark reddish brown eyes devoid of bristles and densely yellow pilose, occiput moderately swollen, antennae situated at middle of head, yellow; thorax yellow to rufous, dark brown to black on posterior border of mesonotum and on postscutellum, metanotum, and lower portions of metanotum and pleurotergon, humeri, upper 2/3 of each mesopleuron, upper part of pteropleuron at wing base and upper portions of metapleuron and pleurotergon, mesonotum faintly gray pubescent, but the rufous ground colour is not obscured; major portions of scutellum white, tinged faintly yellow; Legs entirely yellow, front tibia and basitarsus densely yellow ciliated on dorsal surface; anterior margins of wings broadly yellow, tinged faintly with brown, posterior portion predominantly dark brown, with a hyaline spot in cell R5 beyond r-m crossvein, with 2 hyaline spots in cell 1st M2 and with hyaline markings from the wing margin at apices of cells R5, M2, M4; abdomen pale yellow with broad shining black bands at bases of terga 3 and 4, and with the 5th tergum largely shining black, yellow at apex; the 5th sternum 2X wider than long, slightly concave on posterior margin and

with a small dark brown to black spot at each hind corner, 5th sternum densely setose; in females the basal segment of the ovipositor is equal to abdominal segments 3-5, piercer slender, evenly tapered at apex, blunt at extreme tip, two oblong spermathecae with short, sharply curved necks.

Distribution : India : Uttarakhand (Ranikhet).

Elsewhere : Thailand.

Tribe **Trypetini**

Genus ***Anomoia*** Walker, 1835

13. ***Anomoia immsi*** (Bezzi)

1913. *Phagocarpus immsi* Bezzi, *Mem. Indian Mus.*, **3** : 131.

Type-locality : Bhowali, Kumaon.

Diagnosis : Head yellow, covered with white pollen, bristles black, antennae dark yellow, palpi pale yellow, proboscis darker; thorax on back dark reddish, covered with dark grey pollen and black pubescence pleura and humeral pale reddish and shining, bristles black; scutellum flattened, pale reddish, shining with long marginal bristles; legs yellow with black hairs and bristles, femora thickened; wing veins yellow, hyaline with peculiar pattern, stigma black, a broad basal patch which leaves the costal cell free, except for a yellowish spot on humeral cross-vein, and ends below on 5th vein filling out anal cell, this larger patch is yellow, but outwardly ends in an arcuate black band, which begins below stigma, reaches small cross-vein and ends on 5th vein, which is prolonged in a narrow grayish streak to the hind margin of the wing at the end of 6th vein; there is a small hyaline spot in the first basal cell below the stigma, from the black band, over small cross-vein, extends a narrow black streak, which reaches the fore margin, forms a triangular hyaline indentation beyond the stigma, with vertex on 3rd vein, the two apical diverging black streaks are as follows : the shorter one, on the hind cross-vein, reaching the hind margin, the longer one, arcuate, begins at base of 1st posterior cell and follows the end of 2nd vein, and from here along the costa to the apex of the wings ending a little after the end of 3rd vein, these streaks never unite with black band and are not fused together; abdomen dark reddish, shining with black pubescence, 2nd and 3rd segment blackish; genitalia yellow.

Distribution : India : Uttarakhand (Kumaon), Himachal Pradesh, West Bengal.

Elsewhere : Formosa.

Genus ***Hemilea*** Loew, 1862

14. ***Hemilea praestans*** (Bezzi)

1913. *Acidia praestans* Bezzi, *Mem. Indian Mus.*, **3** : 141.

Type-locality : Bhowali, Kumaon.

Diagnosis : Head yellow, face, cheeks whitish, frons darker yellow,bristles black, antennae dark yellow, short, arista shortly pubescent, palpi pale yellow, proboscis dark yellow; thorax dark reddish, shining black pubescence, humeral and notopleural streak pale yellow, pleurae pale reddish, bristles black; scutellum flattened, pale reddish, squamulae pale, halteres dark yellow; legs yellow, hind tibiae ciliated with short hairs; wings black, with the hind border hyaline from the base to the 2nd posterior cell, limit sharply defined, and always forward of fourth vein, anal cell hyaline, stigma long, black, 2nd longitudinal vein very long, 3rd and 4th parallel, cross veins perpendicular, the smaller approached to the hinder, 3rd vein bristly to the small cross-vein; abdomen black, shining with black hairs and bristles, the base of 1st segment and the sides of 1st and other segments broadly reddish, but last segment is black; ovipositor short, belly reddish, black at end.

Distribution : India : Uttarakhand (Kumaon).

Elsewhere : Formosa.

Genus ***Rhagoletis*** Loew, 1862

15. ***Rhagoletis bezzianum*** Hendel

1931. *Rhagoletis bezzianum* Hendel, *Verh. zool.-bot. Ges. Wien.*, **81** : 13.

Type-locality : Naini Tal.

Diagnosis : Head yellow, frons darkened above antennae and with small black ocellar dot, face whitish, antennae, palpi and proboscis yellow, bristles black; thorax yellow, opaque on back, shining on pleura; scutelum yellow, metanotum black; legs yellow; wings hyaline with yellowish veins and following marks, a broad black spot on anal cross-vein, a brown streak at the fore border after the small cross-vein, running from border to 3rd vein, a broad brown spot before the tip of 2nd vein, a broad border at the tip of wing, beginning at the middle between the 2nd and 3rd veins extending to the tip of the 4th, the two cross-veins

are bordered with brown, the border of hind vein being continued above into a small streak reaching the 3rd vein, stigma pale yellow and below this, in the base of submarginal cell, in the base of 1st basal cell and in the base of discal cell are yellow shades; abdomen yellow, shining.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Genus ***Vidalia*** Robineau-Desvoidy, 1830

16. ***Vidalia trigenata*** Munro

1938. *Vidalia trigenata* Munro, *Rec. Indian Mus.*, **40** : 28.

Type-locality : Naini Tal.

Diagnosis : A yellowish species, head width 1/5 greater than height, frons flat, lower occiput swollen, eyes small with scattered microscopic hairs, black pubescence, bristles black, two superior and four inferior orbitals, antennae ½ length of face, arista pubescent, ocellars moderate, dot black, lunule short, face long and straight; thorax light chestnut, dorsum blackish, with a pair of rather indistinct, wide, brownish yellow stripes to dorsocentral bristles, and a pair above wing base, pubescence black, chaetotaxy complete, one mesopleural, the dorso-centrals, a little behind line of anterior supraalars; scutellum convex at above, with four bristles of equal length; legs normal; wings with more complete, although irregular, bands and rather extensive yellow areas, 3rd vein with some scattered setulae to upper cross-vein; abdomen shining chestnut with black pubescence, base black with reddish apex, about as long as 5th segment.

Distribution : India : Uttarakhand (Naini Tal).

Elsewhere : Nil.

Subfamily TEPHRITINAE

Tribe **Platensinini**

Genus ***Platensina*** Enderlein, 1911

17. ***Platensina acrostacta*** (Wiedemann)

1824. *Trypeta acrostacta* Wiedemann, *Analecta Ent.* : 54.

Type-locality : India.

Material examined : 1♀, Almora, Almora Dist., 23.xi.1999, coll. B.C. Das.

Diagnosis : Head with frontal and ocellar bristles brownish yellow, ocellars strong, approximately equal to lower superior fronto-orbitals, other bristles are white, face black, lower half densely silvery gray pollinose, genae velvety black; thorax black, densely covered with gray pollen, humeri and sides of mesonotum yellow in ground color; sides and venter of scutellum yellow in ground color, pleura yellow, tinged with brown and densely gray pollinose, halteres pale yellow; legs yellow; wings lacking a hyaline spot in apical portion of cell R1 and usually with 2 hyaline spots in 1st M2; abdomen black, yellow on sides of first 2 terga, with 1st tergum yellow-brown, 2nd largely yellow that continuous down to the middle of terga 3 and 4 leaving a shining black mark, 5th tergum entirely shining black, pleura and abdomen broadly yellow; epandrium dark brown to black with surstyli not attenuated and with 10th sternum completely hidden from lateral view, base of ovipositor dark brown to black, equal or slightly longer than the last three terga, two spermathecae, oblong, with long straight neck.

Distribution : India : Uttarakhand (Almora), Bihar, Tamilnadu, West Bengal.

Elsewhere : Cambodia, Pakistan, Sri Lanka, Thailand.

Tribe **Tephrellini**

Genus ***Indaciura*** Hering, 1942

18. ***Indaciura xanthotricha*** (Bezzi)

1913. *Aciura xanthotricha* Bezzi, *Mem. Indian Mus.*, **3** : 151.

Type-locality : Dhikata, Garhwal District.

Diagnosis : This species has flat, white, occipital setae and postocellar bristles and scapular hairs lacking; thorax black and flat; only three hyaline marks in hind margin of wing; abdomen all black and flat; basal segment of ovipositor approximately as long as remainder of abdomen; piercer slender, tapered to a long thin point, two pear shaped spermathecae.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Myanmar, Java, Sri Lanka, Thailand.

Tribe **Tephritini**

Genus ***Campiglossa*** Rondani, 1870

19. ***Campiglossa cribellata*** Bezzi

1913. *Campiglossa cribellata* Bezzi, *Mem. Indian Mus.*, **3** : 161.

Type-locality : Kurseong, E. Himalayas.

Material examined : ♀ ♀, Shyampur, Haridwar Dist., 9.iv.2003, coll. B.G. Kundu.

Diagnosis : Entirely cinereous, whitish on head, frons with a geminate ferrugineous spot over lunula, antennae dark yellow, palpi paler, proboscis darkened; thorax grey, with developed yellow pubescence and black bristles, pleura with long yellow hairs and a row of whitish bristles on hind border of mesopleura, below the humeral bristle and before the prothoracic stigma are dense tufts of bristly whitish hairs; scutellum with four bristles, the basal pair being stronger and inserted upon a pair of black spots like those of back, squamulae whitish, halteres dark yellow; legs yellow, femora cinereous, front femora with black bristles; wings black, with the base whitish hyaline, stigma with two hyaline round spots, the second larger in size, hyaline spots more numerous, the portion after the 5th vein and the axillar lobe are also black with numerous hyaline spots, the rays of fore border are shorter, equal in number, the 2nd posterior cell shows three marginal spots and five discal spots, all of smaller size; abdomen grey, with pale yellowish pubescence and short yellow bristles on the sides, first segment unspotted, the others with a pair of round black spots in the middle and one on each side less distinct.

Distribution : India : Uttarakhand (Haridwar), West Bengal.

Elsewhere : Nil.

Genus ***Elaphromyia*** Bigot, 1859

20. ***Elaphromyia pterocallaeformis*** (Bezzi)

1913. *Paralleloptera pterocallaeformis* Bezzi, *Mem. Indian Mus.*, **3** : 155.

Type-locality : Simla Hills.

Diagnosis : 3rd antennal segment short, about 1/3 to ½ longer than wide, arista pubescent; the dorsocentral bristles are situated in line with anterior supraalars; scutellum with 4 bristles, three pairs of inferior fronto-orbitals present; wings long, slender, parallel-sided, three times longer than wide and covered with numerous sub hyaline spots and markings; abdomen yellow, with variously arranged spots on the terga, especially on last two; piercer of ovipositor flattened laterally on apical portion, two oblong, heavily sclerotized, spiny spermathecae present.

Distribution : India : Uttarakhand (Kumaon), Assam, Himachal Pradesh, West Bengal.

Elsewhere : Formosa, Laos, Philippines, Sri Lanka.

SUMMARY

A comprehensive account of the tephritid fauna of Uttarakhand is presented in this communication. 20 species under 16 genera belonging to 10 tribes of 3 subfamilies are reported from this newly formed state.

All the species reported here are predominantly Oriental in distribution except two species, namely *Sphaeniscus atilius* (Walker) and *Acroceratitis plumosa* Hendel, those are distributed beyond the Oriental Region.

Out of twenty species reported from this state, six species are endemic to Uttarakhand and one species is endemic to India. Interesting to note that, there are four species which are not reported in India other than Uttarakhand state, but extend their distribution outside India in the Oriental Region.

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REFERENCES

Bezzi, M. 1913. Indian Trypaneids (fruit-flies) in the collection of the Indian Museum, Calcutta. *Mem. Indian Mus.,* **3** : 53-175.

Datta, M, Parui, P and Mukherjee, M. 1977. Insects : Diptera, *In Fauna of West Bengal, State Fauna Series,* **3**(7) : 1-76. Z.S.I., Kolkata.

Delfinado, M.D & Hardy, D.E. 1977. *A Catalog of Diptera of the Oriental Region,* Family Tephritidae. The Univeresity Press of Hawaii, Honolulu, **3** : 44-134.

Fabricius, J.C. 1794. *Ent. Syst.,* **4** : 472

Hardy, D.E. 1973. The Fruit-flies (Tephritidae : Diptera) of Thailand and bordering countries. *Pacific Insects Monogr.,* **31** : 1-353.

Mitra, B and Bhattacharya, K. 2006. A report on the Fruit flies of Uttaranchal. *BIONOTES.* **8**(3) : 72.

Munro, H.K. 1938a. Studies on Indian Trypetidae (Diptera). *Rec. Indian Mus.,* **40** : 21-37.

Philip, A. 1950. Description of one new species of *Strumeta* Walker (Trypetidae : Diptera) from Bhutan and a record of one Far-Eastern species of the genus from India. *Indian J. Ent.,* **10**(1) : 31-32.

Radhakrishnan, C 1991. Diptera : Tephritidae. In : *Animal Resources of India.* Edited by Director, Zoological Survey of India, 401-411.

Thomson, F.C. 1998. Fruit fly expert identification system & systematic information data base (ed.). North American Dipterist's Society, Backhuys Publishers, Leiden,

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 501-529.

INSECTA : LEPIDOPTERA : FAMILIES : PIERIDAE AND ARCTIIDAE

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INTRODUCTION

The present work includes a comprehensive account of the two families of butterflies and moths, viz., Pieridae and Arctiidae from Uttarakhand. This study is based on the material collected by different survey parties of Zoological Survey of India and also the specimens available in old National Zoological Collection of Zoological Survey of India. Uttarakhand is surrounded by 14 districts, the present work of the two families have been covered all the districts except Udham Singh Nagar.

Altogether 89 species/subspecies of 38 genera under two families are dealt with here. The family Pieridae constitutes 45 species/subspecies belonging to 18 genera and two subfamilies and the family Arctiidae has other 44 species in 20 genera of six subfamilies. Among the 89 species, 22 species of the Family Arctiidae are recorded as new to this area # and 21 species of the family Pieridae and 12 species of the family Arctiidae are reviewed from literature.

The system of both the families under study has been followed after Arora *et. al* 1977, 1995), Bernardi (1952), Cotes & Swinhoe (1887-1889), Evans (1932), Hampson (1894, 1900, 1901)Hannygton (1910), Mackinnon & deNiceville (1897), Mandal & Chaudhury (1977), Shull (1962), Talbot (1939) and Wynter - Blyth (1957).

SYSTEMATIC LIST

Order LEPIDOPTERA
Sub order RHOPALOCERA
Family PIERIDAE
Sub family PIERINAE
Gnus ***Pareronia*** Bingham

1. *Pareronia valeria hippia* (Fabricius)

Genus ***Delias*** Huebner

2. *Delias belladona horsfieldi* (Gray)
3. *Delias sanaca sanaca* (Moore)
4. *Delias eucharis* (Drury)
5. *Delias hyparete indica* (Wallace)

Genus ***Pontia*** Fabricius

6. *Pontia chloridice alpina* (Verity)
7. *Pontia daplidice moorei* (Rober)

Genus ***Leptosia*** Huebner

8. *Leptosia nina nina* (Fabricius)

Genus ***Prioneris*** Wallace

9. *Prioneris thestylis thestylis* (Doubleday)

Genus ***Anaphaeis*** Huebner

10. *Anaphaeis aurota aurota* (Fabricius)

Genus ***Baltia*** Moore

11. *Baltia butleri butleri* (Moore)

Genus ***Aporia*** Huebner

12. *Aporia peloria* (Hewitson)
13. *Aporia agathon* (Gray)

13a. *Aporia agathon phryxe* (Boisduval)
13b. *Aporia agathon ariaca* (Moore)
13c. *Aporia agathon caphusa* (Moore)

14. *Aporia leucodice* (Eversmann)

14a. *Aporia leucodice soracta* Moore
14b. *Aporia leucodice sara* Evans

15. *Aporia nabellica* (Boisduval)

Genus ***Pieris*** Schrank

16. *Pieris callidice kalora* Moore
17. *Pieris napi ajaka* Moore
18. *Pieris canidia indica* Evans
19. *Pieris brassicae nepalensis* Doubleday

Genus ***Appias*** Huebner

20. *Appias pandione lalage* (Doubleday)
21. *Appias lyncida eleonora* (Boisduval)
22. *Appias libythea* (Fabricius)

Genus ***Cepora*** Billberg

23. *Cepora nerissa phryne* (Fabricius)

Genus ***Ixias*** Huebner

24. *Lxias marrinae* (Cramer)
25. *Ixias pyrene kausala* Moore

Genus ***Colotis*** Huebner

26. *Colotis etrida etrida* (Boisduval)

Genus : ***Euchloe*** Huebner

27. *Euchloe ausonia daphalis* (Moore)

Subfamily COLIADINAE
Genus ***Catopsilia*** Huebner

28. *Catopsilia pomona pomona* (Fabricius)
29. *Catopsilia pyranthe pyranthe* (Linnaeus)
30. *Catopsilia florella gnoma* (Fabricius)

Genus ***Colias*** Fabricius

31. *Colias ladakensis* Flder
32. *Colias erate erate* (Esper)
33. *Colias eugene eugene* Felder
34. *Colias electo fieldi* Ménétriés

Genus ***Gonepteryx*** Leach

35. *Gonepteryx rhamni nepalensis* Doubleday
36. *Gonepteryx mahaguru mahaguru* (Gistel)

Genus ***Eurema*** Huebner

37. *Eurema brigitta rubella* (Wallace)
38. *Eurema laeta laeta* (Boisduval)
39. *Eurema hecabe fimbriata* (Wallace)
40. *Eurema andersoni* (Moore)

Family ARCTIIDAE
Subfamily ARCTIINAE
Genus ***Diacrisia*** Huebner

1. *Diacrisia rhodophila* (Walker) #
2. *Diacrisia erythrozona* (Kollar)
3. *Diacrisia unifascia* (Walker)
4. *Diacrisia multiguttata* (Walker)
5. *Diacrisia punctata* (Moore)
6. *Diacrisia leopardina* (Kollar)

Genus ***Nicaea*** Moore

7. *Nicaea longipennis* (Walker)

Subfamily NYCTEMERIINAE
Genus ***Nyctemera*** Huebner

8. *Nyctemera cenis* (Cramer) #
9. *Nyctemera adversata* (Schaller) #

Subfamily CALLIMORPHINAE
Genus ***Callimorpha*** Latreille

10. *Callimorpha nyctemerata* (Moore) #
11. *Callimorpha principalis* (Kollar)
12. *Callimorpha equitalis* (Kollar)

Subfamily SPILOSOMINAE
Genus ***Amsacta*** Walker

13. *Amsacta moorei* (Butler)

Genus ***Phissama*** Moore

14. *Phissama transiens* (Walker)

Genus ***Alphaea*** Walker

15. *Alphaea quadriramosa* (Kollar)

Genus ***Spilarctia*** Butler

16. *Spilarctia casigneta* (Kollar)
17. *Spilarctia obliqua* (Walker) #

Genus ***Pericallia*** Huebner

18. *Pericallia imperialis* (Kollar)
19. *Pericallia distorta* (Moore)

Subfamily LITHOSIINE
Genus ***Chrysorabdia*** Butler

20. *Chrysorabdia aurantiaca* Hampson
21. *Chrysorabdia viridata* (Walker) #
22. *Chrysorabdia bivitta* (Walker) #

Genus ***Strysopha*** Arora & Chaudhury

23. *Strysopha tortricoides* (Walker) #

Genus ***Eilema*** Muebner

24. *Eilema vagesa* (Moore)

Genus ***Prabhasa*** Moore

25. *Prabhasa venosa* Moore #

Genus ***Zadadra*** Moore

26. *Zadadra distorta* (Moore) #

Genus ***Agylla*** (Walker)

27. *Agylla albifinis* (Walker)
28. *Agylla ramelana* Moore) #

Genus ***Cyana*** Walker

29. *Cyana puella* (Drury) #
30. *Cyana adita* (Moore)
31. *Cyana guttifera* (Walker) #
32. *Cyana arama* (Moore) #

33. *Cyana candida* (Felder) #
34. *Cyana dohertyi* (Elwes) #
35. *Cyana detrita* (Walker)
36. *Cyana bianca* (Walker) #
37. *Cyana bellissima* (Moore)

Genus ***Asura*** Walker

38. *Asura undulosa* (Walker)
39. *Asura strigipennis* (Herich-Schaffer) #

Genus ***Miltochrista*** Huebner

40. *Miltochrista gratiosa* (Guerin & Meneville) #
41. *Miltichrista linga* (Moore) #
42. *Miltochrista magna* Hampson #

Subfamily MICRACTIINAE
Genus ***Argina*** Huebner

43. *Argina argus* (Kollar) #

Genus ***Utetheisa*** Huebner

44. *Utetheisa pulchella* (Linnaeua)

SYSTEMATIC ACCOUNT

Family PIERIDAE

Key to Subfamilies

Palpi always with hair; hind wing with well developed precostal vein curved distal ..... PIERINAE

- Palpi without hair; hind wing without precostal vein or very short, directed basal ..... COLIADINAE

Subfamily PIERINAE

1. Fore wing vein R4 and R5 coincident 2
- Fore wing vein R4 and R5 separate ..... PARERONIA Bingham
2. Fore wing vein R2 absent ..... DELIAS Huebner
- Fore wing vein R2 from cell 3
3. Fore wing vein R3 absent 4
- Forewing vein R3 present and stalked with vein R4 and R5 5
4. Hindwing veins M1 and M2 closed togjter at their origin ..... LEPTOSIA Huebner
- Hindwing veins M1 and M2 wide apart at their origin ..... PONTIA Fabricius
5. Forwingwith costa serrate ..... PRIONERIS Wallace
- Fore wing with costa not serrate 6
6. Forewing vein R1 anastomosing with Sc ..... ANAPHAEIS Huebner
- Forewingvein R1 free 7
7. Forewing vein M2 from the stalk of vein R3, R4 and R5 ..... BALTIA Moore
- Forewing vein M2 from the cell 8
8. Forewing vein M1 from the stalk of R3, R4 and R5 9
- Forewing vein M1 from the cell angle 13
9. Forewing vein M1 given off about the midway of vein R3, R4 and R5 ..... APORIA Huebner

Forewing vein M1 given off nearer to the cell than to fork of R3, R4 and R5 10

10. Forewing vein R3 emmited from very close to apex, the stalk long ..... PIERIS Schrank
- Forewing vein R3 emitted from R4 and R5 further from apex, the stalk short 11
11. Male with a tuft of hair arising between the 7th and 8th abdominal segment ..... APPIAS Huebner
- Male with two hair pencil on the abdomen 12
12. Third segment of palpi slender as long as 2nd segment. Forewing vein M1 from the stalk of R3, R4 and R5 nearly midway between fork and end of cell and not nearer apex of cell than to vein R2 ..... CEPORA Billberg
- Third segment of palpi short and oval. Forewing vein M1 arising from the stalk of R3, R4 and R5 nearer to cell than to fork and nearer to apex of cell than to vein R2 ..... IXIAS Huebner
13. Forewing vein M1 free from upper angle of cell. ..... COLOTIS Huebner
- Forewing vein M1 from the stalk veins of R3, R4 and R5 ..... EUCHLOE Huebner

Subfamily PIERINAE
Genus ***Pareronia*** Binghamm

1907. *Pareronia* Bingham, *Fauna Brit. India*, **2** : 276.

Remarks : This genus is represented in India by four species, of which only one is treated from Uttarakhand.

1. ***pareronia valeria hippia*** (Fabricius)

1787. *Papilio hippia* Fabricius, *Manti. Ins.*, **2** : 55.

1910. *Pareronia valeria hippia*, Hannygton, *J. Bombay nat. Hist. Soc.*, **20** : 364.

Diagnostic character : Ground colour pale blue, upper side of wings with costal, terminal and apical areas black, apical area with prominent spots continued up to marginal area, hind wing marginal markings prominent.

Material examined : 1ex., District : Almora, Takula, 35Km. away from Binsar Wild Life Sanctuary 2150m., 2.x.2004 (Coll. D. R. Maulik).

Wing expanse : 72mm.

Distribution : Throughout India including Uttarakhand (Almora, Dehradun, Garhwal, Kumaon and Mussoorie).

Elsewhere : Myanmar and Thailand.

Remarks : Mackinnon & deNiceville (1898), Hannygton (1910) and Arora *et al.* (1995) reported the occurrence of this species from Mussoorie and Dun Valley, Kumaon and Almora, Dehradun and Garhwal respectively. The present record confirms its distribution from Uttarakhand.

Genus ***Delias*** Huebner

1819. *Delias* Huebner, *Vrz. bek. Schmett.*, (6) : 91.

Remarks : Of the nine species of this genus occurring in India, four are dealt with from Uttarakhand.

Key to species

1. Hindwing underside without red marking ... 2

   Hindwing underside with red marking 3

2. Hindwing underside with cell stripe entirely yellow ..... *belladona* (Fabricius)

   Hindwing underside with cell stripe white at its proximal end ..... *sanaca* (Moore)

3. Fore wing upperside with a submarginal black line ..... *eucharis* (Drury)

   Fore wing upperside without submarginal black line ..... *hyparete* (Linnaeus)

2. ***Delias belladona*** (Fabricius)

1793. *Papilio belladona* Fabricius, *Ent. Syst.*, **3** : 180.

Key to subspecies

Hindwing with the markings developed, the inner area with yellow scaling .... *horsfieldi* (Gray)

Hindwing with the markings not so developed, the inner area without yellow scaling, sometimes with yellow patch .... *ithiela* (Butler)

2a. ***Delias belladonna horsefieldi*** (Gray)

1831. *Pieris horsefieldi* Gray, *Zool. Misc.*, **1** : 32.

1910. *Delias belladonna horsefieldi*, Hannygton, *J. Bombay nat. Hist. Soc.*, **20** : 363.

1995. *Delias belladonna horsefieldi*, Arora *et al. Himalayan Eco System Series : Fauna of Western Himalaya*, Part-**1** : 65.

Material examined : 1 ex. District : Dehradun, 5.v.1956 (Coll. K.K. Tiwary). 1ex., District : Bageswar, Baijnath, Kausani, 27.ix.2004, 1ex., District : Nainital, Ramgarh, 4.x.2004 (Coll. M. Ghosh).

Wing expanse : 78mm.

Distribution : India : Uttarakhand (Bageshwar, Dehradun, Kedarnath, Kumaon, Nainital and Tehri Garhwal), Kulu.

Elsewhere : Nepal.

Remarks : Hannygton (1910) reported its occurrence only from Kumaon, Arora & Mondal (1977) reported this species from Kedarnath. In 1995 arora *et al.* reported itsdistribution from Dehradun, Tehri Garhwal and Nainital.

2b. ***Delias belladona ithiela*** (Butler)

1869. *Thyca ithiela* Butler, *Ann. Mag. Nat. Hist.*, (4)**4** : 242.

1992. *Delias belladona ithiela*, Haribal, *Sikkim Nature conservation Foundation* : 48.

Material examined : Nil.

Wing expanse : 76-90mm. (Haribal, 1992).

Distribution : India : Uttarakhand (Mussoorie), Assam, Meghalaya and Sikkim.

Elsewhere : Myanmar and Central Nepal.

Remarks : Haribal (1992) recorded the species from Mussoorie.

3. ***Delias sanaca sanaca*** (Moore)

1857. *Pieris sanaca* Moore, *cat. Lep. Mus. E.I.C.*, **1** : 79.

1939. *Delias sanaca sanaca, Fauna Brit. India, Butterflies,* **1** : 330-332.

1995. *Delias sanaca sanaca,* Arora *et al. Himalayan Ecosystem series, Fauna of Western Himalaya, Zoological Survey of India* Part-**1** : 65.

Material examined : Nil.

Wing expanse : Male : 69-94mm., female : 84-96mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Garhwal, Mussoorie, Tehri Garhwal), Kulu and North West India.

Remarks : Talbot (193) recorded the species from Mussoorie and Garhwal. Arora *et al.* reported the species from another district Tehri Garhwal.

4. ***Delias eucharis*** (Drury)

1773. *Papilio eucharis* Drury, *Illustr. Nat. Hist.*, Pl. x, figs. 5, 6.

1910. *Delias eucharis,* Hannygton, *J. Bombay nat. Hist. Soc.* **20** : 362-364.

1998. *Delias eucharis,* Arora *et al. Himalayan Ecosystem series, Fauna of Western Himalaya, Zoological Survey of India* Part-**1** : 65.

Material examined : District : Dageshwar, 1ex., Goaldham, 2.x.2004 (coll M. Ghosh).

Wing expanse : 65mm.

Distribution : India : Uttarakhand (Almora, Bageswar, Dehradun, Kumaon, Mussoorie, Tehri Garhwal) Andhra Pradesh, Meghalaya, Peninsular India as far as the Lower slopes of the Himalayas.

Elsewhere : Srilanka.

Remarks : Mackinnon & de Niceville (1898) reported its occurrencein Mussooree and Dun Valley, Hannygton (1910) mentioned its distribution from Kumaon and Arora *et al.* (1995) from Tehri Garhwal and Almora and the present record confirms its distribution from Uttarakhand.

5. ***Delias hyparete indica*** (Wallace)

1867. *Thyca indica* Walace, *Trans. Ent, Soc.* London, **4**(3) : 351.

1939. *Delias hyparete indica,* Talbot, *Fauna Brit. India, Butterflies,* **1** : 357-358.

1995. *Delias hyparete indica,* Arora *et al. NHimalayan Ecosystem Series, Fauna of Western Himalaya, Zoological Survey of India,* Part-**1** : 65.

Material examined : Nil.

Wing expanse : 72-88mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon, Nainital) and Andhra Pradesh.

Elsewhere : Annam, Cochin China, Myanmar, Thailand and Tong King.

Remarks : Hannygton (1910) reported the species fom Kumaon and Arora *et al.* (1995) reported it from Nainital.

Genus ***Pontia*** Fabricius

1807 *Pontia* Fabricius, *Illigers. Mag.*, **6** : 283.

Remarks : The genus is represented by three species, of which two are dealt with here.

Key to species

Hindwing underside in area Rs with a short subbasal white bar anteriorly wider .... *chloridice* (Huebner)

- Hindwing underside in area Rs with a subbasal some what rounded not wider anteriorly .... *daplidice* (Linnaeus)

6. ***Pontia chloridice alpina*** (Verity)

1911. *Pieris chloridice var. alpina* Verity, *Rhopalo. Palaerc.*, : 328.

1995. *Pontia chloridice alpina,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya, Zoological Survey of India,* Part-**1** : 65.

Material examined : Nil.

Wing expanse : Male, female : 45-50mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon, Tehri Garhwal).

Elsewhere : Baluchistan to Chitral and Ladak.

Remarks : Hannygton (1910) and Arora *et al.* (1995) reported this species from Kumaon (up to 12000ft. and Tehri Garhwal respectively.

7. ***Pontia daplidice moorei*** (Rober)

1907. *Leucochloe daplidice moorei* Rober, In Seitz *Macrolepidoptera, Fauna Palaerctica,* **1** : 49.

1995. *Pontia daplidice moorei,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya, Zoological Survey of Idnia,* Part-1 : 65.

Material examinred : 1ex., District : Chamoli, Wag 8.iv.2003 (Coll. B.G. Kundu).

Wing expanse : 40mm.

Distribution : India : Uttarakhand (Chamoli and Tehri Garhwal), Punjab, Murree.

Elewhere : Baluchistan to Chitral, Tibet and Yunnan.

Remakrs : Arora *et al.* (1995) reported the species from Tehri Garhwal. The present record added another District Chamoli.

Genus ***Leptosia*** Huebner

1818. *Leptosia* Huebner, *Samml. Exot. Schmett.,* **1** : 13.

Remarks : A single species *Leptosia nina* (Fabricius) represented this genus in India.

8. ***Leptosia nina nina*** (Fabricius)

1793. *Papilio nina* Fabricius, *Ent. Syst.,* **3**(1) : 194.

1995. *Leptosia nina nina,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya, Zoological Survey of India,* Part-1 : 65.

Diagnostic characters : Wings upperside white, fore wing bases slightly powered with black scales, black apex and outer margin with black border extended up to vein Cula, post discal area with a large pear shaped spot, hind wing uniformly white. Underside white, costal margin and apex of forewing and the whole hind wing striated with greenish striage and minute dots.

Material examined : Nil.

Wing expanse : 35-50mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie) Andamans. Andhra Pradesh, Meghalaya, Nagaland, Peninsular India, Sikkim and Uttar Pradesh.

Elsewhere : Hainan, Indo China, Myanmar, South China and Thailand.

Remarks : Mackinnon & de Niceville (1898), Hannygton (1910), Talbot (1939) and Arora *et al.* reported the occurrence of this species from Dehradun, Kumaon, Mussoorie, Almora and Dehradun respectively.

Genus ***Prioneris*** Wallace

1867. *Prioneris* Wallace, *Trans. Ent. Soc. London,* **4**(3) : 383.

Remarks : This genus is known in India by three species, of which single species is dealt with here.

9. ***Prioneris thestylis thestylis*** (Doubleday)

1842. *Pieris thestylis* Doubleday, In Gray's *Zool. Miscll.* : 76.

1910. *Prioneris thestylis,* Hannygton, *J. Bombay nat. Hist. Soc.* **20** : 362.

1939. *Prioneris thestylis thestylis* (Doubleday), Talbot, *Fauna Brit. India,* Butterflies, **1** : 373-374.

Diagnostic characters : Male upperside with white streaked or spotted, broad black apex. Forewing pointed; female above black with a series of four small prominent white spots in an oblique line at the end of cell. Underside of hindwing with yellow spot in wet season form.

Material examined : Nil.

Wing expanse : 70-90mm (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon and Mussoorie) Meghalaya, Nagaland, Sikkim, West Bengal.

Elsewhere : Hainan, Myanmar and South China.

Remarks : Hannygton (1910) reported the species from Kumaon and Mussoorie.

Genus ***Anaphaeis*** Huebner

1819. *Anaphaeis* Huebner, *Samml. Exot. Schmett.,* **2** : 93.

Remarks : A single species is reported from India, which is dealt with here.

10. ***Anapheis aurota aurota*** (Fabricius)

1793. *Papilio aurota* Fabricius, *Ent. Syst.,* **3**(1) : 197.

1995. *Anapheis aurota,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya, Zoological Survey of India,* Part-1 : 65.

Diagnostic characters : Wings upperside white, fore wing with costal area to base of vein R1 dusky black, a prominent curved jet black

discocellular bar, a broad black apical area narrowing to vein Culb and six white spots present in the apical area, of which the anterior four are elongate. Hind wing with a marginal black border from veins Culb to M1 and bearing four rounded spots from vein Culb to M2.

Material examined : 1ex., District : Bageshwar, Someswar, 35km. away from Wajenyula F.R.H., 163M., 19.ix.2004 (Coll. D.R. Maulik)

Wing expanse : 52mm.

Distribution : Throughout India including Uttarakhand (Almora, Bageswar, Dehradun), except Assam.

Remarks : Arora *et al.* recorcded the species from Almora and Dehradun. The present record added another district Bageswar.

Genus ***Baltia*** Moore

1878. *Baltia* Moore, *Ann. Mag. Nat. Hist.*, (5)1 : 228.

Remarks : Single specius is available in India which is dealt with here.

11. ***Baltia butleri*** (Moore)

1882. *Synchloe butleri* Moore, *Proc. Zool. Soc. Lond.*, : 256pl. ii, fig. 6, 6a.

1995. *Baltia butleri butleri*, Arora *et al. Himalayan Ecosystem Series. Fauna of Western Himalaya, Zoological Survey of India*, Part-1 : 65.

Diagnostic characters : Upperside pure white, bases of wings irrorated with black scales, the terminal series of three or four spots. Hindwing with two conspicuous black spots on discocellular.

Material examined : Nil.

Wing expanse : 36-45mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Almora, Dehradun, Kumaon) up to Ladak.

Remarks : Talbot (1939) mentioned its distribution Ladak to Kumaon, but Arora *et al.* (1995) confirms its distribution from Uttarakhand.

Genus ***Aporia*** Huebner

1819. *Aporia* Huebner, *Verz. bek, Schmett.*, : 90.

Remarks : Of the four species of this genus occurring in India, all are dealt with here.

Key to species

1. Wings thickly scaled. Hindwing with vein Sc + R1 short, its discal end placed above the origin of vein M1. Palpus very hairy .... *peloria* (Hewitson)

- Wings more thickly scaled. Hindwing with vein Sc + R1 placed well beyond the origin vein M1. Palpus less hairy 2

2. Hindwing upperside with pale border, the veins crossing it white or narrowly black 3

- Hindwing upperside with dark border or with marginal vein spots almost complete .... *agathon* (Gray)

3. Hindwing upperside usally unmarked, without discal sagittate band .... *leucodice* (Eversmann)

- Hindwing upperside with a prominent discal band ..... *nabellica* (Boisduval)

12. ***Aporia peloria*** (Hewitson)

1852-1855. *Pieris peloria* Hewitson, *Exot. Butt.*, figs. 15, 16.

1939. *Aporia peloria*, Talbot, Fauna Brit. India, Butterflies, 1 : 311-312.

Material examined : Nil.

Wing expanse : 42-44mm. (Talbot, 1939).

Distribution : Kumaon to Tibet border.

Remarks : Talbot (1939) reported the species from Kumaon.

13. ***Aporia agathon*** (Gray)

1831. *Pieris agathon* Gray, *Zool. Misc.*, 1 : 33.

Key to subspecies

1. Upperside ground colour black, markings of both wings white 2

- Upperside ground colour white, veins broadly bordered with black ..... *phryxe* (Boisduval)

2. Forewing cell dusted with black, all the markings reduced ..... *ariaca* (Moore)

Forewing cell not dusted with black, all the markings prominent ..... *caphusa* (Moore)

13a. ***Aporia agathon phryxe*** (Boisduval)

1836. *Pieris phryxe* Boisduval, *Spec. Gen. Lep.*, 1 : 446.

1939. *Aporia agathon phryxe,* Talbot, *Fauna Brit. India, Butterflies,* **1** :317.

Material examined : Nil.

Wing expanse : 80-90mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Chamoli, Dehra Dun, Mussorrie, Garhwal) to Kashmir.

Remarks : Mackinnon & de Niceville (1898) reported the subspecies from Dun Valley and Mussorree. Arora *et al.* reported the species from Chamoli.

13b. *Aporia agathon ariaca* (Moore)

1872. *Metaporia ariaca* Moore, *Proc. Zool. Soc. Lond.,* : 564.

1939. *Aporia agathon ariaca,* Talbot, *Fauna Brit. India, Butterflies,* **1** : 318.

Material examined : Nil.

Wing expanse : 80-90mm (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon and Nainital).

Remarks : Arora *et al.* (1995) reported the species from Nainital. Talbot (1939) reported the species from Kumaon and Nainital.

13c. *Aporia agathon caphusa* (Moore)

1872. *Metaporia caphusa* Moore, *Proc. Zool. Soc. Lond.,* : 564.

1939. *Aporia agathon ariaca,* Talbot, *Fauna Brit. India, Butterflies,* **1** : 318.

Material examined : Nil.

Wing expanse : 84-94mm. (Talbot, 1939).

Distribution : India : Uttarkhand (Almora, Chamoli, Dehradun, Mussoorie, Tehri Garhwal) to United Provinces.

Remarks : Mackinnon & de Niceville (1898) reported the species from Mussoorie and Dun Valley Arora *et al.* reported the species from Almora, Chamoli Dehradun, and TehriGarhwal. Shull (1962) collected the species from Mussoorie.

14. *Aporia leucodice* (Eversmann)

1843. *Metaporia leucodice* Eversmann, Bull. Soc. Lmp. Nat. Moscou, **16**(3) : 153.

Key to Subspecies

Underside of forewing with a post discal spot in area Culb divided longitudinally with a bar, underside of hindwing paler and discal band often absent ..... *soracta* Moore

- Underside of forewing with postdiscal spots in area Culb and M3, underside of hindwing with a strong discal sagittate band .... *sara* Evans

14a. *Aporia leucodice soracta* Moore

1857. *Aporia soracta* Moore, Cat. Lep. Mus, E.I.C., : 83.

1939. *Aporia leucodice soracta,* Talbot, *Fauna Brit. India, Butterflies,* **1** : 313-314.

Material examined : 8exs., District : Dehradun, 5, 10, 15, v.1956 (Coll. K.K. Tiwari).

Wing expanse : 50-70mm.

Distribution : India : Uttarakhand (Almora Dehradun, Kumaon, Mussoorie). Kashmir to United Provinces.

Remarks : Mackinnon & de Niceville (1898), Hannygton (1910), Arora *et al.* (1995) recorded the species from Dun Valley, Mussorree, Kumaon and Almora respectively.

14b. *Aporia leucodice sara* Evans

1932. *Aporia leucodice sara* Evans, Identification of Indian Butterflies, ed II : 68.

1939. *Aporia leucodice sara* Evans, Talbot, *Fauna Brit. India, Butterflies,* **1** : 314.

Material examined : Nil.

Wing expanse : 50-70mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon)

Remarks : Evans (1932) described the species from Kumaon. The species is endemic.

15. *Aporia nabellica* (Boisduval)

1836. *Pieris nabellica* Boisduval, *Spec. Gen.* Lep., **1** : 509.

1939. *Aporia nabellica,* Talbot, *Fauna Brit. India, Butterflies,* **1** : 315.

Material examined : Nil.

Wing Expanse : 50-60mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie, Nainital) up to Kashmir.

Elsewhere : Chitral.

Remarks : Hannygton (1910) collected the species near the snow at Kumaon. Arora *et al.* reported the species from Nainital.

Genus ***Pieris*** Schrank

1801. *Pieris* Schrank, *Fauna Boica.*, : 152.

Key to species

1. Hindwing underside with postdiscal or submarginal series of spots. Antennal club large and spatulate ..... *callidice* (Huebner)
- Hindwing underside without postdiscal or submarginal series of spots. Antennal club neither large nor spatulate 2
2. Hindwing underside with the veins defined with black ..... *napi* (Linnaeus)
- Hindwing underside with the veins not defined with black 3
3. Forewing upperside with inner edge of black area dentate ..... *canidia* (Sparrman)
- Forewing upperside with inner edge of black area not dentate ..... *brassicae* (Linnaeus)

16. ***Pieris callidice kalora*** Moore

1865. *Pieris kalora* Moore, *Proc. Zool. Soc. Lond.*, : 449, pl. 31, fig. 15.

1939. *Pieris callidice kalora*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 415-416.

Material examined : 1ex., District : Garhwal, Khartoolma, 19.vii.1958 (Coll B.S. Lamba).

Wing expanse : 54mm.

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie, Tehri Garhwal); North West Frontier Provinces.

Elsewhere : Safed Koh to Chitral, United Provinces.

Remarks : Mackinnon & deNiceville (1898) and Hannygton (1910) reported the species under the genus *Synchloe*. Talbot (1939) and Arora *et al.* (1995) described the species under the genus *Pieris*.

17. ***Pieris napi ajaka*** Moore

1865. *Pieris ajaka* Moore, *Proc. Zool. Soc. Lond.*, 490 pl. 31, fig. 16.

1939. *Pieris napi ajaka*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 420.

1995. *Pieris napi ajaka* Arora *et al. Himalaya Ecosystem Series : Fauna of Western Himalaya*, Part-1, Uttar Pradesh, : 65.

Material examined : Nil.

Wing expanse : 40-55mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon, Nainital, Dehradun, Mussoorie) Punjab, Murree to Chitral.

Remarks : Mackinnon & de Niceville (1898), Hannygton (1910) and Arora *et al.* (1995) reported the species from the above mentioned locality.

18. ***Pieris canidia indica*** Evans

1926. *Pieris canidia indica* Evans *J. Bombay nat. Hist. Soc.*, **31** : 712.

1939. *Pieris canidia indica*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 425-426.

1995. *Pieris canidia indica*, Arora *et al. Himalayan Ecosystem Series : Fauna of Western Himalaya*, Part-1, Uttar Pradesh : 65.

Material examined : District : Almora, 2exs., Artoria, 29.ix.2001, 1ex., Binsar, 30.ix.2001 (Coll P. Mukherjee), 1ex., Katri, 1390m., 4.x.2001 (Coll A. Bal.); District : Dehradun, 3exs., Foharar Dhara 16.x.2005, 2exs., Camty Falls, 19.ix.2005 (Coll A.K. Sidhu); District : Haridwar, 1ex., Rishikesh, 9.iv.2003 (Coll B.G. Kundu); District : Nainital, 1ex., Ranikhet, 39km. south of Ranikhet, 1920m. 25.ix.2004 (Coll. D.R. Maulik District : PauriGarhwal, 3exs., Srinagar, 20.iv.2005 (Coll S.K. Chakroborty); District : TehriGarhwal, 2xs., Duili, 7.x.2001 (Coll S.K. Mandal), 1ex., Wagomchomi, 8.iv.2003 (Coll B.G. Kundu), 2exs., Surkhanda Forest, 23.ix.2003 (Coll S.K. Chakraborty), 3exs., Ranoschormi, 28.ix.2005 (Coll A.K. Sidhu); District : Uttarkashi, 1ex., Yamnotri, Borkati, 1km. from F.R.H. 20.ix.2005 (Coll A.K. Sidhu).

Wing expanse : 48-61mm.

Distribution : India : Uttarakhand (Almora, Chamoli, Dehradun, Kumaon, Mussoorie, Nainital, Pithoragarh, Pauri Garhwal, Tehri Garhwal, Uttarkashi); Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : North Baluchistan, Pakistan (Chitral) to the Dwana Range and Myanmar.

Remarks : Mackinnon & deNiceville (1898) and de Niceville (1910) reported the subspecies from Dehradun and Mussoorie; Hannygton (1910) reported it from Kumaon Arora *et al.* reported the species from Almora, Chamoli, Dehradun, Nainital, Pithoragarh, Pauri Garhwal, Tehri Garhwal and Uttarkashi.

19. ***Pieris brassicae nepalensis*** Doubleday

1864. *Pieris brassicae var. nepalensis* Doubleday, *Genera of Diurnal Lepidoptera*, **1** : 9, pl. vi.

1995. *Pieris brassicae nepalensis*, Arora *et al. Himalayan Ecosystem Series, Fauna of Himalayas*, Part-1 : 65.

Material examined : District : Almora : 1ex., Barachhina, 3.iv.2002, District : Bageswar, Baijnath, 9.iv.2002 (cool S. Roychaudhury), District : Dehradun, Chandipur, 29.iii.2003 (coll B.G. Kundu), District : Nainital, 1ex., Ranikhet, Binsarmahadev, 12.iv.2002, 2exs., Parulia, 4.iv.2002 (coll S. Roychaudhury), District : Uttarkashi, 1ex., Tilodh, 1.iv.2003, 1ex., Manda, 1.iv.2003, 2exs., Jathpur, 2.iv.2003, 1ex., Bhaturari, 3.iv.2003, 1ex., Gongotri, Harsil, 4.iv.2003 (coll B.G. Kundu).

Wingexpanse : 52-70mm.

Distribution : India : Uttarakhand (Almora, Bageswar, Chamoli, Dehradun, Kumaon, Mussoorie, Nainital, Pauri Garhwal, TehriGarhwal); Assam, Meghalaya, Nagaland, Sikkim, Plains of Adjoining the Himalayas, West Bengal.

Elsewhere : Baluchistan, Pakistam (Chitral), Tibet and Yannan.

Remarks : Mackinon & DeNiceville (1898), Hannygton (1910) and Shull (1962) recorded the only species, but Arora *et al.* reported the subspecies from this region.

Genus ***Appias*** Huebner

1819. *Appias* Huebner, *Verz. bek. Schmett.*, : 91.

Remarks : Eight species of this genus recorded from India, of which four are dealt with here.

Key to species

1. Hindwing underside with a black dot at end of cell and black marginal dots between the veins ..... *pandione* (Geyer)
- Hindwing underside without black dot at end of cell and no marginal dots between the veins 2
2. Hind wing underside yellow .... *lyncida* (Cramer)
- Hind wing underside not yellow 3
3. Fore wing underside with veins in apical and outer marginal area black .... *libythea* (Fabricius)
- Fore wing underside with veins in apical and outer marginal area not black .... *albina* (Boisduval)

20. ***Appias pandione lalage*** (Doubleday)

1842. *Pieris lalage Doubleday In Gray's Zool. Miscell.* : 76.

1939. *Appias pandione lalage*, Talbot, *Fauna Brit. India*, Butterflies, **1** : 387-389.

Material examined : Nil.

Wing expanse : 55-80mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Mussoorie and Pithoragarh), United Provinces.

Elsewhere : Myanmar and Tavoy.

Remarks : Talbot (1939) and Haribal (1992) reported the species from Mussoorie, Arora *et al.* added another locality Pithoragarh to this species.

21. ***Appias lyncida eleonora*** (Boisduval)

1836. *Pieris eleonora* Boisduval, *Spec. Gen. Lep.*, **1** : 481.

1939. *Appias lyncida eleonora*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 398-400.

Material examined : Nil.

Wing expanse : 55-70mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon), Meghalaya, Sikkim, West Bengal.

Elsewhere : Annam, Hainan, Myanmar, Thailand and Tonking.

Remarks : Hannygton (1910) reported the species under the *hippoides* from Kumaon, Talbot (1939) described it as a synonym of *lyncida eleonora*.

22. ***Appias libythea*** (Fabricius)

1775. *Papilio libythea* Fabricius, *Syst. Ent.*, : 471.

1910. *Appias libythea,* Hannygton, *J. Bombay nat. Hist Soc.,* **20** : 361.

1995. *Appias libythea,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya,* Part-1 : 65.

Material examined : Nil.

Wing expanse : 50-60mm. (Talbot, 1939).

Distribition : India Uttarakhand (Dehradun and Kumaon); Nicobar Island.

Elsewhere : Hainan, Malaya Peninsula, Myanmar, North Philippines and Srilanka.

Remarks : Hannygton (1910) reported the species from Kumaon and Arora *et al.* mentioned its distribution from Dehradun.

Genus ***Cepora*** Billberg

1820. *Cepora* Billberg, *Enumeratio Insecta Orum in Musco Billberg,* : 36.

Remarks : Two species are reported from India, but single species is dealt with here.

23. ***Cepora nerissa phryne*** (Fabricius)

1775. *Papilio phyrne* Fabricius, *Syst. Ent.,* : 473.

1939. *Cepotra nerissa phryne,* Talbot, *Fauna Brit. India,* Butterflies, **1** : 362-364.

1995. Cepotra nerissa phryne, Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya,* Part-**1** : 65.

Diagnostic characters : Male : upperside of forewing with apical black area bearing prominent white spots. Hindwing with marginal black border dentate on the inner edge. Underside with a prominent submarginal dusky black and interrupted in area M2. Female : upperside with extensive blackish brown markings. Fore wing usually with yellow subapical spots, cell bordered with blackish brown having only a white median streak, veins all darkened, especially the submedian and vein M3. Hindwing with prominent submarginal white spots within the blackish brown marginal border, uppermargin of cell blackened than on the fore wing.

Material examined : District : Dehradun, 3exs., Rishikesh, Varendranagar F.R.H., 28.x.2005 (Coll A.K. Sidhu).

Wing expans : 40-50mm.

Distribution : India : Uttarakhand (Almora, Dehradun, Kumaon and Mussoorie); Peninsular India to North West States.

Elsewhere : Nepal and Srilanka.

Remarks : Mackinnon & de Niceville (1898) reported the species from Dehradun and Mussoorie; Arora *et al.* confirms its distribution from Dehradun and also from Almora.

Genus ***Lxias*** Huebner

1819. *Ixias* Huebner, Verz. bek. Schmett., : 95.

Remarks : Of the three species of this genus occurring in India, two species are treated here.

Key to species

Ground colour of both wings dorsally pure white ..... *marianne* (Cramer)

- Ground colour of both wings dorsally chrome yellow ..... *pyrene* (Linnaeus)

24. ***Ixias marianne*** (Cramer)

1779. *Papilio marianne* Cramer, *Pap. Exot.,* **3** : 41, pl. 217, figs. C.D.E.

1939. *Ixias marianne,* Talbot, *Fauna Brit. India,* Butterflies, **1** : 440-443.

1995. *Ixias marianne,* Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalaya,* Part-**1** : 65.

Material examined : Nil.

Wing expanse : 50-55mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Almora, Dehradun, Kumaon, Mussoorie and Tehri Garhwal); Maharashtra, N.W. Himalayas, Punjab, Tamil Nadu and West Bengal. Also extending from Srilanka to Peninsular India.

Remarks : Mackinnon & de Nicville (1898) reported the species from Dehradun and Mussoorie, Hannygton (1910) mentioned another locality Kumaon, Arora *et al.* reported its occureence from Almora, Dehradun and Tehri Garhwal.

25. ***Ixias pyrene kausala*** Moore

1877. *Ixias kausala* Moore, *Ann. Mag. Nat. Hist. Soc.,* (4)**20** : 49.

1910. *Ixias pyrene satadra,* Hannygton, *J. Bombay Nat. Hist. Soc.,* **20** : 361.

1939. *Ixias pyrene kausala*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 446.

Material examined : Nil.

Wing expanse : 50-60mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Dehradun, Mussoorie and Kumaon); Andhra Pradesh, Punjab, West Bengal.

Elsewhere : Baluchistan, Chitral, Sind and United Provinces.

Remarks : Mackinnon & de Nicéville (1898) reported the species from Dehradun and Mussoorie, Hannygton (1910) mentioned another locality kumaon.

Genus ***Colotis*** Huebner

1819. *Colotis* Huebner, *Verz. bek. Schmett.*, : 97.

Remarks : Of the seven species of this genus occurring in India, single species istreated here.

26. ***Colotis etrida etrida*** (Boisduval)

1836. *Anthocharis etrida* Boisduval, *Spec Gen. Lep.*, **1** : 576.

1910. *Colotis etrida*, Hannygton, *J. Bombay. Nat. Hist. Soc.*, **20** : 362.

1939. *Colotis etrida etrida*, Talbot, *Fauna Brit. India, Butteflies*, **1** : 465-466.

Diagnostic characters : Upperside of wings white sparsely dusted with black. Forewing with a small black discocellular spot, apical area broadly black, bearing an oval, curved dark orange patch placed obliquely and tranversed by the black veins; inner edge of black area diffuse. Hindwing with a sub apical spot, diffuse black streaks from the costa and a series of marginal black spots.

Material examined : Nil.

Wing expanse : 25-45mm. (Talbot, 1939).

Distribution : Peninsular India including Uttarakhand (Dehradun, Kumaona nd Mussorrie), to the Himalayas.

Elsewhere : Baluchistan.

Remarks : Mackinnon & de Niceville (1898) and Hannygton (1910) reported the species from Dehradun, Mussoorie and Kumaon.

Genus ***Euchloe*** Huebner

1819. *Eucholoe* Huebner, *Verz. bek. Schmett.*, (6) : 94.

Remarks : The genus is represented by two species, of which only one is dealt with here.

27. ***Euchloe ausonia daphalis*** (Moore)

1865. *Synchloe daphalis* Moore, *Proc. Zool. Soc. Land.*, 491, pl. 31. fig. 14.

1910. *Euchloe belia daphalis*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 363.

1995. *Euchloe ausonia daphalis*, Arora *et al.*, *Himalayan Ecosystem Series, Fauna of Western Himalayas*, Part-**1** : 65.

Diagnostic characters : Upperside white, the base of wings dusted with black. Forewing with basal half of costa spotted with black, a lunate black discocellular spot; apical area black, bearing a subapical band of four white spots, underside of forewing creamy white, costal area dusted with black, a discocellular lunate spot, balck centered with white, apical area dark brown mixed with greenish yellow, the interspaces silver. Hindwing immaculate, with a network of irregular more or less tranverse bands and lines of dark brown overlaid with greenish yellow scales, the interspaces shining with silver.

Material examined : Nil.

Wing expanse : 40-45mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie and Nainital).

Elsewhere : Baluchistan to Chitral.

Remarks : Mackinnon & de Niceville (1898) reported the species from Dehradun and Mussoorie, Hannygton (1910) recorded its occurrence in Kumaon and Arora *et al.* (1995). added another locality Nainital.

Subfamily COLIADINAE

Key to genera

1. Hindwing with precostal vein short and directed basal ..... ***Catopsilia*** Huebner

- Hind wing precostal vein absent or obsolets 2

2. Forewing vein R2 from the cell 3

   Forewing vein R2 from the stalk of R3-R4 and R5 ..... ***Colias*** Fabricius

3. Hindwing produced to a sharp tooth at vein Cula, palpi slighty hairy ..... ***Gonepteryx*** Leach

- Hindwing rounded, palpi not hairy .... ***Eurema*** Huebner

Genus ***Catopsilia*** Huebner

1819. *Catopsilia* Huebner, *Verz. bek. Schmett.*, **7** : 98.

Remarks : All the three species known from India are treated here.

Key to species

1. Underside of wings marked with transverse reddish brown striage 2
   - Underside of wings without reddish brown striage ..... *pomona* (Fabricius)
2. Fore wing upperside below apex with marginal dark border continuous and often broad .... *pyranthe* (Linnaeus)
   - Fore wing upperside below apex with a macular marginal dark border always narrow ..... *florella* (Fabricius)

28. ***Catopsilis pomona pomona*** (Fabricius)

1775. *Papilio pomona* Fabricius, *Syst. Ent.*, : 479.

1910. *Catopsilia pomona*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 363.

1939. *Catopsilia pomona pomona*, Talbot, Fauna Brit. India, *Butterflies*, **1** : 493-495.

Material examined : District : Bageswar, 1ex., Bageswar, 1785m., 30.ix.2004 (Coll D.R. Maulik), District : Dehradun, 3exs., Rishikesh, Varendranagar, F.R.H. Campus, 28.x.2005 (Coll A.K. Sidhu), District : Tehri Garhwal, Baysi, 1.ix.2002 (Coll S.K. Mandal).

Wing expanse : 60-75mm.

Distribution : India : Uttarakhand (Dehradun, Kumaon, Pithoragarh, Pauri Garhwal and Tehri Garhwal); Andaman, Andhra Pradesh, Meghalaya, Nagaland, Nicobar Island, Sikkim and West Bengal.

Elsewhere : Australia, Myanmar, Solomon Island, South China and Sri Lanka.

Remarks : Hannygton (1910) reported the specis from Kumaon, Arora *et al.* (1995) reported it from Dehradun, Tehri Garhwal, Pouri Garhwal and Pithoragarh. The present record confirms its distribution from Uttarakhand.

29. ***Catopsilia pyranthe pyranthe*** (Linnaeus)

1758. *Papilio pyranthe* Linnaeus, *syst. Nat. Ed. 10th.*, : 469.

1910. *Catopsilia pyranthe*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 363.

1939. *Catopsilia pyranthe pyranthe*, Talbot, Fauna Brit. India, *Butterflies*, **1** : 497-498.

Material examined : District : Almora, 1ex., Gagos, 1695m. 29.x.2001 (Coll A. Ball), 9exs., Kaprakhan, 15km. south of Binsar Wild Life Sanctuary, F.R.H., 2150m., 1.x.2004, Takula, 35 km away from Binsar Wild Life Sanctuary, F.R.H., 2150m., 2.x.2004 (Coll. D.R. Maulik), District : Bageswar, 2exs., Someswar, 18.x.2001 (Coll. B.C. Das), 1ex., Baidal, Goddar, 26.ix.2003 (Coll B. Mitra), District : Champawat, 2exs., Tanakpur I.B. 12.x.2004, (Coll B. Mitra), District : Dehradun, 2exs., Lachhiwala, 27.x.2002, 1ex., Maldeata, 2.xi.2002, 1ex., Beriwara, 5.xi.2002 (Coll. M. Prasad), 1ex., Sahasradhara, 16.ix.2005 (Coll A. Sidhu), District : Nainital, 1ex., Ramgarh, 4.x.2004 (Coll. M. Ghosh), District : Tehri Garhwal, 3exs., Chandigarh, 6.ix.2002 (Coll. S.K. Mandal).

Wing expanse : 45-60mm.

Distribution : India : Uttarakhand (Almora, Bageswar, Champawar, Dehradun, Kumaon, Mussoorie, Nainital, Pithoragarh, Pauri Garhwal, Tehri Garhwal); Andaman. Andhra Pradesh, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : Africa, Arabia, Hainan, Indochina, Myanmar, South Chinaand Sri Lanka.

Remarks : Mackinnon & de Niceville (1898), Hannygton (1910) reported the species from Dehradun and Mussoorie and Kumaon respectively. Arora *et al.* (1995) confirms its distribution from Uttarakhand.

30. ***Catopsilia florella gnoma*** (Fabricius)

1776. *Papilio gnoma* Fabricius, Syst. Ent., : 528.

1910. *Catopsiliaflorella gnoma*, Mannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 363.

1939. *Catopilia florella gnoma*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 500-501.

Material examined : District : Tehri Garhwal, 1ex., Chandighat, 6.ix.2002 (Coll S.K. Mandal).

Expanse : 54mm.

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie and Tehri Garhwal). Andaman, Andhra Pradesh, Manipur, Maharashtra, Nagaland, Sikkim, Tamil Nadu and West Bengal.

Elsewhere : Africa to Arabia, Hainan to South China, Myanmar to Indo China and Persia to Sri Lanka.

Remarks : Mackinnon & deNiceville (1898) and Hannygton (1910) reported the species from Dehradun, Mussoorie and Kumaon respectively. The present record added another district from Uttarakhand.

Genus ***Colias*** Fabricius

1807. *Colias* Fabricius, *Illigers Mag.*, **6** : 284.

Remarks : Eight specius of this genus occurring in India, of which four are dealt with here.

Key to species

1. Upperside yellow, orange yellow or white 2
- Upperside orange or reddish orange 3
2. Forewing marginal spots larger, complete and equal in size ..... *ladakensis* Felder

   Forewing without marginal spot .... *erate* (Esper)
3. Hindwing upperside without sex brand in male .....*eogene* (Felder)
- Hindwing upperside with yellow sex brand at the base of area R5 ..... *electo* (Linnaeus)

31. ***Colias ladakensis*** Felder

1865. *Colias ladakensis* Felder, *Reis. Navara Lep.*, **2** : 197, tab. 26, fig. 8,9.

1939. *Colias ladakensis*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 548-549.

1995. *Colias ladakensis*, Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalayas*, Part-**1** : 66.

Material examined : Nil.

Wing expanse : 45-50mm. (Talbot, 1939).

Distribution : India : Uttarakhand (Kumaon and Nainital) to Kashmir.

Remarks : Talbot (1939) reported its distribution from Kumaon and Nainital, Arora *et al.* mentioned its locality from Nainital.

32. ***Colias erate erate*** (Esper)

1805. *Papilio erate* Esper, *Die. Schmett. Suppl.*, (23) : 13, pl. 119, fig. 3.

1910. *Colias erate lativitta*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 363.

1995. *Colias erate erate*, Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalayas*, Part-**1** : 65.

Material examined : District : Dehradun, 3exs., 5, 10.v.1956 (Coll K.K. Tiwary).

Wing expanse : 45-55mm.

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie and Tehri Garhwal).

Remarks : Mackinnon & de Niceville (1898) reported the species from Dehradun & Mussoorie, Hannygton (1910) mentioned its distribution from Kumaon, Shull (1962) collected the species from Mussoorie and Arora *et al.* reported it from Dehradun and Tehri Garhwal.

33. ***Colias eogene eogene*** Felder

1865. *Colias eogene* Felder, *Reise. Novara. Lep.*, **2** : 196, tab, 26, fig. 7.

1939. *Colias eogene eogene*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 548-549.

1995. *Colias eogene eogene*, Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalayas*, Part-**1** : 66.

Material examined : Nil.

Wing expanse : 40-50mm. (Talbot, 1939).

Distribution : India Uttarakhand (Kumaon and Nainital) along the interior Himalaya.

Elsewhere : Eastern Karakorum and Ladak.

Remarks : Talbot (1939) reported the speies from Kumaon, Arora *et al.* (1995) added another locality Nainital.

34. ***Colias electo fieldi*** Menetries

1855. *Colias fieldi* Menetries, *Enum. Corp. Anim. Mus. Petr.*, **1** : 76, pl. 1, fig. 5.

1910. *Colias fieldi edusina, Hannygton, J. Bombay Nat. Hist. Soc.*, **20** : 364.

1995. *Colias electo fieldi*, Arora *et al. Himalayan Ecosystem Series, Fauna of Western Himalayas*, Part-**1** : 66.

Material examined : District : Almora, 1ex., Gagas, 1829m., 29.ix.2001 (Coll. A. Bal), 2exs., Chanbatia, 10.iv.2002 (Coll. S. Roychaudhury), District : Bageswar Bageswar, 30.ix.2004 (Coll. M. Ghosh), District : Dehradun, 28esx., 5, 16, 20.v.1956 (Coll. K.K. Tiwary & Nirapada), Dutta; District : Garhwal, 1ex., Kharjongma, 19.vii.1958 (Coll. B.S. Lamba), District : Rudraprayag, Chandravita, 8.ix.2006 (Coll. A.K. Sidhu).

Wing expanse : 44-52mm.

Distribution : India : Uttarakhand (Bageswar, Chamoli, Dehradun, Kumaon, Mussoorie, Nainital, Pithoragarh, Pauri Garhwal, Rudraprayag and Tehri Garhwal); North Punjab, Sikkim and Western Himalayas.

Elsewhere : Baluchistan and North Myanmar.

Remarks : Mackinnon & de Niceville (1898) mentioned its distribution from Dehradun and Mussoorie, Shull (1962) collected the species from Mussoorie nad Arora *et al.* (1995) confirms its distribution from Uttarakhand.

Genus ***Gonepteryx*** Leach

1815. *Gonepteryx* Leach, *Edinburgh. Encyl.*, **9** : 128.

Remarks : This genus is represented by three speies from India, of which two are dealt with here.

Key to species

Hindwing outermargin not dentate between veins M3 and 2A, excepting the projection at vein M3 ..... *rhamni* (Linnaeus)

\- Hindwing outer margin dentate between vein M3 and 2A ..... *mahaguru* (Gistel)

35. ***Gonepteryx rhamni nepalensis*** Doubleday

1847. *Gonepteryx nepalensis* Doubleday, *Genera of Diurnal Lepidoptera*, **1** : 364.

1910. *Gonepteryx rhamni nepalensis*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 364.

1995. *Gonepteryx rhamni nepalensis*, Arora *et al. Himalayan Ecosystem Series, Fauna of Western* Himalayas, Part-**1** : 65.

Material examined : District : Almora, 1ex., Binsar, 2886m., 26.ix.2001 (Coll A. Bal), 2exs., Kaprakhen, Binsar, 14, 16.x.2001 (Coll B.C. Das), 1ex., Chaubatia, 29.ix.2003 (Coll. B. Mitra), 2exs., Binsar Wild Life Sanctuary, F.R.H. 2480m., 1.x.2004 (Coll. D.R. Maulik), District : Bageswar, 7 exs., Baijnath, 9.x.2001 (Coll P. Mukherjee); District : Chamoli, 2exs., Joshimath, 28.vii, 1.viii.; 1ex., Dangari, 21.viii.1958 (Coll. B.S. Lamba); District : Dehradun, 4exs., 16.v.1956 (Coll. K.K. Tiwary); District : Nainital, 1ex., Ranikhet, Sony, 1829m., 28.ix.2003 (Coll. A.K. Sidhu), 1ex., Tolla Ramgarh, 8.x.2004 (Coll. M. Ghosh); District : Pauri Garhwal, Srinagar, 4.x.2006 (Coll. A.K. Sidhu); District : Uttarkashi, 1ex., 23.viii.1974 coll. H.C. Ghosh, 1ex., Brahmalkhal, 23.ix.2003 coll. A.K. Sidhu.

Wing expanse : 42-52mm.

Distribution : India : Uttarakhand (Almora, Chamoli, Dehradun, Kumaon, Pithoragarh, Mussoorie, Nainital, Pauri Garhwal, Tehri Garhwal and Uttarkashi) Murree. Chitral to Northern Myanmar.

Ramarks : Mackinnon & de Niceville (1898) reported the species from Dehradun and Mussoorie, Hannygton (1910) mentioned its distribution from Kumaon. Arora *et al.* confirms the distribution from Uttarakhand.

36. ***Goanepteryx mahaguru mahaguru*** (Gistel)

1857. *Rhodocera (sic.) mahaguru* Gistel, *Vacuna*, **2**(2) : 605.

1910. *Gonepteryx aspasia* zaneka, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 364.

1939. *Gonepteryx mahaguru mahaguru*, Talbot, *Fauna Brit. India*, Butterflies, **1** : 510.

Material examined : Nil.

Wing expanse : 50-55mm. (Talbot, 1939)

Distribution : India : Uttarakhand (Dehradun, Kumaon, Mussoorie and Nainital), Kashmir, Murree.

Remarks : Mackinnon & deNiceville (1898), Hannygton (1910), Talbot (1939) and Arora *et al.* reported the species from Uttarakhand.

Genus ***Eurema*** Huebner

1819. *Eurema* Huebner, *Verz. bek. Schmett.*, : 96.

Remarks : The genus is represented in India by six species of which, four are dealt with here.

Key to species

1. Fore wing dorsally with black border not continued along vein 1A. Ventral side of both wings without discocellular ring spots 2
- Fore wing dorsally with black border often continued along vein 1A. Ventral side of both wings with large discocellular ring spots 3
2. Dorsal side of both wings with black border usally broad, with inner edge regular. Male without a sex brand. Forewing underside with two small discocellular spots ..... *brigitta* (Cramer)
- Upperside of hindwing in male with a sex brand at base of area Rs. Underside of forewing with a sex brand at base of area 1A + 2A, a single small black discocllular spot present ..... *laeta* (Boisduval)
3. Forewing underside with two spots in cell ... *hecabe* (Linnaeus)
- Forewing underside with single spot in cell ..... *andersoni* (Moore)

37. *Eurema brigitta rubella* (Wallace)

1867. *Terias rubella* Wallace, *Trans. Ent. Soc. Lond.*, 4(3) : 323. 1910.

1910. *Terias libythea*, Hannygton, *J. Bombay Nat. Hist. Soc.*, **20** : 364.

1995. *Eurema brigitta rubella*, Aroa *et al. Himalayan Ecosystem Series, Fauna of Western* Himalayas, Part-**1** : 65.

Material examined : District : Almora, 1ex., Sitalakhet, 1640m., 25.ix.2001, 1ex., Sony, 28.ix2001, 1ex., Katamri, 1640m., 3.x.2001 (Coll A. Bal), 1ex., Khairana, 30km. away from Kalika, 25.x.2004 (Coll D.R. Maulik), District : Bageswar, 1ex., Someswar, Kansan, 18.x.2001, (Coll B.C. Das), 2exs., Someswar, 8.iv.2002 (Coll S. Roychaudhury), 1ex., Bageswar, 1785m. 20.ix.2004 (Coll D.R. Maulik); District : Dehradun, 1ex., Dehradun, 4.x.2002 (Coll M. Prasad); District : Nainital, 1ex., Bhimtal, 1371m., 7.x.2001 (Coll. A. Bal), 1ex., Jealkote, 1400m., 18km. from Nainital, 23.ix.2002 (Coll. P.H. Roy), 2exs., Bhawali, F.R.H. 1762m., 22.ix.2004 (Coll. D.R. Maulik; District : Uttarkashi, 2exs., Yamnotri, Borbat, 22.ix.2005 (Coll. A.K. Sidhu).

Wing expanse : 30-35mm.

Distribution : India : Uttarakhand (Almora, Bagashwar, Dehradun, Mussoorie, Nainital, Tehri Garhwal and Uttarkashi), Karnataka, Maharashtra, Meghalaya, Nicobar Island, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar, South China and Sri Lanka.

Remarks : Mackinnon & deNiceville (1898) and Hannygton (1910) reported the species from Dehradun, Mussoorie and Kumaon, Arora *et al.* (1995) mentioned its distribution from Dehradun, Tehri Garhwal and Uttarkashi. The present record added another three districts.

38. *Eurema laeta laeta* (Boisduval)

1836 *Terias laeta* Boisduval, *Spec. Gen. Lep.*, **1** : 674.

1910. *Terias laeta laeta*, Hannygton, *J. Bombay NAt. Hist. Soc.*, **20** : 364.

1995. *Eurema laeta laeta*, Arora *et al.*, *Himalayan Ecosystem Series, Fauna of Western* Himalayas, Part-**1** : 65.

Material examined : District : Almora, 1ex., Katvamri, 1640m., 3.x.2001 (Coll. A. Bal), 2exs., Kharina, 30km., away from Kalia F.R.H., 1756m., 25.ix.2004, 2exs., Dwarhat, 41km. away from Kalika F.R.H., 1636m., 26.ix.2004, 2exs., Takula, 35km., away from Binsar Wild Life Sanctuary, F.R.H. 2150m., 2.x.2004, 3exs., Aprakham, 15km., South of Binsar Wild Life Sanctuary, 234m., 2.x.2004. 1ex., Kosi, 20km., away from Dina F.R.H., 1690m., 4.x.2004 (Coll. D.R. Maulik); District : Bageswar. 1ex., Someswar, Kansari, 18.x.2001 (Coll. B.C. Das); District : Champawat, 1ex., Tanakpur I.B., nodate, 1ex., Champawat Sarada River Side, Nodate (Coll. B. Mitra); District : Dehradun, 3exs., Z.S.I. Campus, 5.x.2001 (Coll. S.K. Mandal), 2exs., Satyanaryan, 26.x.2002, 2exs., Lachinwala, 27.x.2002, 4exs., Dehradun, 3.xi.2002, 2exs., Dholkanol Forest, 5.xi.2002, 2exs., Beriwar Forest, 5.xi.2002 (Coll. M. Prasad); District : Haridwar, 1ex., Bahadrabad 15.iv.2003 (Coll. B.G. Kundu); District : Nainital, 1ex., Bhimtal, 137m., 7.x.2001, 1ex., Ranibagh, 1950m., 8.x.2001 (Coll. A. Bal), 2exs., Bhattia, 40km. from Bhawali F.R.H., 1762m., 22.ix.2004 (Coll. D.R. Maulik); District : Pauri Garhwal 1ex., Debaprayag, 30.x.2002 (Coll. M. Prasad); District : Rudraprayag, 2exs., Rishikesh, 24.x.2002, 1ex.,

Phata, 10.ix.2006 (Coll. A. Sidhu); District : Tehri Garhwal, 2exs., Suakhali, 22.xi.2003 (Coll. S.K. Chakraborty); District : Uttarkashi, Yamnotri, Barbat, 22.ix.2005 (Coll. A. Sidhu).

Wing expanse : 36-46mm.

Distribution : Peninsular India including Uttarakhand (Almora, Bageswar, Champawat, Dehradun, Haridwar, Nainital, Kumaon, Pithoragarh, Pauri Garhwal, Rudraprayag TehriGarhwal, Uttarkashi); Punjab to Chitral.

Remarks : The species is widely distributed to Uttarakhand.

40. ***Eurema andersoni*** (Moore)

1886. *Terias andersoni* Moore, *J. Linn. Soc. Lond., Zool,* **21** : 47, pl. 4, fig. 8.

1898. *Terias andersoni,* Mackinnon & de Niceville, *J. Bombay Nat. Hist. Soc.,* **11** : 588.

1939. *Eurema andersoni andersoni,* Talbot, *Fauna Brit India,* Butterflies, **1** : 535-536.

Material examined : Nil.

Wing expanse : 42-45mm. (Talbot, 1939).

Distribution : Peninsular India including Uttarakhand (Dehradun and Mussoorie), Andaman Is., and Sikkim.

Elsewhere : Bhutan Myanmar and West Java.

Remarks : Mackinnon & deNiceville (1898) reported the species from Dehradun & Mussoorie.

Family ARCTIIDAE
Key to subfamilies

1. Body stoutly built in one or both sexes 2
2. Body slenderly built in one or both sexes 5
2. Prodoscis not always functional .... ARCTIINAE
- Probscis always functional 3
3. Wings usally white, antennae bipectinate ....NYCTEMERINAE
- Wings usally black, antennae variable in male 4
4. Forewings markings usally in forms of band ..... CALLIMORPHINAE

Forewings markings reduced to dots .... SPILOSOMINAE

5. Head usally broad. Forewing very long and hindwing uncommonly large .... LITHOSIINAE

Head not so broad. Forewing and hindwing moderately large ..... MICRACTIINAE

Subfamily ARCTIINAE
Key to Genera

Antennae bipectinate in male. Hindwing vein Rs and M1 arising from cell .... ***Diacrisia*** Huebner

- Antennae ciliated in male. Hindwing veins Rs and M1 stalked.....***Nicaea*** Moore

Genus ***Diacrisia*** Huebner

1827. *Diacrisia* Huebner, *Verz. bek. Schmett.,* : 169.

Key to Species

1. Forewing ground colour pure white 2
- Forewing ground colour not white 4
2. Wings sparsly clothed with hair .... ***rhodophila*** (walker)
- Wings thickly and smoothly scaled 3
3. Abdomen crimson above, base and extremity white. Forewing without subbasal series of spots .....***erythrozona*** (Kollar)
- Abdomen orange above, with black spots. Forewing with oblique subbasal series of spots .....***unifascia*** (Walker)
4. Hindwing with ground colour whitish or buff 5

Abdomen orange above with base and extremity buff. Forewing with conjoined black patches occupy most of the surface .... ***punctata*** (Moore)

Abdomen crimson above with the extremity yellow. Forewing with black points .... ***leopardina*** (Kollar)

1. ***Diacrisia rhodophila*** (Walker)

1864. *Spilosoma rhodophila* Walker, *List Lep. Het. Brit. Mus.,* : 294.

1901. *Diacrisia rhodophila,* Hampson, *Cat. Lep. Phal. Brit. Mus.,* **3** : 264.

Material examined : District : Nainital, 1ex., Bhimtal, 19.ix.1988 (Coll. P. Smetack).

Wing expanse : 42mm.

Distribution : India : Uttarakhand, (Nainital); Himachal Pradesh, N.W. Himalayas and Sikkim.

Elsewhere : Chanyang, Moupin, Omel, Shan, Putsufeng and West China.

Remarks : The species is first time recorded from Uttarakhand.

2. ***Diacrisia erythrozona*** (Kollar)

1844. *Euprepia erythrozona* Kollar, *In Hugel's Kashmir und das Reich der Siek*, **4** : 468.

1901. *Diacrisia erythrozona*, Hampson., *Cat. Lep Phal. Brit. Mus.*, **3** : 269.

1977. *Diacrisia erythrozona*, Arora *et al. Newsl., zool. Surv. India*, **3**(6) : 391.

Material examined : Nil.

Wing expanse : Male : 42mm., female : 46mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Garhwal and Mussorie); Kashmir and N.W. Himalayas.

Remarks : Cotes & Swinhoe (1887-1889) rported the species from Mussoorie and Arora *et al.* (1977) recorded it from Garhwal.

3. ***Diacrisia unifascia*** (Walker)

1855. *Andala unifascia* Walker, *Cat. Lep. Het. Brit. Mus.*, **3** : 774.

1901. *Diacrisia unifascia*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 273.

1977. *Diacrisia unifascia*, Arora *et al. Newsl., zool. Surv. India*, **3**(6) : 391.

Material examined : District : Garhwal, 1ex., Garhwal, 3.viii.1958 (Coll B.S. Lamba).

Wing expanse : 38mm.

Distribution : India : Uttarakhand (Chamoli, Garhwal, Mussoorie); Kulu, Kangra and N.W. Himalayas.

Remarks : Hampson (1894, 1901) and Arora *et al.* reported the species from Uttarakhand.

4. ***Diacrisia multiguttata*** (Walker)

1855. *Hypercompa multiguttata* Walker, *Cat. Lep. Het. Brit. Mus.*, **3** : 657.

1901. *Diacrisia multiguttata*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 292.

1977. *Diacrisia multiguttata*, Arora *et al. Newsl., zool. Surv. India*, **3**(6) : 391.

Material examined : District : Rudraprayag, 2exs., Guptakashi, 2.vii.2004 (Coll S.K. Chakroborty).

Wing expanse : 35mm.

Distribution : India : Uttarakhand (Garhwal, Rudraprayag); Kashmir, Kulu, N.W. Himalayas, Meghalaya and Sikkim.

Elsewhere : Cambodia, Myanmar and Nepal.

Remarks : Arora *et al.* reported the species from Garhwal. The present record confirms its distribution from Uttarakhand.

5. ***Diacrisia punctata*** (Moore)

1859. *Spilosoma punctata* Moore, *Lep. East. India Comp.*, : 355.

1901. *Diacrisia punctata*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 280-281.

1977. *Diacrisia multiguttata*, Arora *et al. Newsl., zool. Surv. India*, **3**(6) : 391.

Material examined : District : Garhwal, 1ex., 9.v.1958 (Coll. B.S. Lamba).

Wing expanse : 52mm.

Distribution : India : Uttarakhand (Garhwal); Assam, Nagaland and Sikkim.

Elsewhere : Bassein, Java, Myanmar and Thetmyo.

Remarks : Arora *et al.* reported the species from Garhwal.

6. ***Diacrisia leopardina*** (Kollar)

1844. *Euprepia leopardina* Kollar, *In Hugel's Kashmir und. Das. Reich. Der. Siek.*, **4**(2) : 467, pl. 21.

1901. *Diacrisia leopardina*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 288.

Material examined : Nil.

Wing expanse : Male : 44mm., female : 56mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Almora); Kashmir, Manipur, N.W. Himalayas and Simla.

Remarks : Hampson (1901) reported the species from Almora.

Genus ***Nicaea*** Moore

1879. *Nicaea* Moore, *Lep. Atk.*, : 11.

7. ***Nicaea longipennis*** (Walker)

1855. *Hypercompa longipennis* Walker, *Cat. Lep. Het. Brit. Mus.*, **3** : 655.

1901. *Nicaea longipennis*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 218-219.

Diagnostic characters : Head and thorax black, vertex and abdomen orange. Forewing black with two white specks below the costa near base, a bifid spot below middle of costa, a single spot below vein Culb,a trifid postmedial spot below the costa and bifid spot on vein M3, submarginal series of specks; hindwing orange, the base and costa black, a germinate spot from median nervure to innermargin.

Material examined : Nil.

Wing expanse : 58-70mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Kumaon); Assam and Sikkim.

Elsewhere : Changyang, Moupin, Omeishan, Wassukou, Weshan.

Remarks : Hampson (1901) reported the species from Kumaon.

Subfamily NYCTEMERIINAE
Genus ***Nyctemera*** Huebner

1820. *Nyctemera* Huebner, *Verz. bek. Schmett.*, : 178.

Key to Species

1. Abdomen yellowish with tranverse black band on each segments, wings without discocellular spot ..... *cenis* (Cramer)
- Abdomen whitish with dorsal and lateral rows of black spots, wings with discocellular spot ..... *adversata* (Schaller)

8. ***Nyctemera cenis*** (Cramer) #

1779. *Phalaena cenis* Cramer, *Pap. Exot.*, **2** : 82, pl. 147, fig. E.

2003. *Nyctemera cenis*, Majumdar, *State Fauna Series* 9, *Fauna of Sikkim*, Part-4 : 188.

Material examined : District : Nainital, 2exs., No other data.

Wing expanse : 42mm.

Distribution : India : Uttarakhand (Nainital); Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Uttar Pradesh, and West Bengal.

Elsewhere : Bangladesh, China and Myanmar.

Remarks : The species is first time recorded from Uttarakhand.

9. ***Nyctemera adversata*** (Schaller) #

1788. *Phalaena (Geometra) adversata* Schaller, *Naturorscher*, **23** : 52.

2003. *Nyctemera adversata*, Majumdar, *State Fauna Series* 9, *Fauna of Sikkim*, Part-4 : 188.

Material examined : District : Nainital, 2exs., Shila Lake, 7.viii.2004 (Coll. M. Ghosh).

Wing expanse : 46mm.

Distribution : Throughout India including Uttarakhand (Nainital).

Elsewhere : Bangladesh, Hong Kong, Indochina, Japan, Malayasia, South China, Sumatra and Tonkin.

Remarks : The species is first time recorded from Uttarakhand.

Subfamily CALLIMORPHINAE
Genus ***Callimorpha*** Latreille

1809. *Callimorpha* Latreille, *Genera Crustaceorum et. Insectorum*, **4** : 200.

Key to species

1. Head and abdomen orange .... *nyctemerata* (Moore)
- Head and abdomen not orange 2
2. Abdomen with dorsal and lateral series of spots. Forewing metallic green in colour with yellow spots, hindwing orange, the veins streaked with black ....*principalis* (Kollar)

   Abdomen with black bands. Forewing fuscous with slight green tinge and white spots, hindwing white, the veins fuscous ....*equitalis* (Kollar)

10. ***Callimorpha nyctemerata*** (Moore)

1879. *Hypercompa nyctemerata* Moore, *Descr. Indian Lep. Atk.*, **1** : 38.

2003. *Callimorpha nyctemerata,* Majumdar, *State Fauna Series 9, Fauna of Sikkim,* Part-4 : 189.

Material examined : District : Rudraprayag, 1exs., Gourikund, 1982m., 28.iv.2004 (Coll. S.K. Chakroborty).

Wing expanse : 60mm.

Distribution : India : Uttarakhand (Rudraprayag); Sikkim and West Bengal.

Remarks : The species is first time recorded from Uttarakhand.

11. ***Callimorpha principalis*** (Kollar)

1844. *Euprepia principalis* Kollar, In Hugel's Kashmir und das Reich der siek, **4**(2) : 465, pl. 20, fig. 2.

1977. *Callimorpha principalis,* Arora *et al., Newsl., Zool. Surv. India,* **3**(6) : 391.

Material examined : Nil.

Wing expanse : 86mm. (Hampson, 1894).

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Jammu & Kashmir, N.W. Himalayas, Sikkim and West Bengal.

Elsewhere : China and Myanmar.

Remarks : Arora *et al.* (1977) reported the species from Garhwal.

12. ***Callimorpha equitalis*** (Kollar)

1884. *Euprepia principalis* Kollar, *In Hugel's Kashmir und das Reich der siek,* **4**(2) : 465, pl. 20, fig. 3.

2003. *Callimorpha equitalis,* Majumdar, *State Fauna Series 9, Fauna of Simmik,* Part-4 : 189.

Material examined : Nil.

Wing expanse : Male : 70mm. female : 80mm. (Hampson, 1894).

Distribution : India : Uttarakhand (Mussoorie); Himachal Pradesh, Meghalaya, Sikkim and Uttar Pradesh.

Elsewhere : Myanmar and Nepal.

Remarks : Cotes & Swinhoe (1887-1889) reported the species from Mussoorie.

Subfamily SPILOSOMINAE

Key to genera

1. Hind tibiae without medial spur 2
- Hind tibiae with medial spur 3
2. Fore tibiae with apical claw ..... ***Amsacta*** Walker
- Fore tibiae without apical claw ..... ***Phissama*** Moore
3. Fore tibiae with curved apical claw ..... ***Alphaea*** Walker
- Fore tibiae without apical claw 4
4. Thorax clothed with rough wooly hair ..... ***Spilarctia*** Butler

   Thorax smoothly scaled ..... ***Pericallia*** Huebner

Genus ***Amsacta*** Walker

1855. *Amsacta* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 804.

13. ***Amsacta moorei*** (Butler)

1876. *Areas moorei* Butler, *Cist. Entom.*, **2** : 23.

1901. *Amsacta moorei,* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 329.

Diagnostic characters : Antennae black, with basal joint scarlet; palpi scarlet at side white below, the terminal joint black. Head white with crimson line behind it; abdomen scarlet above with dorsal and lateral black spots. Wings white, forewing with scarlet fascia along the costa, a black speck at each angle of cell, sometime with a spot at lower angle of cell and innermargin; bindwing with a black spot at end of cell.

Material examined : Nil.

Wing expanse : Male : 38-40mm, female; 44-45mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Almora); Bombay, V.W. Himalayas.

Elsewhere : Karachi and Sind.

Remarks : Cotes & Swinhoe (1887-1889) and Hampson (1901) reported its occurrence from Almora.

Genus ***Phissama*** Moore

1859. *Phissama* Moore, *Lep. East India Comp.*, : 362.

14. ***Phissama transiens*** (Walker)

1855. *Phissama transiens* Walker, *Cat. Lep. Het. Brit. Mus.*, **3** : 675.

2003. *Phissama transiens*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 190.

Diagnostic characters : Head and thorax dirty white, palpi and femora orange. Forewing very pale fuscous, the costa and base of inner marginivory white, black spots in and just beyond each angle of cell. Hindwing pale fuscous. Abdomen orange above white below.

Material examined : District : Rudraprayag, 2exs., Phata, 9.ix.2006 (Coll. A.K. Sidhu).

Wing expanse : 44mm.

Distribution : India : Uttarakhand (Garhwal, Kumaon and Rudraprayag); Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : China, Indonesia and the Philippines.

Remarks : Arora *et al.* (1977) reported the species from Garhwal, Hampson (1901) mentioned its distribution from Kumaon and the present record added another district Rudraprayag.

Genus ***Alphaea*** Walker

1855. *Alphaea* Walker, *List Lep. Het. Brit. Mus.*, **3** : 683.

15. ***Alphaea qadriramosa*** (Kollar)

1844. *Euprepia quadriramosa* Kollar, *In Hugel's Kashmir und das Reich der siek*, 4(2) : 468.

1998. *Alphaea quadriramosa*,Ghosh & Chaudhury, *State Fauna Series 4, Fauna of Meghalaya*, (Part-6) : 352.

Diagnostic characters : Palpi black fringed with yellow, head and thorax white. Abdomen orange with dorsal black bands, ventral and lateral side with black spots. Forewing white withbroad black fascia along subcostal, median and submedian nervures, the fascia on median nervure extending along M2, M3 and Cula-b. Hindwing white, with a black lunule at end of cell and submarginal series of spots.

Material examined : Nil.

Wing expanse : Male : 40mm., female : 48mm (Hampson, 1894).

Distribution : India : Uttarakhand (Garhwal); Arunachal Pradesh, Assam, Dalhosie, Himachal Pradesh, Meghalaya, Sikkim and Kashmir.

Remarks : Arora *et al.* (1977) reported the species from Garhwal.

Genus ***Spilarctia*** Butler

1875. *Spilarctia* Butler, *Cist. Ent.*, **2** : 39.

Key to species

Palpi dark at base. Antennae strongly pectinated ..... *casgneta* (Kollar)

\- Palpi crimson at base. Antennae weakly pectinated ..... *obliqua* (walker)

16. ***Spilarctia casigneta*** (Kollar)

1844. *Euprepia casigneta* Kollar, *In Hugel's Kashmir und das Reich der siek*, 4(2) : 469.

2003. *Spilarctia casigneta*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 191.

Material examined : Nil.

Wing expanse : Male : 46mm., female : 52-63mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Mussoorie), Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, N.W. Himalayas, Sikkim and Tamil Nadu.

Remarks : Cotes & Swinhoe (1887-1889) reported the species from Mussoorie.

17. ***Spilarctia obliqua*** (Walker)

1855. *Spilosoma obliqua* Walker, *List Lep. Insects Brit. Mus.*, **3** : 679.

2003. *Spilarctia obliqua*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 192.

Material examined : District : Chamoli, 2 exs., Helong, 7.vii.2004 (Coll. S.K. Chakraborty).

Wing expanse : 40mm.

Distribution : Throughout India including Uttarakhand (Chamoli).

Elsewhere : Asia, Bhutan China, Eastern Asia and Nepal.

Remark : The species is first time recorded from Uttarakhand.

Genus ***Pericallia*** Huebner

1827. *Pericallia* Huebner, *Verz. bek. Schmett.*, : 182.

Key to species

Antennae of male bipectinate with very short branches. Head and thorax black. Forewing black with yellowish fascia. Hindwing orange yellow ..... *imperialis* (Kollar)

Antennae of male ciliated. Head brown, thorax yellowish white. Forewing brown with whitish bands. Hindwing scarlet .... *distrorta* (Moore)

18. ***Pericallia imperialis*** (Kollar)

1844. *Euprepia imperialis* Kollar, *In Hugel's Kashmir und das Reich der siek*, 4(2) : 466.

1901. *Pericallia imperialis*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 356.

Material examined : Nil.

Wing expanse : Male : 80mm., female : 94mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Garhwal and Mussoorie); Himachal Pradesh, N.W. Himalayas and Sikkim.

Remarks : Cotes & Swinhoe (1887-1889), Hampson (1901) reported the species from Mussoorie Arora *et al.* (1977) recorded the species from Garhwal.

19. ***Pericallia distorta*** (Moore)

1879. *Pangora distorta* Moore, *Lep. Atk.*, : 42, pl. 2, fig. 14.

1901. *Pericallia imperialis*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **3** : 362.

Material examined : Nil.

Wing expanse : 60mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Mussoorie); N.W. Himalayas and Simla.

Remarks : Hampson (1901) reported the spcies from Mussoorie.

Subfamily LITHOSIINAE

Key to genera

1. Forewing vein M1 absent 2

   Forewing vein M1 present 6

2. Hindwing cell open with a recurrent vein in cell ..... ***Chrysorabdia*** Butler

   - Hindwing cell closed without recurrent vein in cell 3

3. Forewing in male with secondary sexual character 4

   - Both wings in male with secondary sexual character 5

4. Male genitalia with scaphium .... ***Strysopha*** Arora & Chaudhuy

   - Male genitalia without scaphium .... ***Eilema*** Huebner

5. Forewing cell a little over half the length of wing and tuft on forewing about the half the length of cell ..... ***Prabhasa*** Moore

   - Forewing cell about two thirds length of wing, tufts on forewing two thirds length of cell ... . ***Zadadra*** Moore

6. Forewing with an areole ..... ***Agylla*** Walker

   Forewing without areole 7

7. Hindwing with vein M2 obsolescent from just below angle of discocellular .... ***Cyana*** Walker

   Hindwing vein M2 fully developed from well below angle of cell 8

8. Forewing vein R1 anastomosing with Sc .... ***Asura*** Walker

   - Forewing vein R1 not anastomosing with Sc ..... ***Miltochrista*** Huebner

Genus ***Chrysorabdia*** Butler

1877. *Chrysorabdia* Butler, *Trans. Ent. Soc. London*, : 357.

Key to species

1. Forewing of male with a patch of androconia on vein 1A almost met by an oblique streak from end of cell. Hindwing vein M3 and Cula stalked 2

   Forewing of male without streak of androconia. Hindwing vein M3 and Cula from cell ..... *aurantiaca* Hampson

2. Thorax black ..... *viridata* (Walker)

   Thorax yellow ..... *bivitta* (Walker)

20. ***Chrysorabdia aurantiaca*** Hampson

1898. *Chrysorabdia aurantiaca* Hampson, *J. Bombay Nat. Hist. Soc.*, : 297.

1900. *Chrysorabdia aurantiaca*, Hampson, *Cat. Lep. Phal. Brit. Mus.*, **2** : 184, pl. 23, fig. 16.

Material examined : Nil.

Wing expanse : 62mm. (Hampson, 1901).

Distribution : India : Uttarakhand (Garhwal); Assam and Meghalaya.

Remarks : Arora *et al.* (1977) reported the species from Garhwal.

21. ***Chrysorabdia viridata*** (Walker)

1864. *Lithosia viridata* Walker, *List Lep. Insects Brit. Mus.*, **31** : 225.

2003. *Chrysorabdia viridata*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 195.

Material examined : District : Almora, 1ex., Loharkhet, 19.ix.1958 (Coll B.S. Lamba, 1ex., Bhatanjkham, 32km. away from Kalika F.R.H., 163m., 27.ix.2004 (Coll D.R. Maulik).

Wing expanse : 40mm.

Distribution : India : Uttarakhand (Almora) Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, and West Bengal.

Elsewhere : Bangladesh, Bhutan and China.

Remarks : The species is first time recorded from Uttarakhand.

22. ***Chrysorabdia bivitta*** (Walker)

1856. *Lithosia bivitta* Walker, *List Lep. Het. Brit. Mus.*, **7** : 1682.

1998. *Chrysorabdia bivitta*, Ghosh & Chaudhury, *State Fauna Series 4 : Fauna of Meghalaya*, Part **6** : 360.

Material examined : District : Nainital, 1ex., Bhimtal, 10.ix.1988 coll. P. Smetacke.

Wing expanse : 52mm.

Distribution : India : Uttarakhand (Nainital); Assam, Dalhousie, Meghalaya and N.w. Himalayas.

Remarks : The species is first time recorded from Uttarakhand.

Genus ***Strysopha*** Arora & Chaudhury

1982. Strysopha Arora & Chaudhury, *Tech. Monogr.*, No. **6** : 27-28.

23. ***Strysopha tortricoides*** (Walker)

1862. *Lithosia tortricoides* Walker, *J. Proc. Linn. Soc. Zool.*, **6** : 107.

2003. *Strysopha tortricoides*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 195.

Diagnostic characters : Forewing slightly suffused with fuscous, costal area yellow, except apex which is black, the veins streaked with black, a triangular black spot on costa beyond middle. Hindwing pale yellow tinged with fuscous towards apex. Abdomen grey, extremity yellow.

Material examined : District : Almora, 2exs., Batanjkhan 32km. away from Kalika F.R.H. 1636m. 27.ix.2004 (Coll D.R. Maulik).

Wing expanse : 28mm.

Distribution : India : Uttarakhand (Almora); Arunachal Pradesh, Meghalaya, Sikkim.

Elsewhere : Bhutan, China, Indonesia and Malayasia.

Remarks : The species is first time reported from Uttarkhand.

Genus ***Eilema*** Huebner

1816. *Eilema* Huebner, *Verz. bek. Schmett.*, : 165.

24. ***Eilema vagessa*** (Moore)

1859. *Lithosia vagessa* Moore, *Lep. East India Comp.*, : 304.

2003. *Eilema vagessa*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 197.

Diagnostic characters : Orange yellow, palpi blackish at extremity, antennae and legs black. Forewing with the streak of androconia greyish fuscous, hindwing with the patch of androconia fulvous.

Material examined : District : Rudraprayag, 1ex., Guptakashi, 2.vii.2004 (Coll. S.K. Chakraborty).

Wing expanse : 42mm.

Distribution : India : Uttarakhand (Mussoorie and Rudraprayag); Assam, Kashmir, Meghalaya, N.W. Himalayas, Sikkim and West Bengal.

Elsewhere : Myanmar and Nepal.

Remarks : Hampson (1900) reported the species from Mussoorie, the present record confirms its distribution from Uttarakhand.

Genus ***Prabhasa*** Moore

1878. *Prabhasa* Moore, *Proc. Zool. Soc. London,* : 25.

25. ***Prabhasa venosa*** (Moore) #

1878. *Prabhasa venosa* Moore, *Proc. Zool. Soc. London;* 26, pl. 2, fig. 16.

2003. *Prabhasa venosa,* Majumdar, *State Fauna Series 9, Fauna of Sikkim,* (Part-4) : 199.

Diagnostic characters : Male : Forewing uniform greyish brown, the fringe of scales leaden grey without postmedial spot on costa; female : Pale fuscous brown, forewing with an indistinct angulated postmedial fuscous band and more or less developed postmedial spot on costa, the costa whitish from the base to the band. Hindwing pale fuscous.

Material examined : District : Garhwal, 2exs., Dhakwari, 4, 5. viii. 1958 (Coll B.S. Lamba).

Wing expanse : 34mm.

Distribution : India : Uttarakhand (Garhwal); Arunachal Pradesh, Assam, Nagaland, Sikkim and West Bengal.

Elewhere : Bhutan, China and Myanmar.

Remarks : The species is first time recorded from Uttarakhand.

Genus ***Zadadra*** Moore

1878. *Zadadra* Moore, *Proc. Zool. Soc. London,* : 572.

26. ***Zadadra distorta*** (Moore) #

1872. *Lithosia distorta* Moore, *Proc. Zool. Soc. London,* : 572.

2003. *Zadadra distorta,* Majumdar, *State Fauna Series 9, Fauna of Sikkim,* (Part-4) : 199.

Diagnostic characters : Forewing fuscous grey, the costal area ochreous suffused with fulvous with a round black spot beyond middle. Hindwing pale yellow and in male a large patch of androconia below the middle portion of costa.

Material examined : District : Uttarkashi, 2exs., Yamnotri, Borkat, 4416m, at light, 19.ix.2005 (Coll A.K. Sidhu).

Wing expanse : 38mm.

Distribution : India : Uttarkhand (Uttarkashi); Arunachal Prades, Assam, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : China and Nepal.

Remarks : The species is first time recorded from Uttarakhand.

Genus ***Agylla*** Walker

1854. *Agylla* Walker, *List Lep. Insects Brit. Mus.,* **2** : 552.

Key to species

Thorax and abdomen fuscous. Male with bipectinate antennae. Wings fuscous, the apical area of both wings white .... *albifinis* (Walker)

- Thorax and abdomen white. Male with ciliated antennae. Wing white, the costa and apical portion of outer margin black .... *remelana* (Moore)

27. ***Agylla albifinis*** (Walker)

1856. *Sidyma albifinis* Walker, *List Lep. Insects Brit. Mus.,* **7** : 1686.

1900. *Agylla albifinis,* Hampson, *Cat. Lep. Phal. Brit. Mus.,* **2** : 193-194.

Material examined : District : Almora, 1exs., Joshimath, 7.vii.1958 (Coll B.S. Lamba).

Wing expanse : 44mm.

Distribution : India : Uttarakhand (Almora, Garhwal and Mussoorie) : N. W. Himalayas and Shimla.

Remarks : Cotes & Swinhoe (1887-1889), Hampson (1900) reported the species from Mussoorie and Arora *et al.* mentioned the distribution from Garhwal, the present record confirms its distribution from Uttarakhand.

28. ***Agylla ramelana*** (Moore) #

1865. *Lithosia ramelana* Moore, *Proc. Zool. Soc. Lond.,* : 798.

2003. *Agylla ramelana,* Majumdar, *State Fauna Series 9, Fauna of Sikkim,* (Part-4) : 201.

Material examined : District : Pithoragarh, 4exs., Gurma, 22.ix.2004 (Coll B. Mitra), District : Rudraprayag, 1exs., Guptakashi, 1319m., 5.x.2004

(Coll P. Mukherjee & Partey), District : Uttarakashi, 1exs., F.R.H., 18.ix.2005 (Coll. A.K. Sidhu).

Wing expanse : 36-48mm.

Distribution : India : Uttarakhand (Pithoragarh, Rudraprayag and Uttarkashi); Arunachal Pradesh, Assam, Meghalaya and West Bengal.

Elsewhere : Indonesia.

Remarks : The species is first time recorded from Uttarakhand.

Genus ***Cyana*** Walker

1854. *Cyana* Walker, *List Lep. Insects Brit. Mus.*, **2** : 528.

Key to species

1. Forewing in female with the vein M2 and M3 stalked ..... *puella* (Drury)
- Forewing in female with the vein M2 and M3 from the cell 2
2. Forewing in male with the lobe trifid 3
- Forewing in male with the lobe not trifid 4
3. Forewing with scarlet line ..... *adita* (Moore)
- Forewing with yellow lines ..... *guttifera* (Walker)
4. Forewing with bifid lobe 5
- Forewing with single lobe 8
5. Abdomen with the terminal half of the dorsum crimson ..... *arama* (Moore)
- Abdomen wholly white 6
6. Forewing with bands 7
- Forewing without band ..... *candida* (Felder)
7. Forewing with three black spots and yellow bands. Hindwing pure white, underside with dorsal lunule at end of cell ..... *dohertyi* (Elwes)
- Forewing with three fuscous spots and fuscous bands. Hindwing white without lunule ..... *detrita* (Walker)
8. Forewing with black edged scarlet anti and postmedial bands ..... *bianca* (Walker)
- Forewing with scarlet anti and postmedial bands without black edges ..... *bellissima* (Moore)

29. ***Cyana puella*** (Drury) #

1773. *Deiopia puella* Drury, *Ill. Exot. Ent.*, 2, pl. 2, fig. 2.

1894. *Cyana puella*, Hampson, *Fauna Brit. India*, Moths, **2** : 57.

Material examined : District : Dehradun, 9exs., Rishikesh, Narendrangar F.R.H., 17.x.2005 (Coll A.K. Sidhu).

Wing expanse : 25-34mm.

Distribution : India : Uttarakhand (Dehradun); Bombay, Dolhousie, Nilgiris, N.W. Himalays and Simla.

Elsewhere : Sri Lanka and Nepal.

Remarks : The species is first time recorded from Uttarakhand.

30. ***Cyana adita*** (Moore)

1854. *Bizone adita* Moore, *Cat. Lep. East India Comp.*, : 306, tab. 1a, fig. 1.

2003. *Syana adita*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 203.

Material examined : District : Rudraprayag, 3exs., Gourikund, 1981m. 2.x.2004, 1ex., Guptakashi, 1319m., 5.x.2004 (Coll P. Mukherjee).

Wing expanse : 48 mm.

Distribution : India : Uttarakhand (Garhwal and Rudraprayag); Meghalaya, N.W. Himalayas, Sikkim and West Bengal.

Elsewhere : Tibet.

Remarks : Arora *et al.* reported the species from Garhwal.

31. ***Cyana guttifera*** (Walker) #

1865. *Bizone guttifera* Walker, *List Lep. Het. Brit. Mus.*, 7 : 1779.

2003. *Cyana guttifera*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 203.

Material examined : District : Uttarkashi, 1ex., Yamnotri, Borkat, 4416ft., at light, 19.ix.2005 (Coll. A.K. Sidhu).

Wing expanse : 28mm.

Distribution : India : Uttarakhand (Urrarkashi); Andamans, Assam, Bombay, Himachal Pradesh, Maharashtra and Kerala.

Remarks : The species is first time recorded from Uttarkhand.

32. *Cyana arama* (Moore)

1859. *Bizone arama* More, *Cat. Lep. East India Comp.*, : 306pl. 7a, fig. 10.

2003. *Cyana arama*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 203-204.

Material examined : District : Uttarkashi, 2exs., Uttarkashi, F.R.H., 23.ix.2005 (Coll. A.K. Sidhu).

Wing expanse : 33mm.

Distribution : India : Uttarakhand (Uttarkashi); Assam, Meghalaya, Nagaland, Sikkim and West Bengal.

Remarks : The species is first time recorded from Uttarakhand.

33. *Cyana candida* (Felder)

1874. *Chionaema candida* Felder, *Reis. Nov.* pl. 106, fig. 17.

2003. *Cyana candida*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 204.

Material examined : District : Uttarkashi, 2exs., Lanka, 9150ft., 15.vii.1974 (Coll. H.C. Ghosh).

Wing expanse : 40mm.

Distribution : India : Uttarakhand (Uttarkashi); Dalhousie, Himachal Pradesh, N.W. Himalayas and Sikkim.

Remarks : The species is first time recorded from Uttarakhand.

34. *Cyana dohertyi* (Elwes)

1890. *Bizone dohertyi* Elwes, *Proc. Zool. Soc. Lond.*, : 394, pl. 32, fig. 4.

2003. *Cyana dohertyi*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 204.

Material examined : District : Uttarkashi, 3exs., Yamnotri, Borkat, 4416ft., 19.ix.2005 (Coll A.K. Sidhu).

Wing expanse : 35-42mm.

Distribution : India : Uttarakhand (Uttarkashi); Assam, Mehalaya, Nagaland, N.W. Himalayas and Sikkim.

Remarks : The species is first time recorded from Uttarakhand.

35. *Cyana detrita* Walker

1854. *Cyana detrita* Walker, *List Lep. Insect Brit. Mus.*, **2** : 529.

2003. *Cyana detrita*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 204.

Material examined : District : Nainital, 2exs., Bhimtal, 19.ix.1988 coll P. Smetack.

Wing expanse : 30mm.

Diatribution : India : Uttarakhand (Garhwal and Nainital); Assam, Himachal Pradesh, Meghalaya, Nagaland, N.W. Himalayas, Sikkim and Uttar Pradesh.

Remarks : Arora *et al.* (1977) reported the species from Garhwal, the present record confirms its distribution from Uttarakhand.

36. *Cyana bianca* (Walker)

1856. *Bizone bianca* Walker, *List Lep. Insect Brit. Mus.*, **7** : 1684.

2003. *Cyana bianca*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 205.

Material examined : District : Almora, 3exs., Ranikhet, F.R.H. 2160m. 27.ix.2004 (Coll D.R. Maulik).

Wing expanse : 34-42mm.

Distribution : India : Uttarakhand (Almora); Arunachal Pradesh, Assam, Meghalaya, Sikkim.

Elsewhere : Bangladesh, Bhutan and Malaya Peninsula.

Remarks : The species is first time recorded from Uttarakhand.

37. *Cyana bellissima* (Moore)

1878. *Cyana bellissima* Moore, *Proc. Zool. Soc. Lond.*, : 27, pl. 3, fig. 13.

2003. *Cyana bellissima*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 204.

Material examined : Nil.

Wing expanse : Male : 46mm., female : 51-64mm. (Hampson, 1900).

Distribution : India : Uttarakhand (Mussoorie); Manipur, N.W. Himalayas and Sikkim.

Elsewhere : Myanmar.

Remarks : Cotes & Swinhoe (1887-1889) and Hampson (1894, 1900) reported the species from Mussoorie.

Genus ***Asura*** Walker

1854. *Asura* Walker, *List Lep. Insect Brit. Mus.*, **2** : 484.

Key to species

Forewing with postmedial line highly and irregularly dentate ..... *undulosa* (Walker)

- Forewing with postmedial line not highly dentate .... *strigipennis* (Herrich Schaffer)

38. ***Asura undulosa*** (Walker)

1854. *Cyllene undulosa* Walker, *List Lep. Insect Brit. Mus.*, **2** : 545.

2003. *Asura undulosa*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 207.

Material examined : District : Rudraprayag, 2exs., Gourikund, 1982m. 28.vi.2004 (Coll S.K. Chakroborty).

Wing expanse : 24mm.

Distribution : India : Uttarakhand (Garhwal, Rudraprayag); Arunachal Pradesh, Assam, Manipur, Meghalaya and West Bengal.

Elsewhere : Bhutan and Myanmar.

Remarks : Arora *et al.* (1977) reported the species from Garhwal, the present record confirms its distribution from Uttarakhand.

39. ***Asura strigipennis*** (Herrich-Schaffer) #

1855. *Paidia strigipennis* Herrich-Schaffer, *Ausserens. Schemett.*, : 21, pl. 437.

2003. *Asura strigipennis*, Majumdar, *State Fauna Series 9, Fauna of Sikkim*, (Part-4) : 208.

Material examined : District : Garhwal, 1ex., Birahi, 16.viii.1958. (Coll B.S. Lamba).

Wing expanse : 30mm.

Distribution : India : Uttarakhand (Garhwal); Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Bhutan, China, Indonesia and Myanmar.

Remarks : The species is first time recored from Uttarkhand.

Genus ***Miltochrista*** Huebner

1816. *Miltochrista* Huebner, *Verz. bek. Schmett.*, : 166.

Key to species

1. Forewing with crimson strieaks in the interspaces .... *gratiosa* (Guerin & Meneville)
- Forewing without crimson streak 2
2. Forewing with the veins on terminal area streaked with black ..... *linga* (Moore)
- Forewing with the veins on terminal area not sreaked with black ..... *magna* Hampson

40 ***Miltochrista gratiosa*** (Guerin & Meneville) #

1843. *Euchelia gratiosa* Guerin & Meneville, *In Deless. Souvo. Inde*, **2** : 90, pl. 25, fig. 1.

2003. *Miltochrista gratiosa*, Majumdar, *State Fauna Series 9 : Faunaof Sikkim*, Part-4 : 211.

Material examined : District : Nainital, 3exs., Bhimtal, 2,19.ix.1988 (Coll P. Smetacke), District : Uttarkashi, 10exs., Yamnotri, Borkat, 21.ix.2005 (Coll. A.K. Sidhu).

Wing expanse : 32-48mm.

Distribution : India : Uttarakhand (Nainital and Uttarkashi); Andamans, Arunachal Pradesh, Assam, Meghalaya and West Bengal.

Elsewhere : Bhutan, China, Eastern Asia, Indonesia, Japan, Myanmar and Sri Lanka.

Remarks : The species is first time recorded from Uttarakhand.

41. ***Miltochrista linga*** (Moore) #

1859. *Barsine linga* Moore, *Lep. East India Comp.*, : 301.

2003. *Miltochrista gratiosa*, Majumdar, *State Fauna Series 9 : Fauna of Sikkim*, Part-4 : 211.

Material examined : Distrct : Nainital, 2exs., Bhimtal, 1.ix.1988 (Coll P. Smetacke), District : Uttarkashi, 3exs., Uttarkashi F.R.H. 23.ix.2005 (Coll A.K. Sidhu).

Wing expanse : 35-38mm.

Distribution : India : Uttarakhand (Nainital and Uttarkashi); N.W. Himalayas and Sikkim.

Remarks : The species is first time recorded from Uttarakhand.

42. *Miltochrista magna* Hampson

1894. *Miltochrista magna* Hampson, *Fauna Brit. India,* Moths, **2** : 112.

2003. *Miltochrista gratiosa,* Majumdar, *State Fauna Series 9 : Fauna of Sikkim,* Part-4 : 211.

Material examined : District : Nainital, 3exs., Bhawali F.R.H., 1781m., 21.ix.2004 (Coll D.R. Maulik).

Wing expanse : 40mm.

Distribution : India : Uttarakhand (Nainital); Arunachal Pradesh, Manipur, Meghalaya, Sikkim.

Elsewhere : Myanmar.

Remarks : The species is first time recorded from Uttarakhand.

Subfamily MICRACTIINAE

Key to genus

Palpi porrect. Antennae of male serrate. Tibiae with minute spurs. Hindwing with a fold on inner margin containing a glandular patch near base and with a tuft of long hair beyond it ..... ***Argina*** Heubner

Palpi upturned. Antennae of male ciliated. Tibiae with normal spurs. Hindwing normal. ..... ***Utetheisa*** Huebner

Genus *Argina* Hueebner

1818. *Argina* Huebner, *Verz. Bek. Schmett.,* : 167.

43. *Argina argus* (Kollar)

1844. *Euprepia argus* Kollar, *In. Hugel's Kashmir und das Reich der Siek,* **4** : 467, pl. 21, fig. 3.

2003. *Argina agrus,* Majumdar, *State Fauna Series 9 : Fauna of Sikkim,* Part-4 : 214.

Diagnostic characters : Head, thorax, abdomen and forewing scarlet, with black spots. Forewing with six transverse series of yellow ringed black spots, each series curved, irregularly disposed and variable as to size and number. Hindwing scarlet with a black spot at end of cell, other at vein Culb, at its middle and a submarginal series, a few small spots on margin.

Material examined : District : Tehri Garhwal, 16exs., Ombata, 2300ft. 10.iv.1958 (Coll. B.S. Lamba).

Wing expanse : 48-58mm.

Distribution : Throughout India including Uttarakhand (Tehri Garhwal).

Elsewhere : Eastern Asia, Myanmar and Sri Lanka.

Remarks : The species is first time recorded from Uttarakhand.

Genus *Utetheisa* Huebner

1816. *Utetheisa* Huebner, *Verz. bek. Schmett.,* : 168.

44. *Utetheisa pulchella* (Linnaeus)

1758. *Tinea pulchella* Linnaeus, *Syst. Nat.,* **1** : 534.

2003. *Utetheisa pulchella,* Majumdar, *State Fauna Series 9 : Fauna of Sikkim,* Part-4 : 214-215.

Diagnostic characters : Forewing white with five interrupted scarlet bands and with series of black spots between them and marginal series of black spots. Hindwing semidiaphanous white, a very irregular black submarginal band at apical area and between veins Cula and 2a.

Material examined : Nil.

Wing expanse : Male : 40-46mm, femal : 45mm. (Hampson, 1894).

Distribution : Throughout India including Uttarakhand (Mussoorie).

Elsewhere : Africa, Australia, Europe, Malaya Archipelogo, New Guinea, the Phillippines and Sri Lanka.

Remarks : The species is widely distributed but Cotes & Swinhoe 1887-1889) reported the species specifically from Mussoorie.

SUMMARY

The paper incorporates the taxonomic account of the fauna belonging to the families Pieridae and Arctiidae of thirteen districts of Uttarakhand collected by different survey parties of Zoological Survey of India. Altogether 89 species/subspecis of 38 genera have been examined, of which 22 species of the family Arctiidae have been established as new locality record and 21 species

of the family Pieridae and 12 species of the family Arctiidae are reviwed from literature. Running keys to families, subfamilies, genera, species and subspecies have been provided. Besides original references and distribution have been given.

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REFERENCES

Arora, G.S. & Mandal, D.K. 1977. On scientific results of Swiss Zoological Expedition to India. Part-1, Butterflies of Garhwal District (India). *Newsl. Zool. Surv. India,* **3**(4) : 229-234.

Arora, G.S., Mandal, D.K. & Chaudhury, M. 1977. On scientific results of Swiss Zoological Expedition to India. Part-11, Moths of Garhwal District (India). *Newsl. Zool. Surv. India,* **3**(4) : 338-395.

Arora, G.S. Ghosh, S.K & Chaudhury, M. 1995. Himalayan Ecosystem Series, Fauna of Western Himalayas, Part-1 (U.P.), Z.S.I. : 61-73.

Bernardi, G. 1952. Lepidopteres recoltes par a Barbezet au cours de 1' espedition Lyonnaise 1952 au Garhwal. *Bull. Mem. Soc. Linn. Lyon.,* **21**(5) : 256-258.

Cotes, E.C. & Swinhoe, C. 1887-1889. A Catalogue of moths of India, (6) : 1-812, (Arctiidae) Part-**11** : 87-134.

Evans, W.H. 1932. The Identification of Indian Butterflies, 2nd ed., : 445pp., 32pls. (Published by *Bombay Nat. Hist. Soc.,* Bombay).

Hampson, G.F. 1894. The Fauna of British Indiaincluding Ceylon and Burma, Moths, **2** : xii + 609, London (Taylor & Francis).

Hampson, G.F. 1900. Catalogue of the Lepidoptera Phalaenae in the British Museum, **2** : xx + 590 + 20, London (By the Trustees).

Hampson, G.F. 1901. Catalogue of the Lepidoptera Phalaenae in the British Museum, **3** : xix + 690 + 23, London (By the Trustees).

Hannygton, F. 1910. The Burrerflies of Kumaon. *J. Bombay nat Hist. Soc.,* **20** : 361-372.

Hannygton, F. 1911. The Butterflies of Kumaon. *J. Bombay nat Hist. Soc.,* **20** : 871-872.

Mackinnon, P.W. & de Niceville, L. 1897. A list of butterflies of Mussoorie and the Dun valley in the Western Himalayas and neighbouring reigon. *J. Bombay nat. Hist. Soc.,* **11** : 205-221.

Mackinnon, P.W. & de Niceville, L. 1898. A list of butterflies of Mussoorie and the Dun Valley in the Western Himalayas and neighbouring region. *J. Bombay nat. Hist. Soc.* **11** : 368-389, 585-605, pls.

Mandal, D.K. & Chaudhury, M. 1977. On a collection of burrerflies (Lep : Rhopalocera) of the Indian Kalidhang Expedition 1974. *Newsl. zool. Surv. India,* **3**(6) : 341-345.

Shull, E.M. 1962. Over one hundred butterfly species caught in a single day (3rd June, 1961) at Mussoorie, India. *Journal of the lepidopterists Society,* **16**(2) : 143-145.

Talbot, G. 1939. The Fauna of British Indiaincluding Ceylon and Burma, Moths, **1** : xxix + 600, 2 pls., 1 map. London (Taylor & Francis).s

Wynter-Blyth, M.S. 1957. Burtterflies of the Indian region. -xx+523pp., 72 pls. (Published *by Bombay Nat. Hist. Soc.,* Bombay).

Zool. Surv. India
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INSECTA : LEPIDOPTERA LYCAENIDAE, LIBYTHEIDAE AND ACRAEIDAE

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INTRODUCTION

Butterflies being beautiful creatures have attracted the attention of scientists as well as amateurs from time to time. The butterflies of Indian subcontinent comprises about 1432 species and the contributions to the knowledge of butterflies of India are mainly by various workers de Niceville (1886, 1890), Bingham (1905, 1907), Evans (1932), Talbot (1947), Wynter-Blyth (1957) and Cantlie (1962). The butterflies of Uttarakhand have also been well documented by various workers like Mackinnon and de Niceville (1897), Ollenbach (1929), Piele (1937), Barnardi (1952), Lesse (1952), Stempffer (1952), Shull (1958,1962), Baindur (1993), Rose and Sidhu (1994), Arora et. al. (1995), Arora and Mandal (1997).

During the course of present studies an attempt has been made to study the butterflies of the families Lycaenidae, Libytheidae and Acraeidae from Uttarakhand. The study is based on the material collected by several scientists of Zoological Survey of India from 2000 to 2006 and from collections of Dr. H.S. Rose, Punjabi University, Patiala collected during two I.C.A.R. projects from 1991 to 1996. Consequently 55 species of butterflies under 34 genera and three families Lycaenidae, Libytheidae and Acraeidae have been included in present work. The common name, original reference, synonymy, wing expanse and geographical distribution of each species/ subspecies have been given. The key to subfamilies, genera and species have been provided.

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SYSTEMATIC ACCOUNT

Family LYCAENIDAE

Head narrow; eyes closer, contiguous with antennae, inner periphery emarginated to accommodate antennal scape; hindwing with precostal vein wanting; male foreleg with one claw, female foreleg with two claws.

Varshney (1997) has been followed for treating subfamilies under the family Lycaenidae. At present three subfamilies have been dealt with from Uttarakhand viz., Theclinae, Lycaeninae and Polyommatinae.

Key to subfamilies of the family Lycaenidae

1. Antennal club well differentiated, flattened 2
   - Antennal clud not well differentiated more or less cylindrical, imperceptibally goes into flagellum ..... THECLINAE
2. Hindwing lobed ..... LYCAENINAE
   - Hindwing not lobed ..... POLYOMMATINAE

Subfamily THECLINAE

Thorax and abdomen broader and stronger; antennal club not well differentiated, more or less cylindrical, imperceptibly goes into flagellum; proboscis with shaft smooth; forewing with 10 or 11 veins, veins Sc and R1 always free; legs with paired terminal tibial spurs.

Key to the genera of subfamily Theclinae

1. Forewing with 10 veins ..... ***Horaga*** Moore
   Forewing with 11 veins 2
2. Labial palpi hairy 3
   Labial palpi smooth 5

3. Forewing with stalks of veins R3+R5 and vein M1originate separately; female with a cap of dense hairs at abdominal tip ..... ***Chaetoprocta*** de Niceville

Forewing with stalks of veins R3+R5 and vein M1 originate from a point; female without a cap of dense hairs 4

4. Eyes sparsely hairy ..... ***Euaspa*** Moore

Eyes densely hairy ..... ***Chrysozephyrus*** Shirozu & Yamamoto

5. Hindwing with longest tail present at 1A+2A 6

- Hindwing with longest tail or tooth present at vein Cu1b or tailless 8

6. Underside of both wings with metallic silvery streaks ..... ***Spindasis*** Wallengren

- Underside of both wings without any metallic silvery streaks 7

7. Labial palpi with third segment shorter, less than half the length of second segment ..... ***Pratapa*** Moore

Labial palpi with third segment longer, equal to or more than half the length of second segment ..... ***Ancema*** Eliot

8. Forewing with vein M2 much closer to vein M1 than to vein M3 at origin ..... ***Arhopala*** Boisduval

- Forewing with vein M2 not very closer to vein M1 or equidistant between veins M1 and M3 at origin 9

9. Males without secondary sexual characters, female sbrown ..... ***Deudorix*** Hewitson

- Males with secondary sexual characters, females not brown ..... ***Rapala*** Moore

Genus ***Horaga*** Moore

1881. *Horaga* Moore, Lep Ceylon 1(3) : 98.

This genus is represented in India by five species viz., *onyx* Moore, *albimacula* Wood-Mason & de Niceville, *syninx* Felder, *amehnystus* Druce and *viola* Moore, of which former two are treated here. Both these species are endangered species.

Key to species of genus *Horaga* Moore

1. Underside of forewing with discal band extends well above vein R5 ..... *onyx* Moore

- Underside of forewing with discal band not beyond vein R5 ..... *albimacula* Wood-Mason and de Niceville

1. ***Horaga albimacula*** (Wood-Mason and de Niceville)

1881. *Sithon albimacula* Wood-Mason and de Niceville, *J. asiat. Soc. Bengal*, Pt. II **50**(4) : 249.

1889. *Horaga albimacula* de Niceville, *J. Asiat. Soc. Bengal*, Pt II **57** : 284.

Horaga albimacula viola (Moore)

Common name : Brown Onyx.

1882. *Horaga albimacula viola* Moore, *Proc. Zool. Soc. Lond* **1882**(1) : 248.

Material examined : Dehradun, 1 ex., 01.viii.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Female : 14.5 mm.

Distribution : India: Kangra – Burma.

2. ***Horaga onyx*** (Moore)

Common name : Common onyx

1858. *Thecla onyx* Moore, *In Cat. Lep. Ins. E. India Co.* (1) : 30.

1882. *Horaga onyx* Moore, *Proc. Zool. Soc. Lond.* **1882**(1) : 247.

1914. *Horaga arta* Frustorfer, *deut. Ent. Zeit. (Iris)* **28**(1) : 34.

Material examined : Dehradun, 1ex., 01.viii.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Female : 18.0 mm.

Distribution : India : Kangra to south Burma.

Genus ***Chaetoprocta*** de Niceville

1890. Chaetoprocta de Niceville, Butts India Burmah Ceylon **3** : 311.

This genus contains three species *baileyi* Forster, *susumi* Fujioka and *odata* Hewitson, of which the latter is treated here.

3. ***Chaetoprocta odata*** (Hewitson)

Common Name : Walnut Blue.

1865. *Dispas odata* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 66.

1890. *Chaetoprocta odata* De Niceville, *Butts India Burmah Ceylon* **3** : 312.

Material Examined : Dehradun, 15 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, 7 exs., 18.vi.1992; Dehradun, Mussoorie, Aglar valley, 15 exs., 2.vi.1993-6.vi.1993; Dehradun, Mussoorie, 2 exs., 4.vi.1992; Dehradun, Dhanolti, 1ex., 8.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 17.5-18.5 mm Female : 18.0 – 18.5 mm.

Distribution : North –West Himalayas, Chitral to Kumaon, Mussoorie, Kangra District, Shimla Hills, North Kashmir, Nepal.

Genus ***Euaspa*** Moore

1884. *Euaspa* Moore, *J. asiat Soc. Bengal*, Pt II **53**(1) : 29.

Of the three species viz., *milionia* Hewitson, *ziha* Hewitson and *pavo* de Niceville occurring in India, the former two are treated here.

Key to species of genus *Euaspa* Moore

1. Forewing and hindwing with broad white discal patch on upperside , underside of both wings with broad white discal bands .... *milionia* Hewitson

- Forewing with two minute discal white spots on Upperside, hindwing without any white patch dorsally; underside of both wings with linear discal bands ..... *ziha* Hewitson

4. ***Euaspa milionia*** (Hewitson)

Common name : Water hairsteak.

1819. *Myrina milionia* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** (Suppl.) : 5.

1890. *Euaspa milionia* de Niceville, *Butts India Burmah Ceylon* **3** : 310.

Material Examined : Dehradun, Mussoorie, 15 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, 12 exs., 2.vi.1993-6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 17.0 mm., Female : 17.0 – 17.5 mm.

Distribution : North –West Himalayas, Shimla, Kangra valley, Kumaon, Mussoorie, Dun Valley, Khijjar, Nepal.

5. ***Euaspa ziha*** (Hewitson)

Common Name : White Spotted Hairstreak.

1865. *Dispas ziha* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 66.

1890. *Zephyrus ziha* de Niceville, *Butts India Burmah Ceylon* **3** : 308.

1932. *Thecla ziha* Evans, *Ident. Indian Butts* (2nd ed.) : 252.

1963. *Euaspa ziha* Cantlie, *Lyc. Butts revised* : 91.

Material Examined : Dehradun, Mussoorie, 5 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, 4 exs., 3.vi.1993-5.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 18.5-19.5 mm Female : 18.6 – 19.5 mm

Distribution : North –West Himalayas, Shimla, Kullu, Mussoorie, Dun Valley, Nilgiris.

Genus ***Chrysozephyrus*** Shiroru and Yamamoto

1956. *Chrysozephyrus* Shiroru and Yamamoto, Sieboldea **1**(4) : 381.

Of the twenty two species occurring in India, one species *Chrysozephyrus ataxus* (westwood) is dealt with from Uttarakhand.

6. ***Chrysozephyrus ataxus*** (Westwood)

Common Name : Wonderful Hairstreak.

1851. *Dispas ataxus* Westwood, In Gen. *Diurn. Lep. Lycaenidae* **(2)** : pl. 74.

1890. *Zephyrus ataxus* de Niceville, *Butts India Burmah Ceylon* **3** : 303.

1932. *Thecla ataxus* Evans, *Ident. Indian Butts* (2nd ed.) : 250.

1963. *Chrysozephyrus ataxus* Cantlie, *Lyc. Butts revised* : 100.

Material Examined : Dehradun, Mussoorie, Murray Pumping Station, 1 ex., 5.vi.1993; Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex., 8.vi.1993; Dehradun, Dhanolti, 1 ex., 8.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 21.5 mm., Female : 22.0 mm.

Distribution : North–West Himalayas, Dun Valley, Mussoorie, Kangra, Shimla Hills, Kumaon, Murree-Kumaon.

Genus ***Spindasis*** Wallengren

1857. *Spindasis* Wallengren, *K. svenska Ventensk Akad. Handl. (nf.)* **2**(4) : 45.

This genus is represented by 19 species in India, of which three species i.e., *Spindasis nipalicus* (Moore), *Spindasis elwesi* Evans and *Spindasis vulcanus* (Fabricius) are treated here.

Key to the species of Genus *Spindasis* Wallengren

1. Underside of forewing with no costal markings above subcostal vein between end cell and base 2

- Underside of forewing with a basal streak along the costa above subcostal vein between end cell and base ..... *vulcanus* Fabricius

2. Underside of forewing with submarginal band obscure or absent ..... *nipalicus* Moore

Underside of forewing with submarginal band sharply defined ..... *elwesi* Evans

7. *Spindasis nipalicus* (Moore)

Common Name : Silver-grey Silverline

1884. *Aphnaeus nipalicus* Moore, *J. asiat. Soc. Bengal, Pt.* II **53**(1) : 27.

1932. *Spindasis nipalicus* Evans, *Ident. Indian Butts* (2nd ed.) : 278.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 2 exs., 3.vi.1993; (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : 17.0 mm.

Distribution : North –West Himalayas, Kullu to Nepal, Mussoorie, Shimla Hills, Manipur, Naga Hills.

8. *Spindasis elwesi* Evans

Common Name : Elwe's Silverline.

1925. *Spindasis elwesi* Evans, *J. Bombay nat. Hist. Soc.* **30**(4) : 759.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1 ex., 5.vi.1992; Dehradun, Mussoorie, Murray Pumping Station, 15 exs., 2.vi.1993-6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 19.5 mm., Female : 21.0 mm.

Distribution : Kumaon to Assam.

9. *Spindasis vulcanus* (Fabricius)

Common Name : Common Silverline.

1775. *Papilio vulcanus* Fabricius, *Syst. Ent.* : 519.

1793. *Hesperia vulcanus* Fabricius, *Ent. Syst.* **3**(1) : 264.

1824. *Polyommatus vulcanus* Godart, *In Ency. Meth.* 9(Ins.) (2) : 644.

1829. *Amblypodia vulcanus* Horsfield, *Descr. Cat. Lipid. Ins.* (2) : 106.

1890. *Aphaneus vulcanus* de Niceville, *Butts India Burmah Ceylon* **3** : 349.

1932. *Spindasis vulcanus* Evans, *Ident. Indian Butts* (2nd ed.) : 278.

1779. *Papilio etolus* Cramer, *Uitl. Zzkapellen* **3**(18) : 28.

1883. *Aphaneus bracteatus* Butler, *Proc. Zool. Soc. Lond.* **1883**(2) : 147.

1884. *Aphnaeus tigrinus* Moore, *J. asiat. Soc. Bengal, Pt.* II **53**(1) : 25.

Spindasis vulcanus vulcanus (Fabricius)

1775. *Papilio vulcanus* Fabricius, *Syst. Ent.* : 519.

1932. *Spindasis vulcanus vulcanus* Evans, *Ident. Indian Butts* (2nd ed.) : 278.

Material Examined : Pauri Garhwal, Srinagar, 1 ex., 8.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 14.0 mm., Female : 14.0 – 15.5 mm.

Distribution : Throughout India and Pakistan except desert tracts.

Genus *Pratapa* Moore

1881. *Pratapa* Moore, *Lep Ceylon* **1**(3) : 108.

This genus contains three species i.e., *deva* Moore, *icetoides* Elwes and *icetas* Hewitson from India. The latter species is being treated in the present work and it is an endangered species.

10. *Pratapa icetas* (Hewitson)

Common Name : Dark blue Royal.

1865. *Iolaus icetas* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 44.

1890. *Camena icetas* de Niceville, *Butts India Burmah Ceylon* **3** : 342.

1932. *Pratapa icetas* Evans, *Ident. Indian Butts* (2nd ed.) : 280.

Pratapa icetas icetas (Hewitson)

1865. *Iolaus icetas* Hewitson, *Ill. Diurn. Lep. Lycaenidae* 1 : 44.

1932. *Pratapa icetas icetas* Evans, *Ident. Indian Butts* (2nd ed.) : 280.

Material Examined : Dehradun Mussoorie, Bhilaru Pumping Station, 2exs., 3.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Nainital, 1 ex., 30.viii.1883 (Coll. De Niceville).

Wing expanse : Half : Male : 19.5 mm., Female : 21.0 mm

Distribution : Kangra to Kumaon, Nepal.

Genus ***Ancema*** Eliot

1973. *Ancema* Eliot, *Bull. Br. Mus. Nat. Hist. Ent.* **28**(6) : 438.

This genus contains only two species i.e., *ctesia* Hewitson and *blanka* deNiceville, both are represented in India. In the present work former species is being treated from Uttarkhand.

11. ***Ancema ctesia*** (Hewitson)

Common Name : Bi-spot Royal

1865. *Camena ctesia* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 48.

1932. *Pratapa ctesia* Evans, *Ident. Indian Butts* (2nd ed.) : 279.

1973. *Ancema ctesia* Eliot, *Bull. Br. Mus. Nat. Hist. (Ent).* **28**(6) : 438.

Material Examined : Dehradun, Mussoorie, Murray Pumping Station, 1 ex., 5.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : 21.0 mm.

Distribution : North–West Himalayas, Kumaon to Assam, Sikkim, N.E. Burma, Formosa, Malaya.

Genus ***Arhoplala*** Boisduval

1832. *Arhoplala* Boisduval, *In d'Urville, Voy, Astrolabe* 1(Lep) : 75.

Of the 70 species of this genus occurring in India, five species i.e., *Arhoplala ganessa* (Moore), *Arhopala dodonaea* (Moore), *Arhopala rama* (Kollar), *Arhopala atrax* (Hewitson) *and Arhopala amantes* (Hewitson) are dealtwith from Uttarakhand.

Key to the species of the genus *Arhopala* Boisduval

1. Hindwing tailless ..... *ganessa* Moore
- Hindwing tailed or toothed 2
2. Hindwing toothed at vein Cu1b 3
- Hindwing tailed at vein Cu1b 4
3. Both wings dorsally light blue, sexes alike ..... *dodonaea* Moore
- Both wings above deep violet, shows sexual dimorphism ..... *rama* Kollar
4. Adults small, wings above violet ..... *atrax* Hewitson
- Adults larger, wings above violet blue ..... *amantes* Hewitson

12. ***Arhopala ganesa*** (Moore)

Common Name : Tailless Bush Blue.

1858. *Amblypodia ganesa* Moore, *In Cat. Lep. Ins. E. India Co.* **(1)** : 44.

1882. *Panchala ganesa* Moore, *Proc. Zool. Soc. Lond.* **1882** : 252.

1890. *Arhopala ganesa* de Niceville, *Butts India Burmah Ceylon* **3** : 373.

Arhopala ganesa ganesa (Moore)

1858. *Amblypodia ganesa* Moore, *In Cat. Lep. Ins. E. India Co.* **(1)** : 44.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 9 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 9 exs., 3.vi.1993-5.vi.1993; Dehradun, Mussoorie, Murray Pumping Station, 4 exs., 5.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 16.5-17.5 mm; Female : 13.5-16.5 mm

Distribution : West Himalayas, Chitral to Kumaon, Kashmir, Kangra, Shimla, Mussoorie, Dun Valley.

13. ***Arhopala dodonaea*** (Moore)

Common Name : Pale Himalayan Oak Blue

1858. *Amblypodia dodonaea* Moore, *In Cat. Lep. Ins. E. India Co.* (1) : 43.

1882. *Panchala dodonaea* Moore, *Proc. Zool. Soc. Lond.* **1882** : 252.

1890. *Arhopala dodonaea* de Niceville, *Butts India Burmah Ceylon* **3** : 248.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 15 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 15 exs., 3.vi.1993-5.vi.1993; Dehradun, Mussoorie, Murray Pumping Station, 5 exs., 6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 17.0-22.5 mm; Female : 21.0-23.0 mm

Distribution : North-West Himalayas, Muree toNainital, Kashmir to Sikkim, Kangra, Shimla Hills, Mussoorie, Dun Valley, Chitral to Kumaon, Nepal.

14. *Arhopala rama* (Kollar)

Common Name : Pale Himalayan Oak Blue.

1844. *Thecla rama* Kollar, *In Hugel. Kaschmir* **4**(2) : 412.

1882. *Panchala rama* Moore, *Proc. Zool. Soc. Lond.* **1882** : 252.

1890. *Arhopala rama* de Niceville, *Butts India Burmah Ceylon* **3** : 251.

1858. *Amblypodia querceti* Moore, *In Cat. Lep. Ins. E. India Co.* (1) : 43.

1886. *Amblypodia violacea* Rober, *Corresbl. Ent. Ver. Iris* **1**(1) : 72.

Arhopala rama rama (Kollar)

1844. *Thecla rama* Kollar, *In Hugel. Kaschmir* **4**(2) : 412.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 3 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 3 exs., 3.vi.1993-5.vi.1993; Dehradun, Mussoorie, Murray Pumping Station, 4 exs., 6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 18.0-20.0 mm; Female : 19.5-21.0 mm.

Distribution : Kashmir to Sikkim, China, Nepal, N.E. Burma.

15. *Arhopala atrax* (Hewitson)

Common Name : Indian Oak Blue.

1862. *Amblypodia atrax* Hewitson, *Spec. Cat. Lyc. Brit. Mus.* : 13.

1890. *Arhopala atrax* de Niceville, *Butts India Burmah Ceylon* **3** : 246.

1891. *Arhopala alemon* de Niceville, *J. Bombay nat. Hist. Soc.* **6**(3) : 371.

1903. *Arhopala hewitsoni* Bethune-Baker, *Trans. Zool. Soc. Lond.* **17**(1) : 132.

Material Examined : Dehradun, Mussoorie, Murray Pumping Station, 1 ex., 6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 20.5 mm; Female : 20.5-22.5 mm.

Distribution : Mussoorie, Shimla Hills, Dun Valley, Kumaon, Foot of Himalaya form Dehradun to Bhutan, Orissa, Naga Hills, Bihar, Manipur, South Burma.

16. *Arhopala amantes* (Hewitson)

Common Name : Large Oak Blue.

1862. *Amblypodia amantes* Hewitson, *Spec. Cat. Lyc. Brit. Mus.* : 4.

1890. *Arhopala amantes* de Niceville, *Butts India Burmah Ceylon* **3** : 239.

Arhopala amantes amantes (Hewitson)

1862. *Amblypodia amantes* Hewitson, *Spec. Cat. Lyc. Brit. Mus.* : 4.

Material Examined : Dehradun, Dakpathar, 1 ex., 20.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 31.0 mm; Female : 31.0 mm.

Distribution : South India-Dun-Sikkim,Ceylon.

Genus *Deudorix* Hewitson

1863. *Deudorix* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 16.

Two species of this genus i.e., *Deudorix epijarbus* (Moore) and *Deudorix hypergyria* (Elwes) occur in India, the former species is treated here from Uttarakhand.

17. *Deudorix epijarbas* (Moore)

Common Name : Cornelian.

1858. *Dispas epijarbas* Moore, *In Cat. Lep. Ins. E. India Co.* (1) : 32.

1863. *Deudorix epijarbas* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 20.

1927. *Deudorix acetas* Seitz, *In Seitz Grossxhmett Erde* **9** : 1117.

Deudorix epijarbas anacus Frustofer

1912: *Deudorix epijarbas anacus* Frustorfer, *Berl. Ent. Z.* **56**(3/4) : 265.

Material Examined : Chamoli, Gopeshwar, 1 ex., 10.vi.1992; Dehradun, Mussoorie, Aglar Valley, 1 ex., 4.vi.1992 (Coll. A.K. Sidhu and H.S. Rose); Bageshwar, Rakhauli, 1ex., 29.ix.2005 (coll. B. Mitra and party); Rudrapryaag, Phata, 1 ex., 09.ix.2006 (coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 19.5-22.0 mm; Female : 21.0-23.5 mm.

Distribution : Chitral to Kumaon, Nepal, Sikkim, Assam, Bihar, Nilgiris, Orissa, Gujarat, Bombay, Andamans, Nicobars, Burma, Nepal, Ceylon.

Genus ***Rapala*** Moore

1881. *Rapala* Moore, *Lep. Ceylon* **1**(3) : 105.

This genus is represented by 22 species from India and from Uttarakhand three species viz., *Rapala manea* Hewtison, *Rapala nissa* (Kollar) and *Rapala selira* (Moore) are treated herewith.

Key to the species of the genus *Rapala* Moore

1. Underside of hindwing with discal band more or less curved, parallel to termen .... *manea* Fabricius
- Underside of hindwing with discal band straight to vein Cu1a or Cu1b 2
2. Wings above deep violet, with or without small orange discal patch..... *nissa* Kollar
- Wings above brown with violet gloss, forewing with large coppery patch .... *selira* Moore

18. ***Rapala manea*** Hewitson

Common name : Slate Flash.

1863. *Rapala manea* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 23.

Rapala manea schistacea (Moore)

1879. *Rapala manea schistacea* Moore, *Proc. Zool. Soc. Lond.* **1879** : 140.

Material Examined : Dehradun, Mussoorie, Murray Pumping Station, 1 ex., 6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : 18.0 mm.

Distribution : Himalaya, Mussoorie, Dun Valley, Kumaon, Assam, Bengal, Orissa, Nilgiris, Ceylon, Burma, Nepal.

19. ***Rapala nissa*** (Kollar)

1844. *Thecla nissa* Kollar, *In Hugel, Kaschmir* **4**(2) : 412.

1890. *Rapala nissa* de Niceville, *Butts India Burmah Ceylon* **3** : 463.

1871. *Thecla betuloides* Blanchard, *C.R. hebd. Seanc. Acad. Sci.* **72** : 810.

1887. *Rapala maculala* Staudinger, *In Exot. Schmett.* **1** : 224.

1919. *Rapala formosana* Matsmura, *Thous. Ins. Japan Addit.* **3** : 599.

1935. *Rapala mushana* Matsmura, *Ins. Matsumur.* **9** : 173.

1959. *Rapala bifida* Cantlie, *J. Bombay nat. Hist. Soc.* **56**(3) : 652.

Material Examined : Dehradun, Mussoorie, Aglar Valley, 1 ex., 4.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 8 exs., 3.vi.1992-5.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 4 exs., 2.vi.1993-3.vi.1993; Tehri Garhwal, Kempty Falls, 2exs., 4.vi.1993; Nainital, Mallital, 1ex., 25.iv.1992; Chamoli, Gopeshwar, 1ex., 10.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 19.0-20.5 mm; Female : 19.0-21.0 mm.

Distribution : Himalaya, Assam, Sikkim, China, Sumatra, Burma.

20. ***Rapala selira*** (Moore)

Common Name : Himalayan Red Flash.

1874. *Deudorix selira* Moore, *Proc. Zool. Soc. Lond.* **1874** : 272; *Rapala.*

1963. *Rapala selira* Cantlie, *Lyc. Butts revised* : 152.

1916. *Rapala roana* Fruhstorfer, *Ent. Rundsch.* **33**(5) : 25.

Material Examined : Nainital, China peak, 2exs., 26.iv.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 19.5 mm; Female : 19.5-20.0 mm.

Distribution : Westren Himalaya, Chitral to Kumaon, Shimla Hills.

Subfamily LYCAENINAE

Adults with wings marked with copper coloured scales; eyes smooth; labial palpi bristly; antenna with well defined flattened club, nudum limited to club, flagellar segments long; male fore tarsus fused; forewing with 11 veins, veins Sc and R1 run parallel to each other.

Key to the genera of subfamily Lycaeninae

1. Wings with Theclinae like markings on under surface; male foretarsus ending in a blunt rounded process ..... ***Heliophorus*** Geyer
- Wings with Polyommatinae like markings on under surface; male foretarsus ending in a sharp tapered, downcurved process .... ***Lycaena*** Fabricius

Genus ***Heliophorus*** Geyer

1832. *Heliophorus* Geyer, *In Zutr. Sammal. Exot. Schmett.* **4** : 40.

Of the twelve species of this genus from India, three species are collected from Uttarakhand and included here.

Key to the species of the genus *Heliophorus* Geyer

1. Underside of forewing with long, broad, orange, inwardly white edged sumarginal band; hindwing with two prominent large basal spots ..... *sena* Kollar

   Underside of forewing without submarginal band, hindwing with very minute obscure spots 2

2. Wings above in male non-metallic silky blue; hindwing toothed at vein Cu1b .... *oda* Hewtison

   Wings above in male metallic green with powdered black scales; hindwing tailed at vein Cu1b ..... *androcles* Westwood

21. ***Heliophorus sena*** (Kollar)

Common Name : Sorrel Sapphire

1844. *Polyommatus sena* Kollar, *In Hugel, Kaschmir* 4(2) : 415.

1857. *Ilerda sena* Horsflied and Moore, *Cat. Lep. Mus. E.I.C.* 1(30) : 28.

Material Examined : Dehradun, Mussoorie, Aglar Valley, 4exs., 4.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 4exs., 3.vi.1992; Tehri Garhwal, Kempty Falls, 3exs., 5.vi.1992; Tehri Garhwal, Kempty Falls, 5exs., 6.vi.1993; Pauri Garhwal, Srinagar, 3exs., 8.vi.1992; Chamoli, Gopeshwar, 7exs., 10.vi.1992; Nainital, Mallital, 6exs., 25.iv.1992; Nainital, China peak, 4exs., 26.iv.1992; Nainital, Tiffen Top, 7exs., 29.iv.1992; Nainital, Bhimtal, 1ex., 27.iv.1992; Nainital, Sattal, 1ex., 27.iv.1992; (Coll. A.K. Sidhu and H.S. Rose); Almora, Artola, 1 ex., 29.ix.2001 (coll. P. Mukhopadhyay and party); Almora, Menon, 1 ex., 02.x. 2001 (coll. Animesh Bal and party); Almora, Chopta, 3 exs., 11.x.2001 (coll. B.C. Das and party); Almora, Kosi, 1ex., 05.x.2001 (coll. P. Mukhopadhyay and party); Almora, 2 exs., 11.x.2001 (coll. R.C. Basu and party); Uttarkashi, Barkot, 1 ex., 20.ix.2005 (coll. A.K. Sidhu and party); Dehradun, Sahastardhara, 7 exs., 26.ix.2005 (coll. A.K. Sidhu and party); New Tehri, Ranichouri, 1 ex., 22.ix.2005 (coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 12.5-16.0 mm; Female : 13.0-17.0 mm.

Distribution : North-West Himalaya, Kashmir to Kumaon, Nepal.

22. ***Heliophorus oda*** (Hewitson)

Common name : Eastern Blue Sapphire.

1863. *Ilerda oda* Hewitson, *Ill. Diurn. Lep. Lycaenidae* **1** : 58.

Material Examined : Chamoli, Gobindghat, 2exs., 13.vi.1992; Nainital,China Peak, 10 exs., 26.iv.1992; Nainital, Tiffen Top, 1ex., 29.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 16.0 mm; Female : 16.0-16.3 mm.

Distribution : North-West Himalaya, Kashmir to Kumaon, Sikkim, Bhutan, Nepal.

23. ***Heliophorus androcles*** (Westwood)

Common name : Green Sapphire

1852. *Heliophorus androcles* Westwood, *In Gen. diurn. Lep.* (2) : pl. 75.

1884. *Ilerda langi* Moore, *Proc. Zool. Soc. Lond.* 1883 (4) : 526.

1890. *Ilerda virdipunctata* de Niceville, *Butts India Burmah Ceylon* **3** : 329.

1912. *Ilerda virdis* Evans, *J. Bombay nat. Hist. Soc.* **21**(3) : 989.

1929. *Heliophorus gemma* Riley, *J. Bombay nat. Hist. Soc.* **33**(2) : 397.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex.,4.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex., 5.vi.1993; Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex., 2.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex., 3.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 17.5-18.0 mm; Female : 18.0 mm.

Distribution : West Himalaya from Kashmir to Kumaon, Pangi, Sikkim, Naga Hills, Assam, Burma.

Genus ***Lycaena*** Fabricius

1807. *Lycaena* Fabricius, *Mag. F. Insektenk (Illiger)* **6** : 825.

In India this genus is represented by six species, of which two i.e., *Lycaena phaleas* Linnaeus and *Lycaena panava* (Westwood) are treated here.

Key to the species of the genus *Lycaena* Fabricius

1. Forewing with stalk of veins R3+ R5 shorter than half the length of vein R5 .... *phaleas* Fabricius

- Forewing with stalk of veins R3 + R5 longer than Half the length of vein R5 .... *panava* Westwood

24. ***Lycaena phaleas*** (Linnaeus)

Common name : Common Copper.

1761. *Papilio phaleas* Linnaeus, *Fauna Svec.* (ed. 2) : 285.

1823. *Polyommatus phaleas* Godart, *Enc. Meth.* **9**(167) : 670.

1852. *Chrysophanus phlaeas* Westwood, *Gen. diurn. Lep.* **2**(4).

1763. *Papilio virgaureae* Scopali, *Ent. Carn.* (468) : 180.

1777. *Papilio timeus* Cramer, *Pap. Ex.* **2** :137.

1886. *Chrysophanus timaeus* Doherty, *J. asiat. Soc. Bengal* **55** : 30.

1880. *Chrysophanus stygianus* Butler, *Proc. Zool. Soc. Lond.* **1880** : 408.

1884. *Chrysophanus baralacha* Moore, *J. asiat. Soc. Bengal* **53** : 25.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 4exs., 3.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 2exs., 5.vi.1993; Dehradun, Mussoorie, Bhilaru Pumping Station, 3exs., 7.vi.1993; Nainital, China peak, 1ex., 26.iv.1992; Nainital, Tiffen Top, 1ex., 27.iv.1992; Dehradun, Dhanolti, 2exs., 8.vi.1993; Dehradun, Bandhal Valley, 1ex., 9.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Tehri Garwal, Surkanda Forest, 1 ex., 23.xi.2003 (coll. S.K. Chakraborty and party).

Wing expanse : Half : Male : 15.5-18.5 mm; Female : 16.0-20.0 mm

Distribution : Western Himalaya, Kashmir to Nainital, Shimla Hills, Balauchistan, Palaearctic and Nearctic regions.

25. ***Lycaena panava*** (Westwood)

Common name : White-Bordered Copper.

1852. *Thecla panava* Westwood, *In Gen. diurn, lep.* (2) : 487.

1985. *Lycaena panava* Varshney, *J. Bombay nat. Hist. Soc.* **82** : 315.

1844. *Polyommatus pavana* Kollar, *In Hugel Kaschmir* **4**(2) : 416.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 2exs., 4.vi.1992; Nainital,China peak, 5exs., 26.iv.1992; Nainital, Tiffen Top, 4exs., 29.iv.1992; Nainital, Mallital, 3exs., 25.iv.1992; Dehradun, Dhanolti, 2exs., 8.vi.1993; Dehradun, Bandhal Valley, 1ex., 9.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Almora, Binsur, 1 ex., 26.ix.2001 (Coll. Animesh Bal and party); Almora, Lukum, 1ex., 07.Vii. 2004 (Coll. D.R. Maulik and party); Almora, Forest Rest House, 1 ex. 27.ix.2004 (Coll. D.R. Maulik and party).

Wing expanse : Half : Male : 18.0-19.0 mm Female : 14.5-20.0 mm.

Distribution : Almorah, Kashmir to Kumain, Nainital, Shimla Hills, Nepal Himalaya.

Subfamily POLYOMMATINAE

Adults with wings marked with blue scales; thorax and abdomen thin and weak; antenna with

club well differentiated, flattened or hollowed beneath, nudum confined to club; forewing always with 11 veins; stalk of veins R3 + R5 and vein M1 separate at origin; male genitalia with saccus absent or poorly developed, dorsum weaker; female genitalia with ductus seminalis always enters at base of ductus bursae, the latter slender.

Key to the genera of the subfamily *Polyommatinae*

1. Underside of forewings with a streak From base below vein Sc 2
- Underside of forewings with no streak from base below vein Sc 5
2. Eyes smooth 3
- Eyes hairy 4
3. Upperside of wings mostly blue ..... ***Tarucus*** Moore
- Upperside of wings mostly white ..... ***Castalius*** Hubner
4. Forewing with veins Sc and R1 free ..... ***Leptotes*** Scudder
- Forewing with veins Sc and R1 anastomosed ..... ***Azanus*** Moore
5. Underside of wings without any black, circular spots, except tornal spots on hindwing 6
- Underside of wings with variable number of black spots, in addition to tornal spots on hindwing 7
6. Forewing with veins Sc and R1 free ..... ***Lampides*** Hubner
- Forewing with veins Sc and R1 anastomosed ..... ***Prosotas*** H.H. Druce
7. Underside of wings markings not white edged 8

   Underside of wings with markings white edged 10
8. Forewing with vein Sc as long as cell ..... ***Acytolepsis*** Toxopeus

   Forewing with vein Sc shorter than cell 9
9. Male genitalia with tegument swollen laterally, valvae without long apical processes, female genitalia without intersternal pouch ..... ***Celatoxia*** Eliot & Kawazoe
- Male genitalia with tegument not swollen, subscaphium less sclerotized, valvae with long apical processes, female genitalia with intersternal pouch ..... ***Celastrina*** Tutt.
10. Hindwing tailed 11
- Hindwing tailless 13
11. Eyes hairy ..... ***Catochrysops*** Boisduval
- Eyes smooth 12
12. Forewing with veins Sc and R1 free ..... ***Euchrysops*** Butler
- Forewing with veins Sc and R1 anastomosed ..... ***Everes*** Hubner
13. Underside of hindwings with jewelled spots along margin and at tornus ..... ***Freyeria*** Courvoisier
- Underside of hindwings without jewelled Spots 14
14. Forewing with origin of vein Culb opposite to origin of vein R1 or vein R1 nearer base 15
- Forewing with origin of vein Culb nearer Base than that of origin of vein R1 16
15. Underside of hindwings with discal spot in R5 shifted in and not in line with discal spots in Sc + R1 and M1 ..... ***Chilades*** Moore
- Underside of hindwings with discal spot in R5 in line with discal spots in Sc + R1 and M1 ..... ***Aricia*** R. L.
16. Forewing with veins Sc and R1 anastomosed upto costa ..... ***Zizula*** Chapman
- Forewing with veins Sc and R1 separate at costa 17
17. Eyes hairy, underside of hindwings with discal spot in Rs moved in, not in line with discal spots in Sc + R1 and M1 ..... ***Zizina*** Chapman
- Eyes smooth, underside of hindwings with discal spot in Rs in line with discal spots in Sc + R1 and M1 18
18. Adults relatively larger, male with pale blue wings dorsally ..... ***Pseudozizeeria*** Beuret

- Adults smaller, male with dark blue wings dorsally ..... ***Zizeeria*** Chapman

Genus ***Tarucus*** Moore

1881. Moore, Lep. Ceylon **1** : 81.

This genus is represented in India by nine species, out of which two species *Tarucus hazara* Evans and *Tarucus alteratus* Moore are recorded from Uttrankhand. The former species is a new record from Uttarakhand as well as India, previously it is reported from a single locality Abbottabad from Pakistan.

Key to the species of the genus *Tarucus* Moore

1. Male with upperside of wings blackish-violet, borders broad; female with upperside of wings brown without any markings .... *hazara* Evans

- Male with upperside of wings violet blue, borders narrower; female with upperside of wings brown with blue scales at base, discal area of forewing white with a prominent spot at end cell ..... *alteratus* Moore

26. ***Tarucus hazara*** Evans

1932. *Tarucus hazara* Evans, *Bombay nat. Hist. Soc.* : 215.

Material Examined : Dehradun, Rishikesh, 3exs., 15.vi.1992; Dehradun, Mussoorie, Aglar Valley, 1ex., 4.vi.1992; Dehradun,Vikasnagar, 4exs., 21.iv.1992; Pauri Garhwal, Srinagar, 1ex., 8.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 12.5-13.5 mm; Female : 14.0-17.0 mm

Distribution : Abbottabad, Pakistan.

27. ***Tarucus alteratus*** Moore

1882. *Tarucus alteratus* Moore, *Proc. Zool. Soc. Lond.* **1882** : 245.

Material Examined : Dehradun, Rishikesh, 5exs., 15.vi.1992; Dehradun, Vikasnagar, 1ex., 19.iv.1992; Dehradun, Vikasnagar, 5exs., 21.iv.1992; (Coll. A.K. Sidhu and H.S. Rose); Almora, Dwarhat, 1 ex., 26.ix.2004; (Coll. D.R. Maulik and party); Uttarkashi, Barkot, 2 exs., 22.ix.2005 ; (Coll. A.K. Sidhu & party).

Wing expanse : Half : Male : 10.5 mm; Female : 10.5-11.0 mm.

Distribution : Western Himalaya, Punjab, Central India; Peshawar, Campbellpore (Pakistan).

Genus ***Castalius*** Hubner

1819. *Castalius* Hubner, Verz. bekannt. Schmett (5) : 70.

This genus is represented by single species *Castalius rosimon* (Fabricius) from India and is also being reported from Uttarakhand.

28. ***Castalius rosimon*** (Fabricius)

Common Name : Common Pierrot.

1775. *Papilio rosimon* Fabricius, *Syst. Ent.* : 523.

1793. *Hesperia rosimon* Fabricius, *Ent. Syst.* **3** : 288.

1823. *Polyommatus rosimon* Godart, *Enc. Meth.* **9** : 658.

1828. *Lycaena rosimon* Horsfield, *Cat, Lep. E.I.C.* **6** : 71.

1874. *Cupido rosimon* Druce, *Proc. Zool. Soc. Lond.* **1** : 106.

1881. *Lampides rosimon* Wood-Mason and de Niceville, *J. asiat. Soc. Bengal* **1**(41) : 235.

1816. *Castalius rosimon* Hubner, *Verz. Bek. Schmett.* : 70.

1775. *Papilio maimon* Fabricius, *Syst. Ent.* : 534.

1775. *Papilio clyton* Cramer, *Pap. Ex.* **1** : pl. 67.

1781. *Papilio coridin* Cramer, *Pap. Ex.* **4** : pl. 340.

1816. *Castalius naxus* Hubner, *Verz. Bek. Schmett.* : 70.

1885. *Castalius chota* Swinhoe, *Proc. zool. Soc. Lond.* : 133.

1886. *Castalius approximatus* Butler, *Ann. Mg. Nat. Hist.* **18** : 186.

Material Examined : Dehradun, Forest Research Institute, 1ex., 9.vi.1993; Dehradun, Vikasnagar, 1ex., 2.vi.1992; (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 15.0 mm; Female : 15.0 mm.

Distribution : Throughout India except the desert tracts, East Nepal, Malay peninsula, Java, Burma, Ceylon, Hong Kong, Sulawesi, Lesser Sunda Islands, Borneo.

Genus ***Leptotes*** Scudder

1876. Scudder, Bull. Buffalo Soc. Nat. Sci. **3** : 124.

In India this genus is represented by two species viz. *Leptotes plinius* Fabricius and *Leptotes pirithous* Linnaeus, the former is recorded from Uttarakhand.

29. *Leptotes plinius* (Fabricius)

Common Name : Zebra blue.

1793. *Hesperia plinius* Fabricius, *Ent. Syst.* **3**(1) : 284.

1823. *Polyommatus plinius* Godart, *Enc. Meth.* **9** : 658.

1881. *Tarucus plinius* Moore, *Lep. Ceylon* **1** : 82.

Material Examined : Dehradun, Rishikesh, 3exs., 15.vi.1992; Dehradun, Mussoorie, 1ex., 7.vi.1993; Dehradun, Bandhal Valley, 1ex., 9.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Devapryaag, 1ex., 11.ix.2006 ; (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 13.5-14.5 mm; Female : 13.5-16.0 mm.

Distribution : India, Nepal, Bangladesh, South China, Sri Lanka, Taiwan, Philippines, Papua New Guinea, East Australia, Solomon.

Genus *Azanus* Moore

1881. Moore, Lep. Ceylon **1**(2) : 79.

Out of the four species recorded from India i.e. *Azanus ubaldus* (Cramer), *Azanus uranus* (Butler), *Azanus urios* (Riley & Godfrey) and *Azanus jesous* (Gurerin-meneville), the former is being treated from Uttarakhand.

30. *Azanus ubaldus* (Cramer)

Common name : Bright Babul Blue.

1782. *Papilio ubaldus* Cramer, Pap. Exot. **4** : 209.

1882. *Azanus ubaldus* Moore, *Proc. Zool. Soc. Lond.* : 245.

1782. *Papilio artemides*, Stoll, In Cramer, *Uitl. Kapellen* **4**(33) : 211.

1865. *Lycaena zena* Moore, *Proc. Zool. Soc. Lond.* **1865**(2) : 202.

1870. *Lycaena itea* Walker, Entomologist **5** : 55.

1870. *Azanus macalenga* Trimen, 1870, *Trans. Ent. Soc. Lond.* **18**(4) : 364.

Material examined : Dehradun, Sahastardhara, 1 ex., 16.ix.2005; (A.K. Sidhu and party).

Wing expanse : Half : Male : 12.0 mm; Female : 11.5-12.0 mm.

Distribution : India, West Pakistan, Ceylon.

Genus *Lampides* Hubner

1819. Lampides Hubner, Verz. bekannt. Schmett. (5) : 70.

This genus is a monotypic genus contains single species *Lampides boeticus* (Linnaeus) represented from India and is also dealt with in present work.

31. *Lampides boeticus* (Linnaeus)

Common Name : Pea blue.

1767. *Papilio boeticus* Linnaeus, *Syst. Nat.* (ed. 12) **1**(2) : 789.

1823. *Polyommatus boeticus* Godart, *In Ency. Meth.* **9** : 653.

1869. *Lampides boeticus* Butler, *Cat. Fab. Lep. B. M.* (11) : 165.

1775. *Papilio coluteae* Fuessly, *Verz. Bakannt. Schweiz. Ins.* : 31.

1775. *Papilio damoetes* Fabricius, *Syst. Ent.* : 526.

1777. *Papilio archias* Cramer, *Util. Kapellen* **2**(16) : 129.

1785. *Papilio pisorum* Fourcroy, *Ent. Paris* **2** : 242.

1882. *Lampides armeniensis* Gerhard, *Berl. Ent. Z.* **26** : 125.

1886. *Polyommatus bagus* Distant, *Ann. Mag. Nat. Hist. Soc.* **17**(5) : 532.

1925. *Lampides obsoleta* Evans, *J. Bombay nat. Hist. Soc.* **30**(2) : 351.

Material Examined : Almora, Ranikhet, 3exs., 28.iv.1992; Nainital, China peak, 5exs., 26.iv.1992; Nainital, Mallital, 4exs., 25.iv.1992; Nainital, Tiffen Top, 3exs., 29.iv.1992; Dehradun, Bandhal Valley, 1ex., 9.vi.1993; Dehradun, Mussoorie, Bhilaru Pumping Station, 1ex., 5.vi.1992; Dehradun, Mussoorie, Mossy Falls, 1ex., 7.vi.1992; Dehradun, Mussoorie, Aglar Valley, 1ex., 4.vi.1992 (Coll. A.K. Sidhu and H.S. Rose); Almora, Malbagh, 4 exs., 04.04.2002 (Coll. S. Ray Chaudhary and party).

Wing expanse : Half : Male : 14.0-18.0 mm; Female : 14.5-16.5 mm.

Distribution : Oriental, Palaearctic and Australian regions, North Africa.

Genus *Prosotas* H.H. Druce

1891. *Prosotas* H.H. Druce, *Proc. zool. Soc. Lond.*, **1891** : 366.

Out of the eight species of this genus represented from India, one i.e., *Prosotas nora* (C. Felder) is treated here from Uttarakhand.

32. *Prosotas nora* (C. Felder)

Common Name : Common Line Blue.

1860. *Lycaena nora* C. Felder, *Sber. Akad. Wiss. Wien.* **40** : 458.

1883. *Nacaduba nora* de Niceville, *J. Asiat. Soc. Bengal* : 73.

Prosotas nora ardates (Moore)

Common name : Common Line Blue.

1875. *Lycaena ardates* Moore, *Proc. zool. Soc. Lond.* **1874**(4) : 574.

Material Examined : Dehradun, Mussoorie, Aglar Valley, 3exs., 15.vi.1992; Dehradun, Mussoorie, 1ex., 7.vi.1993; Dehradun, Bandhal Valley, 1ex., 9.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Tehri Garhwal, Kempty falls, 3 exs., 19.ix.2005 (Coll. A.K. Sidhu and party); Dehradun, Mussoorie, Yamuna Bridge, 19.ix.2005 (Coll. A.K. Sidhu and party); Rudrapryaag, Phata, 2 exs., 09.ix.2006; (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 9.5-12.0 mm; Female : 11.0-12.0 mm.

Distribution : India, Ceylon.

Genus ***Acytolepis*** Toxopeus

1927. Acytolepis Toxopeus, Tijdschr. Ent. **70** : 271.

This genus is represented by two species *Acytolepis lilacea* (Hampson) and *Acytolepis puspa* (Horsefield) from India, the latter is recorded from Uttarakhand.

33. ***Acytolepis puspa*** (Horsfield)

Common Name : Common Line Blue.

1828. *Polyommatus puspa* Horsfield, *Descr. Cat. Lipid. Ins.* (I) : 67.

1890. *Cyaniris puspa* de Niceville, *Butts India Burmah Ceylon* **3** : 100.

1932. *Lycaenopsis puspa* Evans, *Ident. Indian Butts* (2nd ed.) : 221.

1963. *Celastrina puspa* Cantlie, *Lyc. Butts Revised* : 42.

1983. *Acytolepis puspa* Eliot and Kawazoe, *Butts Lycaenopsis group* : 172.

1910. *Cyaniris contillia* Fruhstorfer, *Stett. Ent. Ztg.* **71**(2) : 285.

1910. *Cyaniris sania* Fruhstorfer, *Stett. Ent. Ztg.* **71**(2) : 285.

Acytolepis puspa gisca (Fruhstorfer)

1910. *Cyaniris puspa gisca* Fruhstorfer, *Stett. Ent. Ztg.* **71**(2) : 285.

1910. *Cyaniris puspa hermagoras* Fruhstorfer, *Stett. Ent. Ztg.* **71**(2) : 284.

1917. *Lycaenopsis puspa telis* Fruhstorfer, *Arch. Naturgesc.* (A) **82**(1) : 25.

1941. *Celastrina puspa barneyi* Corbet, *Hongkong Nat.* **10**(3/4) : 149.

Material Examined : Nainital,China peak, 2exs., 26.iv.1992; Almora, Ranikhet, 1ex., 28.iv.1992 (Coll. A.K. Sidhu and H.S. Rose); Almora, Dinapani, Kosi, 2 exs., 04.x.2004 (Coll. D.R. Maulik and party); Almora, Dinapani, Bar Chhina, 1 ex., 05.x.2004 (Coll. D.R. Maulik and party); Uttarkashi, Barkot, 1 ex., 20.ix.2005 (Coll. A.K. Sidhu and party); Devagpryaag, 2 exs., 10.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 16.0 mm; Female : 16.0 mm.

Distribution : Throughout Himalaya, N.E. Afghanistan, Pakistan.

Genus ***Celatoxia*** Eliot and Kawazoe

1983. *Celatoxia* Eliot and Kawazoe, *Butts Lycaenopsis group* : 198.

From India, this genus is represented by two species *Celatoxia albidisca* (Moore) and *Celatoxia marginata* (de Niceville), the latter species is being treated in the present work.

34. ***Celatoxia marginata*** (de Niceville)

Common name : Marginated Hedge Blue.

1884. *Cyaniris marginata* de Niceville, *J. Asiat. Soc. Bengal, Pt.* II **52**(2/4) : 70.

1932. *Lycaenopsis marginata* Evans, *Ident. Indian Butts* (2nd ed.) : 223.

1983. *Celatoxia marginata* Eliot & Kawazoe, *Butts Lycaenopsis group* : 199.

Celatoxia marginata marginata (de Niceville)

1884. *Cyaniris marginata* de Niceville, *J. asiat. Soc. Bengal, Pt.* II **52**(2/4) : 70.

Material Examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1 ex., 3.vi.1993; Dehradun, Mussoorie, Murray Pumping Station, 1 ex., 6.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Almora, Binsor, 1 ex., 14.x.2001 (Coll. B.C. Das and party).

Wing expanse : Half : Male : 15.0 mm; Female : 15.0 mm.

Distribution : Central Himalaya, Nainital, Kumaon, Vietnam, Taiwan, Burma.

Genus *Celastrina* Tutt

1906. *Celastrina* Tutt, *Ent. Rec.*, **18** : 131.

Out of seven species of this genus recorded from India, three species viz., *Celastrina argiolus* (Linnaeus), *Celastrina huegelli* (Moore) and *Celastrina gigas* (Hemming) are dealt with in the present work.

Key to the species of the genus *Celastrina* Tutt

1. Adults smaller, males pale blue .... *argiolus* Linnaeus
- Adults larger, male violet blue 2
2. Male genitalia with each valve possessing well developed prominent teeth on apical process ..... *huegelii* Moore
- Male genitalia with each valve without or with qualidary teeth on apical process .... *gigas* Hemming

35. *Celastrina argiolus* (Linnaeus)

Common Name : Hill Hedge Blue.

1758. *Papilio argiolus* Linnaeus, *Syst. Nat.* (ed. 10) **1** : 483.

1932. *Lycaenopsis argiolus* Evans, *Ident. Indian Butts* (2nd ed.) : 225.

1963. *Celastrina argiolus* Cantlie, *Lyc. Butts Revised* : 49.

1776. *Papilio cleobis* Sulzer, *Abgekurtze Gesch. Ins.* **1** : 146.

1779. *Papilio argalus* Bergstrasser, *Nom. Ins.* **2** : 18.

1779. *Papilio argyphontes* Bergstrasser, *Nom. Ins.* **1** : 15.

1779. *Papilio argyrophontes* Bergstrasser, *Nom. Ins.* **3** : 15.

1779. *Papilio thersanon* Bergstrasser, *Nom. Ins.* **3** : 4.

1783. *Papilio marginatus* Retzius, *Gen. Spec. Ins.* : 30.

1908. *Celastrina kobei* Tutt, *Nat. Hist. Brit. Butts.* **2** : 401.

Celastrina argiolus kollari (Westwood)

1848. *Lycaena kollari* Westwood, *In Gen. diurn. Lep.* (2) : 491.

1865. *Polyommatus argiolus kasmira* Moore, *Proc. zool. Soc. Lond.* **1865**(2) : 503.

Material Examined : Almora, Ranikhet, 1 ex., 28.iv.1992; Nainital, China peak, 2 exs., 26.iv.1992; Mallital, Nainital, 2 exs., 25.iv.1992; Dehradun, Mussoorie, Aglar Valley,1 ex., 4.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 4 exs., 5.vi.1993; (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 15.2-15.5 mm; Female : 15.2-15.5 mm.

Distribution : Western Himalaya from Chitral to Kumaon, North-East Afghanistan, Kunar Valley.

36. *Celastrina huegelli* (Moore)

Common Name : Large Hedge Blue.

1882. *Cyaniris huegelli* Moore, *Proc. Zool. Soc. Lond.* **1882**(1) : 244.

1963. *Celastrina huegelli* Cantlie, *Lyc. Butts Revised* : 48.

Celastrina huegelli huegelli (Moore)

1882. *Cyaniris huegelli* Moore, *Proc. zool. Soc. Lond.* **1882**(1) : 244.

Material Examined : Dehradun, Mussoorie, 3 exs., 5.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Champawat, Dham, 1 ex., 15.ix.2004 (Coll. B. Mishra and party); Tehri Garhwal, Suakholi, 1 ex., 22. Xi.2003 (Coll. S.K. Chakraborty and party); Tehri Garhwal, Chamba, 1 ex., 24.xi.2003 (Coll. S.K. Chakraborty and party); Dehradun, Mussoorie, Yamuna Bridge, 2 exs., 19.ix.2005 (Coll. A.K. Sidhu and party); Uttarkashi, Barkot, 1 ex., 20.ix.2005 (Coll. A.K. Sidhu and party); New Tehri, Ranichouri, 2 exs. 26.ix.2005 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 20.0 mm; Female : 20.0 mm.

Distribution : Western Himalaya as far as Nainital.

37. *Celastrina gigas* (Hemming)

1928. *Lycaenopsis gigas* Hemming, *Proc. ent. Soc. Lond.* **60**(5/6) : 277.

1983. *Celastrina gigas* Eliot & Kawazoe, *Butts Lycaenopsis group* : 231.

Material Examined : Chamoli, Gopeshwar, 5 exs., 10.vi.1992; Chamoli, Gobinddham, 2 exs., 13.vi.1992; Dehradun, Mussoorie, Aglar Valley, 4 exs., 4.vi.1992; Dehradun, Mussoorie, Bhilaru

Pumping Station, 5 exs., 3.vi.1992-6.vi.1992; Dehradun, Mussoorie, Bhilaru Pumping Station, 5 exs., 2.vi.1993-3.vi.1993; Dehradun, Mussoorie, Bhilaru Pumping Station, 1 ex.,13.ix.1992; Dehradun, Mussoorie, Moosy Falls, 1 ex., 7.vi.1993; Dehradun, Dhanolti, Bandhal valley, 2 exs.,4.vi.1992; Tehri Garhwal, Kempty Falls, 2 exs.,14.ix.1992; Nainital,Mallital, 1 ex., 25.iv.1992; Nainital, China peak, 2 exs., 26.iv.1992; Nainital, Tiffen Top, 15 exs., 29.iv.1992; Almora, Ranikhet, 3 exs., 28.iv.1992 (Coll. A.K. Sidhu and H.S. Rose); Almora, Kandu, 1 ex., o6.iv.2002 (Coll. S. Roy Chaudhary and party); Ranikhet, Khairner, 4 exs., 25.ix.2004 (Coll. D.R. Maulik and party); Almora, Dwarhat, 1 ex., 26.ix.2004 (Coll. D.R. Maulik and party); Almora, Brechhina, 1 ex., 05.x.2004 (Coll. D.R. Maulik and party); Almora, Dinapani,1 ex., Brechhina, 05.x.2004 (D.R. Maulik and party); Dehradun, Deer Park, 2 exs., 16.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 19.0-21.0 mm; Female : 20.0-22.0 mm.

Distribution : Western Himalaya, West Nepal.

Genus ***Catochrysops*** Boisduval

1832. Boisduval, 2 nd' urville, *Voy. Asvrolabe* **1** (Lep) : 87.

In India, this genus is represented by two species viz. *Catochrysops strabo* (Fabricius) and *Catochrysops panormus* (Felder), the former species is being reported from Uttarakhand.

38. ***Catochrysops strabo*** (Fabricius)

Common name : Forget-me-not.

1793. *Hesperia strabo* Fabricius, *Ent. Syst.* **3** : 287.

1823. *Polyommatus strabo* Godart, *Enc. Meth.* **9** : 656.

1832. *Catochrysops strabo* Boisduval, *In d'Urville Voy. Astrolabe* **1**(Lep.) : 88.

1866. *Lycaena tejua* Reakirt, *Proc. Acad. Nat. Sci. Philad.* **18** : 245.

1938. *Catochrysops riama* Corbet, *J. Fed. Malay St. Mus.* **18**(2) : 250.

Material Examined : Nainital, Mallital, 1 ex., 25.iv.1992; Almora, Ranikhet, 1 ex., 28.iv.1992 (Coll. A.K. Sidhu and H.S. Rose); Rudrapryaag, Phata, 1 ex., 09.ix.2006 (Coll. A.K. Sidhu and party); Uttarkashi, Barkot, 1 ex., 22.ix.2005 (Coll. A.K. Sidhu and party); Haridwar, Jawalapur, 1 ex., 14.ix.2006 (Coll. A.K. Sidhu and party); Tehri Garhwal, Kempty falls, 1 ex., 19.ix.2006 (A.K. Sidhu and party);

Wing expanse : Half : Male : 15.0 mm; Female : 15.0-16.5 mm.

Distribution : Mussoorie, Dehradun, Mandi, Shimla, Solan.

Genus ***Euchrysops*** Butler

1900. *Euchrysops* Butler, *Entomologist* **33** : 1.

In India, this genus is represented by single species *Euchrysops cnejus* (Fabricius) which is also treated in present work.

39. ***Euchrysops cnejus*** (Fabricius)

Common name : Gram Blue

1798. *Hesperia cnejus* Fabricius, *Ent. Syst. Suppl.* : 430.

1823. *Polyommatus cnejus* Godart, *Enc. Meth.* **9** : 657.

1829. *Lampides cnejus* Horsfield, *Cat. Fab. Lap. B.M.* : 165.

1873. *Cupido cnejus* Druce, *Proc. zool. Soc. Lond.* **1873** : 348.

1881. *Catochrysops cnejus* Moore, *Lep. Cey.* **1** : 92.

1932. *Euchrysops cnejus* Evans, *Iden. Indian Butts* (2nd ed.) : 234.

1844. *Lycaena pandia* Kollar, *In Hugel Kaschmir* **4**(2) : 418.

1844. *Lycaena patala* Kollar, *In Hugel Kaschmir* **4**(2) : 419.

1871. *Cupido amazara* Kirby, *Syn. Cat. Diurn. Lep.* : 376.

1885. *Catochrysops theseus* Swinhoe, *Proc. zool. Soc. Lond.* **1885**(1) : 131.

Euchrysops cnejus cnejus (Fabricius)

1798. *Hesperia cnejus* Fabricius, *Ent. Syst. Suppl.* : 430.

Material Examined : Dehradun, Vikasnagar, 2 exs., 21.vi.1992; Dehradun, Rishikesh,1 ex., 15.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 14.5-17.0 mm; Female : 15.0-17.5 mm.

Distribution : India, Baluchistan, Sri Lanka, South China, Malay Archipelago, Australia.

Genus ***Everes*** Hubner

1819. Everes Hubner, Verz. bekannt. Schmett. (5) : 69.

Four species *Everes rhandura* Evans, *Everes argiades* (Pallas), *Everes huegelii* (Gistel) and *Everes lacturnus* (Godart) are represented from India and the latter three species are being treated from Uttarakhand.

Key to the species of the genus *Everes* Hubner

1. Underside of hindwing with a spot present in middle of cell, two costal spots in Sc + R1 and a spot on dorsum in 1A + 2A black, rest of the spots on underside of both wings grey .. .. *lacturnus* Godart

   Underside of both wings with all spots black and of equal intensity 2

2. Underside of hindwing with marginal copper border short ..... *argiades* Pallas

   Underside of hindwing with marginal copper border longer ..... *huegelii* Gistel.

40. *Everes lacturnus* (Godart)

Common name : Indian Cupid.

1823. *Polyommatus lacturnus* Godart, *Enc. Meth.* **9** : 660.

1963. *Everes lacturnus* Cantlie, *Lyc. Butts Revised* : 38.

Material Examined : Garhwal, Srinagar, 5 exs., 8.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 12.0-14.0 mm; Female : 13.5-14.0 mm.

Distribution : South India, Sikkim, Assam, Shimla, Burma, Ceylon, Nepal, China, Malaya.

41. *Everes argiades* (Pallas)

1771. *Papilio argiades* Pallas, *Reise durch verschied. Provinz* **1** : 472.

1881. *Lycaena argiades* Elwes, *Proc. zool. Soc. Lond.* **1881** : 887.

1890. *Everes argiades* de Niceville, *Butts India Burmah Ceylon* **3** : 137.

1775. *Papilio amyntas* Fabricius, *Syst. Ent.* (384) : 430.

1775. *Papilio tiresias* Rottemburg, *Naturf.* **6**(10) : 23.

1779. *Papilio polysperchon* Bergstrasser, *Nomencl.* **2** : 72.

1932. *Everes indica* Evans, *Ident. Indian. Butts.* (2nd ed.) : 219.

Everes argiades diporides Chapman

Common name : Chapmans's Cupid.

1909. *Everes diporides* Chapman, *Trans. Ent. Soc. Lond.* **56**(3/4) : lxxxii.

Material Examined : Nainital, 1ex., 27.iv.1992; Almora, Ranikhet, 1 ex., 28.iv.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 11.0 mm; Female : 11.5 mm.

Distribution : Himalaya.

42. *Everes huegelli* (Gistel)

Common name : Tailed Cupid.

1857. *Lycaena huegelli* Gistel, *Vacuna* **2**(2) : 605.

1963. *Everes huegelli* Cantlie, *Lyc. Butts. Revised* : 37.

Everes huegelli huegelli (Gistel)

1857. *Lycaena huegelli* Gistel, *Vacuna* **2**(2) : 605.

Material Examined : Dehradun, Mussoorie, 1 ex., 3.vi.1992; Mussoorie, Dehradun, 3 exs., 5.vi.1993; Tehri Garhwal, Kempty Falls, 4 exs., 4.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 12.0-13.5 mm; Female : 13.5-14.0 mm.

Distribution : Chitral-Kumaon Himalaya, Assam, Burma.

Genus *Freyeria* Courvoisier

1920. *Freyeria* Courvoisier, *Iris* **34** : 234.

The genus *Freyeria* Courvoisier is represented by three species viz. *trochylus* Freyer, *putli* Kollar and *galka* Lederer from India, the former two were collected from Uttarakhand and included here.

Key to the species of the genus *Freyeria Courvoisier*

1. Hindwing with marginal spots black, with obscure orange scaling on upper - surface .. .. *putli* Kollar

   - Hindwing with marginal spots in space M3 and Cula prominent and widely orange crowned on upper surface ..... *trochylus* Freyer

43. *Freyeria putli* (Kollar)

Common name : Grass Jewel.

1848. *Lycaena putli* Kollar, *In Hugel's Kaschmir* **4**(2) : 422.

1881. *Chilades putli* Moore, *Lep. Cey.* **1** : 77.

1886. *Plebejus putli* Butler, *Proc. zool. Soc. Lond.* **1886** : 368.

1932. *Zizeeria putli* Evans, *Iden. Indian Butts* (2nd ed.) : 233.

1963. *Freyria putli* Cantlie, *Lyc. Butts Revised* : 62.

1970. *Freyria putli* Fujioka, *Spec. Bull. Lep. Soc. Jap.* : 19.

Material Examined : Dehradun, Mussoorie, Mossy Falls, 1 ex., 7.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Rudrapryaag, Phata, 1 ex., 09.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 12.0-13.5 mm; Female : 13.5-14.0 mm.

Distribution : South – North-East India, Nepal, Ceylon, East India, Burma.

44. *Freyeria trochylus* (Freyer)

1845. *Lycaena trochylus* Freyer, *Neuere Beitr. Schmett.* **5**(74) : 98.

1862. *Polyommatus trochylus* Kirby, *Eur. Butt.* : 99.

1886. *Plebejus trochylus* Butler, *Proc. zool. Soc. Lond.* **1886** : 368.

1932. *Zizeeria trochylus* Evans, *Iden. Indian Butts* (2nd ed.) : 233.

1963. *Freyeria trochylus* Cantlie, *Lyc. Butts Revised* : 63.

1970. *Freyeria trochylus* Fujioka, *Spec. Bull. Lep. Soc. Jap.* : 20.

1874. *Lycaena parva* Murray, *Trans. Ent. Soc. Lond.* **22**(4) : 526.

1874. *Lycaena trochilus* Murray, *Trans. Ent. Soc. Lond.* **22**(4) : 526.

1876. *Lycaena gnoma* Snellen, *Tijdschr. Ent.* **19** : 526.

1906. *Chilades grisea* Aigner-Abafi, *Ent. Zeit.* **19**(35) : 209.

1954. *Freyeria obscura* Heydemann, *Z. wien. Ent. Ges.* **39** : 424.

Material Examined : Dehradun F.R.I. 2 exs., 9.vi.1993; Tehri Garhwal, Kempty Falls, 1 ex., 7.vi.1993 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 12.0-13.5 mm; Female : 13.5-14.0 mm.

Distribution : North-West India, Nepal, West Pakistan.

Genus *Chilades* Moore

1881. *Chilades* Moore, *Lep. Ceylon* **1**(2) : 76.

In India, this genus is represented by three species viz. *Chilades lajus* (Cramer), *Chilades pandava* (Horsefield) and *Chilades parrhasius* (Fabricius), of which the former two species are treated here.

Key to the species of the genus *Chilades* Moore

1. Hindwing tailess, without orange scaling above tornal black spot in space Culb on underside ..... *lajus* Cramer
- Hindwing tailed, with orange scaling above tornal black spot in space Culb .... *pandava* Horsefield

45. *Chilades lajus* (Cramer)

Common name : Lime Blue.

1780. *Papilio lajus* Cramer, *Pap. Ex.* **4** : 62.

1890. *Chilades lajus* de Niceville, *Butts India Burmah Ceylon* **3** : 89.

1793. *Hesperia cajus* Fabricius, *Ent. Syst.* **3**(1) : 296.

1847. *Lycaena laius* Doubleday, *List. Spec. lep. Brit. Mus.* (2) : 279.

1865. *Lycaena brahmina* Felder and Felder, *Reise Novara* (2) : 279.

1866. *Polyommatus kandura* Moore, *Proc. zool. Soc. Lond.* **1865**(3) : 775.

1866. *Polyommatus varunana* Moore, *Proc. zool. Soc. Lond.* **1865**(3) : 772.

Material Examined : Haridwar, 1 ex., 13.ix.2006 (Coll. A.K. Sidhu and party); Haridwar, Jawalapur, 2 exs., 14.ix.2006 (Coll. A.K. Sidhu and party.

46. *Chilades pandava* (Horsfield)

Common name : Plains Cupid.

1829. *Lycaena pandava* Horsfield, *Desr. Cat. Lipid. Ins.* (2) : 62.

1881. *Catochrysops pandava* Moore, *Lep. Cey.* **1** : 92.

1932. *Euchrysops pandava* Evans, *Iden. Indian Butts* (2nd ed.) : 235.

1885. *Catochrysops bengalia* de Niceville, *J. Asiat. Sic. Bengal, Pt.* II **54** : 47.

1885. *Catochrysops nicola* Swinhoe, *Proc. zool. Soc. Lond.* **1885**(1) : 132.

Chilades pandava pandava (Horsfield)

1829. *Lycaena pandava* Horsfield, *Desr. Cat. Lipid. Ins.* (2) : 62.

Material Examined : Dehradun, Mussoorie, Mossy Falls, 1 ex., 7.vi.1993; Tehri Garhwal, Kempty Falls, 1 ex., 4.vi.1993; Dehradun, Mussoorie, Aglar Valley, 1 ex., 4.vi.1992; Dehradun, Bandhal Valley, 5 exs., 9.vi.1993; (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 10.0-15.2 mm; Female : 15.5 mm.

Distribution : India, Nicobars, Andamans, East Pakistan, Burma.

Genus *Aricia* R. L.

1817. *Aricia* R.L., Janaische Allgen. Lit. Ztg, *Jena* **14**(1) : 280.

Two species a*gestis* Denis and Schiffermueller and *astorica* Tytler of the genus *Aricia* R.L. are reported from India and from Uttarakhand the former species has been collected.

47. *Aricia agestis* (Denis & Schiffermuller)

Common name : Orange-bordered Argus or Brown Argus.

1775. *Papilio agestis* Denis & Schiffermuller, *Ankundung sys. Werkes Schmett.* : 184.

1963. *Aricia agestis* Cantlie, *Lyc. Butts Revised* : 52.

1779. *Papilio astrarche* Bergstrasser, *Nom. Ins.* **3** : 4.

1818. *Lycaena eumedes* Meisner, *Natur. Anz. Allg. Schw. Gen.* **1818** : 87.

1865. *Polyommatus nazira* Moore, *Proc. zool. Soc. Lond.* **1865**(2) : 504.

1867. *Lycaena graafii* Snellen, *Vlind. Nederl. Macrolep.* : 59.

1888. *Aricia albicans* Aurivillius, *Nord. Fjaril.* : 13.

1890. *Lycaena sarmatis* Grum-Grshimailo, *In Romanoff Mem. Lep.* **4** : 393.

1910. *Aricia gallica* Oberthur, *Etud. Lep. Comp.* **4** : 252.

1919. *Lycaena sachalinensis* Matsumura, *Thous. Ins. Japan Addit.* **3** : 647.

1940. *Polyommatus heliomedon* Bryk, *Ark. Zool.* **32A**(22) : 23.

Material Examined : Chamoli, Gopeshwar, 1 ex., 10.vi.1992; Dehradun, Mussoorie, 5 exs.,75.vi.1993; Dehradun, Dhanolti, 2 exs., 8.vi.1993 (Coll. A.K. Sidhu and H.S. Rose); Nainital, Khairna, 1 ex., 25.ix.2004 (Coll. D.R. Maulik and party).

Wing expanse : Half : Male : 14.5-15.0 mm; Female : 14.5-15.0 mm.

Distribution : Himalaya, Palaearctic region, Balauchistan.

Genus *Zizula* Chapman

1910. *Zizula* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 483.

In India this genus is represented by single species *hylax*, which is also collected from Uttarakhand and treated here.

48. *Zizula hylax* (Fabricius)

Common name : Tiny Grass Blue.

1775. *Lycaena hylax* Fabricius, *Syst. Ent.* : 526.

1963. *Zizula hylax* Cantlie, *Lyc. Butts Revised* : 65.

1967. *Zizula hylax* Stempffer, *Bull. Brit. Mus. Nat. Hist. (Ent.) Suppl.* **10** : 261.

1862. *Lycaena gaika* Trimen, *Trans. Ent. Soc. Lond.* **1**(3) : 403.

1863. *Lycaena mylica* Guenee, *In Maillard Notes Ile Reunion* **2**(Lep.) : 18.

1870. *Lycaena cleodora* Walker, *Emtomologist* **5** : 54.

1884. *Lycaena perparva* Saalmuller, *Lepid. Madagascar* **1** : 93.

Material Examined : Nainital, China Peak, 1 ex., 26.iv.1992 (Coll. A.K. Sidhu and H.S. Rose); Devapryaag, 1 ex., 11.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 9.0 – 10.5 mm; Female : 9.5 mm.

Distribution : India, Andamans and Nicobars, Ceylon, Burma.

Genus *Zizina* Chapman

1910. *Zizina* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 482.

The single representative species *otis* Fabricius of the genus *Zizina* Chapman is from India and is also being reported from Uttarakhand.

49. *Zizina otis* (Fabricius)

Common name : Lesser Grass Blue

1787. *Papilio otis* Fabricius, *Syst. Mantissa Ins.* **2** : 73.

1910. *Zizina otis* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 489.

1866. *Polyommatus sangra* Moore, *Proc. zool. Soc. Lond.* **1865**(3) : 772.

1874. *Lycaena indica* Murray, *Trans Ent. Soc. Lond.* **22**(4) : 525.

1876. *Lycaena lysizone* Snellen, *Tijdschr. Ent.* **19** : 152.

1883. *Zizera oriens* Butler, *Ann. Mag. Nat. Hist.* **11**(5) : 417.

1885. *Lycaena thibetensis* Poujade, *Bull. Soc. Ent. Fr.* **4**(6) : 151.

1909. *Zizera dryina* Chapman, *Trans. Ent. Soc. Lond.* **56**(3/4) (Proc.) : 82.

Material Examined : Nainital, 2 exs., 25.iv.1992; Nainital, 1 ex., 26.iv.1992; 1ex., Nainital, 29.iv.1992; Dehradun, Rishikesh, 1 ex.,15.vi.1992; Dehradun, Dakpather, 1ex., 18.vi.1992 (Coll. A.K. Sidhu and H.S. Rose).

Wing expanse : Half : Male : 8.0 – 9.0 mm; Female : 9.0 – 10.0 mm.

Distribution : India, Andamans, Ceylon, Burma.

Genus ***Pseudozizeeria*** Beuret

1955. *Pseudozizeeria* Beuret, *Mitt. Ent. Ges. Basel, (n.f.)* **5** : 125.

This is monotypic genus containing single species *Pseudozizeeria maha* Kollar, which is reported from India and is also being treated from Uttarakhand.

50. ***Pseudozizeeria maha*** (Kollar)

Common name : Pale Grass Blue.

1844. *Lycaena maha* Kollar, *Hugel's Kaschmir* **4**(2) : 422.

1882. *Zizera maha* Moore, *Proc. zool. Soc. Lond.* **1882** : 245.

1910. *Zizeeria maha* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 484.

1955. *Pseudozizeeria maha* Beuret, *Mitt. Ent. Ges. Basel* (n.f.) **5** : 125.

1865. *Polyommatus chandala* Moore, *Proc. zool. Soc. Lond.* **1865**(2) : 504.

1865. *Lycaena diluta* Felder and Felder, *Reise Novara* (2) : 280.

1878. *Lycaena japonica* Murray, *Ent. Mon. Mag.* **11** : 170.

1878. *Polyommatus similes* Moore, *Proc. zool. Soc. Lond.* **1878**(3) : 702.

1879. *Lycaena squalida* Butler, *Trans. Ent. Soc. Lond.* **27**(1) : 4.

1882. *Lycaena alope* Fenton, *In Proc. zool. Soc. Lond.* **1881**(4) : 851.

1885. *Lycaena marginata* Poujade, *Bull. Soc. Ent. Fr.* **4**(6) : 151.

1885. *Lycaena opalina* Poujade, *Bull. Soc. Ent. Fr.* **5**(6) : 143.

1886. *Plebejus albocaeruleus* Robber, *Correspbl. Ent. Ver. Iris.* **1**(3) : 59.

1904. *Lycaena zera* Fawcett, *Proc. zool. Soc. Lond.* **1904** : 138.

1927. *Zizera saishutonis* Matsumura, *Ins. Matsumur* **1**(4) : 169.

Material Examined : Chamoli, Gopeshwar, 12exs, 10.vi.1992; Pauri Garhwal, Srinagar, 2exs, 8.vi.1992; Dehradun, Mussoorie, Aglar Valley, 1ex., 4.vi.1992; Dehradun, Rishikesh, 3 exs., 15.vi.1992; Dehradun, Bandhal Valley, 1 ex., 9.vi.1993; Dehradun, Mussoorie, 6 exs., 3.vi.1993-7.vi.1993; Dehradun, 15 exs., 8.vi.1993-9.vi.1993; Nainital, Mallital, 2 exs., 25.iv.1992; Nainital, Sattal, 1ex., 27.iv.1992; Almora, Ranikhet, 2 exs., 28.iv.1992 (Coll. A.K. Sidhu and H.S. Rose); Almora, Lulkum, 1 ex., 07.viii. 2004 (Coll. D.R. Maulik and party); Nainital , Bhawali, 1 ex., 23.ix.2004; (Coll. D.R. Maulik and party); Nainital, Khairna, 2 exs., 25.ix.2004 (Coll. D.R. Maulik and party); Bhageshwar, Wajyula, 3 exs., 28.ix.2004 (Coll. D.R. Maulik and party); Dehradun, Yamuna Bridge, 1 ex., 19.ix.2005 (Coll. A.K. Sidhu and party); Dehradun, Sahastar Dhara, 2 exs., 26.ix.2005, (Coll. A.K. Sidhu and party); Rudrapryaag, Phata, 5 exs., 10.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 12.0 – 12.5 mm; Female : 12.5 – 13.0 mm.

Distribution : Central-North India, Nepal, Pakistan, Baluchistan.

Genus ***Zizeeria*** Chapman

1910. *Zizeeria* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 480.

This genus contains two species viz., *Zizeeria karsandra* (Moore) and *Zizeeria knysna* (Trimen) and both are represented from India. The former species is being dealt with from Uttarakhand.

51. ***Zizeeria karsandra*** (Moore)

Common name : Dark Grass Blue.

1878. *Polyommatus karsandra* Moore, *Proc. Zool. Soc. Lond.* **1865**(2) : 505.

1868. *Lycaena karsandra* Felder, *Verh. Zool. Bol. Gesellsch. Wien.* **18** : 282.

1881. *Zizera karsandra* Moore, *Lep. Cey.* **1** : 78.

1910. *Zizeeria karsandra* Chapman, *Trans. Ent. Soc. Lond.* **1910** : 484.

1870. *Lampides neis* Walker, *Entomologist* **5** : 54.

1877. *Lycaena conformis* Butler, *Proc. zool. Soc. Lond.* **1877**(3) : 469.

1929. *Zizera ishigakiana* Matsumura, *Ins. Matsumur* **3**(2/3) : 109.

Material Examined : Nainital, Bhimtal, 1 ex., 27.iv.1992; Dehradun, Rishikesh, 6 exs., 15.vi.1992; Dehradun, Dakpather, 3 exs., 18.vi.1992; Dehradun, Mussoorie 10 exs., 4.vi.1993-7.vi.1993; Dehradun, Mussoorie, Aglar Valley, 1 ex., 4.vi.1992; Garwal, Srinagar, 1ex., 8.vi.1992 (Coll. A.K. Sidhu and H.S. Rose); Paurigarhwal, Srinagar, Srikot, 2 exs., 03.ix.2006 (Coll. A.K. Sidhu and party); Almora, Kosi, 1 ex., 12.x.2001 (Coll. B.C. Das and party); Dehradun, Rishikesh, 3 exs., 24.x.2007 (Coll. M. Prasad and party); Champawat, Chalthi, 1 ex., 16.ix.2004 (Coll. B. Mishra and party); New Tehri, Rani Chouri, 1 ex., 22.ix.2005 (Coll. A.K. Sidhu and party); Dehradun, Sahastardhara, 1 ex., 26.ix.2005 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male : 9.0 – 10.5 mm; Female : 9.5 – 11.5 mm.

Distribution : India, Ceylon, Burma.

Family LIBYTHEIDAE

Palpi enormously long, like a beak or snout; forewing much produced at vein M3 and falcate below; apex truncate. Termen of hindwing waved.

Genus *Libythea* Fabricius

1807. *Libythea* Fabricius, *Mag. F. Insektenk. (illiger),* **6** : 284.

This genus contains five species from India, of which two viz., *Libythea myrrha* (Godart) and *Libythea celtis* Laicharting are being deatwith from Uttarakhand.

Key to the species of the genus *Libythea* Fabricius

1. Upperside of forewing with ochreous spot in Cu1b ..... *celtis* Laicharting

2. Upperside of forewing without ochreous spot in Cu1b ..... *myrrha* (Godart)

52. *Libythea celtis* (Laicharting)

Common Name : Common Beak.

1782. *Papilio celtis* Laicharting, in Fuessly, *Arch. Insectengesch.* (Heft 2) (4) : 1, pl. 8, f. 1-3.

Material examined : Devapryaag, 1 ex., 30.ix.2002 (Coll. M. Prasad and party).

Wing expanse : Half : Male & Female : 22.5 – 25.0 mm.

Distribution : Kashmir to Assam, South India, North Burma.

53. *Libythea myrrha* (Godart)

Common Name : Club beak.

1819. *Libythea myrrha* Godart, *Encyclopédie Méthodique.* **9**(1) : 169, 171, no. 4.

Material examined : Uttarkashi, Barkot, 1 exs., 19.ix.2005, 1 ex., 21.ix.2005, 1 ex., 22.ix.2005 (Coll. A.K. Sidhu and party); Uttarkashi, Bharamkhal, 1 ex., 23.ix.2005 (Coll. A.K. Sidhu and party); Rudrapryaag, Phata, 1 ex., 06.ix.2006 (Coll. A.K. Sidhu and party); Paurigarhwal, Srinagar, 1 ex., 04.ix.2006 (Coll. A.K. Sidhu and party); Devapryaag, 1 ex., 10.ix.2006 (Coll. A.K. Sidhu and party); Tehrigarhwal, Kempty falls, 1 ex., 16.ix.2005 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male & Female: 22.5 to 27.5 mm.

Distribution : India, Ceylon.

Family ACRAEIDAE

Yellow or tawny in colour with few dark markings; wings sparsely scaled; forwings long; hindwings rounded, free from abdomen from their inner margins and not channeled to receive it.

Genus *Acraea* Fabricius

1807. *Acraea* Fabricius, *Mag. F. Insektenk. (Illiger)* **6** : 284.

This genus contains about one hunderd species from the world, of which two species viz., *Acraea violae* (Fabricius)and *Acraea issoria* (Hubner) are represented from India. Both are being dealt with from Uttarakhand.

Key to the species of the genus *Acraea* Fabricius

1. Antennae club short, abrupt .... *violae* Fabricius

- Antennae club long, gradual .... *issoria* Hubner

54. ***Acraea violae*** (Fabricius)

Common name : Tawny Coster.

1775. *Papilio violae* Fabricius, *Syst. Ent.* (3) : 460.

Material examined : Dehradun, Sahastardhara, 1 ex., 01.x.2002 (Coll. M. Prasad and party); Dehradun, Forest Research Institute, 1 ex., 16.ix.2005 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male & Female : 25.0 – 32.5 mm.

Distribution : India, Ceylon.

55. ***Acraea issoria*** (Hubner)

Common name : Yellow Coster.

1818. *Telchinia issoria* Hubner, *Zutrage z. Samml. exot. Schmett.*, **1** : 27.

Material examined : Pauri Garhwal, Srinagar, 1 ex., 04.ix.2006 (Coll. A.K. Sidhu and party); Rudrapryaag, Phata, Railgaoun, 1 ex., 06.ix.2006 (Coll. A.K. Sidhu and party); Devapryaag, 1 ex., 10.ix.2006 (Coll. A.K. Sidhu and party); Tehri Garhwal, Kempty falls, 1 ex., 16.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : Half : Male & Female : 25.0 – 35.0 mm

Distribution : Assam, Himalayas as far west upto Kullu and Burma.

SUMMARY

The studied on butterfly fauna from Uttarakhand state deals with 55 species representing 34 genera and three families viz., Lycaenidae, Libytheidae and Acraeidae. One species *Tarucus hazara* Evans is new records from India and state.

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REFRENCES

Arora, G.S., Ghosh, S.K. and Choudhary, M. 1995. Lepidoptera : Rhopalocera in Arora, G.S. & Kumar, A fauna of western Himalaya (U.P.). *Zool. Surv. India, Himalayan Ecosystem Sereis,* **1** : 61-73.

Arora, G.S. and Mandal, D.K. 1997. On scientific results of the Swiss Zoological Expedition to India. Part 1. Butterflies of Garhwal Districts (U.P. : India). *Newl. Zool. Surv. India,* **3**(4) : 229-234.

Baindur, A. 1993. The butterflies of Nanda Devi in *Scientific and Ecological Expedition Nanda Devi,* 2nd May to 22nd July, **1993** : 35-43 Army HQ, Delhi.

Barnardi, G. 1952. Lepidopteres recolted par A. Barbezat Au Cours de L'Expedition Lyonaise 1951 Au Garhwal. *Bull. Mens. Soc. Linn.,* **21**(3) : 203-206.

Bingham, C.T. 1905. *The fauna British India including Ceylon and Burma (Butterflies), Vol. I.* xviii+537 pp., 9 pls. Published by London, taylor and Francis.

Bingham, C.T. 1907. *The fauna British India including Ceylon and Burma (Butterflies), Vol. II.* viii+480 pp. Published by London, taylor and Francis.

Cantlie, K. 1962. *The Lycaenidae portion (except Arhopala Group) of Brigadier Evans' the identification of India Butterflies, 1931.* Vi+156 pp., index 12 pp., 5 pls. (Published by The Bombay natural History Society, Bombay).

De Niceville, L. 1886. *The Butterflies of India, Burmah and Ceylon,* Vol. 2, xii+ 503 pp., 15-25 pls.

De Niceville, L. 1890. *The Butterflies of India, Burmah and Ceylon,* Vol. 3, xii+ 503 pp., 26-29 pls.

Evans, W. H. 1932. *The Identification of Indian Butterflies. 2nd Edition.* 454 pp., 32 pls. (Published by The Bombay natural History Soceity, Bombay).

Lesse, H. 1952. Lepdopteres par A. Barbezat Au Cours de L. Expedition Lyonaise 1951 Au Garhwal. *Bull. Mens. Soc. Linn., Lyon,* **21**(3) : 203-206.

Mackinnon, P.W. and de Niceville, L. 1897. A list of butterflies of Mussoorie in the Western Himalayas and neighbouring region. *J. Bombay nat. Hist. Soc.* **11** : 205-221; 368-389; 585-605.

Ollenbach, O.C. 1929. Butterfly collecting grounds at Mussoorie. *J. Bombay nat. Hist. Soc.,* **34** : 836-840.

Peile, H.D. 1937. *A guide to collecting butterflies of India.* 360 pp., 15 pls. London.

Rose, H.S. and Sidhu, A.K. 1994. Lycaenid butterfly diversity of Mussoorie (Utter Pradesh) along with some comments on Wildlife (Protection) Act, 1972. *Cheetal* **33**(3-4) : 10-16.

Shull, E.M. 1958. My highest catch of butterflies species in a single day (4th June, 1957) Mussoorie, India. *Lepid. News* **11** : 167-168.

Shull, E.M. 1962. Over one hundered butterfly species caught in a single day (3rd June, 1961) at Mussoorie, India. *J. lipid. Soc.* **16**(2) : 143-145.

Stempffer, H. 1952. Lepidopteres recolted par A. Barbezat Au Cours de L'Expedition Lyonaise 1951 Au Garhwal. *Bull. Mens. Soc. Linn.,* **21** : 181-184.

Talbot, G. 1947. *The fauna of British India including Ceylon and Burma (Butterflies),* Vol. II xv+506 pp., 2 pls. (Published by London, Taylor and Francis).

Varshney, R.K. 1997. Index Rhopalocera Indica Part III. Genera of Butterflies from India and Neighbouring countries (Lepidoptera : Lycaenidae). *Oriental Insects* **31** : 83-138.

Wynter-Blyth, M.A. 1957. *Butterflies of the India Region.* Xx+523pp., 72 pls. (Published by The Bombay natural History Society, Bombay).

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 553-568.

LEPIDOPTERA : SPHINGIDAE

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INTRODUCTION

The present paper deals with the family Sphingidae from Uttarakhand. The study is based on the material collected by different survey parties of Zoological Survey of India and also the specimens available at old National Zoological Collection of Zoological Survey of India. Uttarakhand is surrounded by 14 districts, of which the present family covered 10 districts.

Altogether 41 species and subspecies of 29 genera belonging to five subfamilies are dealt with here, of which 23 species are reviewed from literature marked with asterisk(*) and from the rest 18 species, 9 species are recorded as new to this area. The systematic position have been followed after Bell & Scott (1937), Butler (1875, 1877) and Hampson (1892). The range of distribution of each species cited in the text has been collected from Bell & Scot (1937), Hampson (1892), Cotes & Swinhoe (1887) and Arora *et al.* (1977).

SYSTEMATIC LIST

Order LEPIDOPTERA
Family SPHINGIDAE
Group ASEMANOPHORAE
Subfamily ACHERONTIINAE
Genus ***Acherontia*** Laspeyres

1. *Acherontia styx styx* (Westwood)

Genus ***Herse*** Oken

2. *Herse convolvuli convolovuli* (Linnaeus)

Genus ***Dolbina*** Staudinger

*3. *Dolbina inexacta* (Walker)

Genus ***Psilogramma*** Rothschild & Jordan

4. *Psilogramma menephron menephron* (Cramer)

Subfamily AMBULICINAE
Genus ***Marumba*** Moore

5. *Marumba dyrus dyrus* (Walker)

*6. *Marumba sperchius albicans* (Butler)

Genus ***Leucophlebia*** Westwood

*7. *Leucophlebia emittens* Walker

Genus ***Clanis*** Huebner

*8. *Clanis deucalion* (Walker)

Genus ***Polyptychus*** Hubner

*9. *Polyptychus dentatus* (Cramer)

*10. *Polyptychus trilineatus trilineatus* (Moore)

Genus ***Agnosia*** Rothschild & Jordan

*11. *Agnosia orneus* (Westwood)

Genus ***Clanidopsis*** Rothschild & Jordan

12. *Clanidopsis exusta* (Butler)

Genus ***Oxyambulyx*** Rothschild & Jordan

*13. *Oxyambulyx sericeipennis sericeipennis* (Butler)

Genus ***Cypa*** Walker

*14. *Cypa pallens pallens* Jordan

Group SEMANOPHORAE
Subfamily CHAEROCAMPINAE
Genus ***Cechenena*** Rothschild & Jordan

*15. a. *Cechenena lineosa scotti* (Rothschild)
*b. *Cechenena lineosa lineosa* (Walker)

Genus ***Rhagastis*** Rothschild & Jordan

*16. *Rhagastis confusa* Rothschild & Jordan

Genus ***Celerio*** Oken

*17. *Celerio nicaea lathyrus* (Walker)

Genus ***Hippotion*** Hubner

*18. *Hippotion celerio* (Linnaeus)

19. *Hippotion boerhaviae* (Fabricius)

Genus ***Rhyncholaba*** Rothschild & Jordan

20. *Rhyncholaba acteus* (Cramer)

Genus ***Theretra*** Hubner

21. *Theretra alecto alecto* (Linnaeus)

22. *Theretra nessus* (Drury)
*23. *Theretra boisduvali* (Bugnion)
24. *Theretra clotho clotho* (Drury)
*25. *Theretra lycetus* (Cramer)
26. *Theretra oldenlandiae oldenlandiae* (Fabricius)

Genus ***Pergesa*** Walker

*27. *Pergesa elpenor rivularis* (Boisduval)

Subfamily SESIINAE
Genus ***Sataspes*** Moore

*28. *Sataspes scotti* Jordan

Genus ***Cephonodes*** Hubner

29. *Cephonodes hylas hylas* (Linnaeus)
*30. *Cephonodes picus* (Cramer)

Genus ***Haemorrhagia*** Grote & Robinson

*31. *Haemorrhagia saundersi* (Walker)

Subfamily PHILAMPELINAE
Genus ***Macroglossum*** Scopoli

32. *Macroglossum bombylans* (Boisduval)
*33. *Macroglossum belis* (Linnaeus)

Genus ***Rhopalopsyche*** Butler

34. *Rhopalopsyche nycteris nycteris* (Kollar)

Genus ***Gurelca*** Kirby

35. *Gurelca masuriensis* (Butler)

Genus ***Ampelophaga*** Bremer & Grey

36. *Ampelophaga rubiginosa fasciosa* Moore

Genus ***Nephele*** Hubner

37. a. *Nephele didyma f. didyma* (Fabricius)
b. *Nephele didyma f hespera* (Fabricius)

Genus ***Panacra*** Walker

38. *Panacra sinuata* Rothschild & Jordan
*39. *Panacra metallica anfracta* Gehlen

Genus ***Acosmeryx*** Boisduval

40. *Acosmeryx anceus subdentata* Rothschild & Jordan

SYSTEMATIC ACCOUNT

Family SPHINGIDAE
Key to Groups

First segment of palpus without patch of hairs on the inner surface near base ..... **Asemanophorae**

- First segment of palpus with a patch of short sensory hairs on the inner surface near base ..... **Semanophorae**

Group **Asemanophrae**
Key to the Subfamilies

- Terminal segment of antennae long and thin with long hairs and bristles, and forewing not sinuate ..... ACHERONTIINAE

Terminal segment of antennae variable and forewing sinuate ..... AMBULICINAE

Subfamily ACHERONTIINAE
Key to the Genera

1. Hind wings yellow ..... ***Acherontia*** Laspeyres
- Hind wing dusky, reddish brown or rufous .. 2
2. Abdomen with pink side patches ..... ***Herse*** Oken
- Abdomen without pink side patches 3
3. Thorax with a "death's head" mark ..... ***Dolbina*** Staudinger
- Thorax without "death's head" mark ..... ***Psilogramma*** Rothschild & Jordan

Genus *Acherontia* Laspeyres

1809. *Acherontia* Laspeyres, *Jen. Allg. Litt. Zit.*, **4** : 99.

Remarks : The genus is represented by two species/subspecies of which only one is dealt with here.

1. ***Acherontia styx styx*** (Westwood)

1848. *Sphix (Acherontia) styx* Westwood, *Cab. Or. Ent.*, 88, pl. 62, fig. 3.

1937. *Acherontia styx styx*, Bell & Scott, *Fauna Brit. India*, Moths, **5** : 58-60.

Diagnostic characters : Head and thorax dark blue grey with black lateral lines, which meet behind, the centre of thorax occupied a fulvous "skull-mark" with two black 'eyes'. Fore wing mottled with various shads of brown, fulvous and grey, a pale spot in the end of the cell. Hind wing yellow with a post medial black band not reaching the costa or anal angle, a similar submarginal maculate band.

Material examined : 1ex. District : Pauri Garhwal; Srinagar, 2.ix.2006; (Coll A.K. Sidhu & Party).

Wing expanse : 95 mm.

Distribution : India : Throughout India including Uttarakhand (Pauri Garhwal).

Elsewhere : Asia minor, Borneo, Celebes, China, Japan, Malaysia, Myanmar, Philippines, Sri Lanka, Timor.

Remarks : Bell & Scott (1937) reported the species from throughout India, but present record confirms its distribution specifically from Uttarakhand.

Genus ***Herse*** Oken

1815. *Herse* Oken, *Lehrb. Naturg.*, **3**(1) : 762.

Remarks : Only one Indian subspecies reported under this genus, which is dealt with here.

2. ***Herse convolvuli convolvuli*** (Linnaeus)

1758. *Sphinx convolvuli* Linnaeus, *Syst. Nat., 10thed* : 490.

1937. *Herse convolvuli convolvuli,* Bell & Scott, *Fauna Brit. India,* Moths, **5** : 61-65.

Diagnostic characters : Upperside grey. Forewing with many narrow whitish lunulate bands, which are obsolescent in some specimens; black streaks outwards from cell below vein R_1 armd M_1. Hindwing pale grey, with broad subbasal, two median and postmedian, fuscous transverse bands.

Material examined : 4 exs., District : New Tehri, Rani Chauri; 24, 28.ix.2005; (Coll A.K. Sidhu & Party).

Wing expanse : 85-110 mm.

Distribution : India : Throughout India including Uttarakhand (New Tehri)

Elsewhere : Eastern Hemisphere except the higher latitude, rarely in Siberia. It occurs very rarely in England.

Remarks : Bell & Scott (1937) reported its occurance throughout Indian subregion, the present record of the subspecies from New Tehri confirms its distribution from Uttarakhand.

Genus ***Dolbina*** Staudinger

1887. *Dolbina* Staudinger, *In Rom. Mem. Lep.*, **3** : 155.

Remarks : The genus is represented by only one Inidan species, which is dealt with here.

3. ***Dolbina inexacta*** (Walker)

1856. *Macrosila inexacta* Walker, *List Lep. Ins. Brit. Mus.*, **8** : 208.

1937. *Dolbina inexacta,* Bell & Scott, *Fauna Brit. India,* Moths, **5** : 95-98.

Diagnostic characters : Forewing with indistinct dark waved antemedian, post-median and submarginal lines, of which the median is the most strongly marked, a conspicuous white spot at end of the cell, distal margin of fore wing somewhat sinuate (almost straight in male) before angle. Hindwing brown, cilia chequered brown and white.

Material examined : Nil.

Wing expanse : 86 mm. (Bell & Scot, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. and E. Himalayas and South India.

Elsewhere : China.

Remarks : Cotes & Swinhoe (1887) reported its distribution from Mussoorie which is also mentioned by Bell & Scott (1937).

Genus ***Psilogramma*** Rothoschild & Jordan

1903. *Psilogramma* Rothoschild & Jordan, *Revision of Sphingidae* : 42.

Remarks : The genus is represented by single Indian subspecies, which is dealt with here.

4. ***Psilogramma menephron menephron*** (Cramer)

1780. *Sphinx menephron* Cramer, *Pao. Exot.*, **3** : 164, pl. 285, fig. A.

1937. *Psilogramma menephron menephron,* Bell & Scott, *Fauna Brit. India,* Moths, **5** : 77-81.

Diagnostic characters : Head, thorax, abdomen and forewing grey, dark brown bands along side of palpi. Abdomen with a blackish dorsal stripe and a broad grey stripe on each side of it, brown subdorsal segmental patch. Forewing with some dark striage from the costa, two dark strigae in the interspace below vein Cula and Culb, a dark striage from the costa below apex, a series of whitish submarginal lunules, cilia chequered black and white. Hindwing brown, with a black patch at anal angle, and more or less suffused with grey.

Material examined : 1 ex., District : Haridwar; 14.ix.2006; (Coll A.K. Sidhu and Party).

Wing expanse : 82 mm.

Distribution : India : Uttarakhand (Haridwar, Mussoorie); throughout India E. Himalayas (Khasi Hills); South India.

Elsewhere : China and eastwards to the Solomon Islands.

Remarks : Cotes & Swinhoe reported the species from Mussoorie, the present record confirm its distribution from the Uttarakhand.

Subfamily AMBULICINAE

Key to the Genera

1. Mid tibia with spines 2
- Mid tibia wihtout spines 5
2. Hind tibia with two pairs of spurs 3
- Hind tibia with one pair of spurs ..... ***Marumba*** Moore
3. Forewing with a broad maize-yellow streak from base to apex ..... ***Leucophlebia*** Westwood
- Forewing without such streak 4
4. Joint of palpus not open, forewing upperside with cinnamon brown to red brown ..... ***Clanis*** Hubner
- Joint of palpus open, forewing grey with oblique lines ..... ***Polyptychus*** Hubner
5. Hind tibia with one pair of spurs ..... ***Agnosia*** Rothschild & Jordan
- Hind tibia with two pairs of spurs 6
6. Tarsal claws without pulvillus ..... ***Clanidopsis*** Rothschild & Jordan
- Tarsal claws with pulvillus 7
7. Spurs very short ..... ***Cypa*** Walker
- Spurs very long ..... ***Oxyambulyx*** Rothschild & Jordan

Genus ***Marumba*** Moore

1882. *Marumba* Moore, *Lep. Ceylon*, **2** : 8.

Remarks : The genus is represented by eleven Indian species of which two species are dealt with here.

Key to the Species

Antennae of male not so heavy, one third length of the forewing, a little shorter in female ..... *dyras* (Walker)

- Antennae of male very heavy, two fifths length of the forewing, slightly compressed in female ..... *sperchius albicans* (Butler)

5. ***Marumba dyras dyras*** (Walker)

1856. *Smerinthus dyras* Walker, *List Lep. Ins. Brit. Mus.*, **7** : 250.

1937. *Marumba dyras dyras*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 179-182.

Material examined : 1 ex., District : Pauri Garhwal, Srinagar, 2.ix.2006; 1 ex., District : Rudraprayag, Phata, 5.ix.2006 (Coll. A.K. Sidhu and party).

Wing expanse : 92-112 mm.

Distribution : India : Uttarakhand (Mussoorie, Pauri Garhwal, Rudraprayag); W. and E. Himalayas, South India; Andamans Islands.

Elsewhere : Sri Lanka.

Remarks : Butler (1875), reported this species as *Triptogon masuriensis* from Mussoorie, and present record from Pauri Garhwal and Rudraprayag confirms its distribution from Uttarakhand.

6. ***Marumba sperchius albicans*** (Butler)

1875. *Triptogon albicans* Butler, *Proc. Zool. Soc. London*, : 254.

1937. *Marumba sperchius albicans*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 185.

Material examined : Nil.

Wing expanse : Male : 106-120 mm; female : 121-144 mm. (Bell & Scott, 1937)

Distribution : India : Uttarakhand (Mussoorie), Western Himalayas.

Remarks : Cotes & Swinhoe (1887) and Butler, (1875) reported the subspecies from Mussoorie as *Triptogon albicans* (Butler).

Genus ***Leucophlebia*** Westwood

1848. *Leucophlebia* Westwood, *Cab. Or. Ent.*, : 46.

Remarks : The genus is represented by two Indian species of which one is dealt with here.

7. *Leucophlebia emittens* Walker

1866. *Leucophlebia emittens* Walker, *List. Lep. Ins. Brit. Mus.*, **35** : 1858.

1937. *Leucophlebia emittens*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 159-160.

Diagnostic characters : Palpi and frons pink. Forewing with the yellow streak broader and extending below the cell, vein M_1 and R_1 yellow. Outer margin of hind wing narrowly pink, thorax with a narrow tawny streak on vertex.

Material examined : Nil.

Wing expanse : Male : 50-56 mm; female : 60 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Almora), Western Himalayas, South India.

Elsewhere : Myanmar.

Remarks : Cotes & Swinhoe (1887) and Butler (1875) reported this species from Almora as *Leucophlebia bicolor.*

Genus *Clanis* Huebner

1822. *Clanis* Huebner, *Verz. Bek. Schmett.*, : 138.

Remarks : The genus is represented by five Indian species/subspecies of which one species is dealt with here.

8. *Clanis deucalion* (Walker)

1856. *Basiana deucalion* Walker, *List. Lep. Insects., Brit. Mus.*, **8** : 237.

1937. *Clanis deucalion*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 149-150.

Diagnostic characters : Forewing elongate, upperside with three sharply marked dentate lines on disc, equi-distant from other and from cell and the post-discal, indistinct line which begins at the apical patch; underside of forewing with a black streak. Hindwing with a black patch. Hind tibia white, as long as first tarsal segment, terminal pair of spurs unequal.

Material examined : Nil.

Wing expanse : Male : 104-116 mm; female : 124 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); Meghalaya W. and Himalayas.

Remarks : Bell and Scott (1937), bred the specimen at Mussoorie.

Genus *Polyptychus* Huebner

1822. *Polyptychus* Huebner, *Verz. Bek. Schmett.*, : 141.

Remarks : The genus is represented by six Indian spcies of which two species/subspecies are dealt with here.

Key to the Species

Postdiscal line of forewing straight .... *dentatus* (Cramer)

- Postdiscal line of forewing curved distad behind R2..... *trilineatus* (Moore)

9. *Polyptychus dentatus* (Cramer)

1777. *Sphinx dentatus* Cramer, *Pap. Exot.*, **2** : 42, pl. cxxxv, fig. G.

1937. *Polyptychus dentatus*, Bell & Scott, *Fauna Brit. India. Moths*, **5** : 169-172.

Material examined : Nil.

Wing expanse : Male : 92-108; mm; female : 116-120 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); S. India, and as far as the Allahabad.

Elsewhere : China, Sri Lanka, and United States.

Remarks : Cotes and Swinhoe (1887) reported the species from Mussoorie.

10. *Polyptychus trilineatus trilineatus* Moore

1888. *Polyptychus trilineatus* Moore, *Proc. zool. Soc. London* : 390.

1937. *Polyptychus trilineatus trilineatus*, Bell & Scott, *Fauna Brit. India, moths*, **5** : 167-168.

Material examined : Nil.

Wing expanse : Male : 74-102 mm; female : 90112 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Dehradun); W. Himalayas.

Remarks : Bell and Scott (1937) reported the subspecies from Dehradun.

Genus *Agnosia* Rothschild & Jordan

1903. *Agnosia* Rothschild & Jordan, *Revision of Sphingidae*, : 294.

Remarks : The genus is represented by two Indian species of which one is dealt with here.

11. ***Agnosia orneus*** (Westwood)

1848. *Sphinx orneus* Westwood, *Cab. Or. Ent.*, 13, pl. xvi, fig. 2.

1937. *Agnosia orneus*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 210-212.

Diagnostic characters : Head, thorax, abdomen and forewing reddish-ochraceous. Forewing with broad grayish-ante and post median bands, a greyish band along inner margin with some strigae on it, a dark speck at the end of cell. Hindwing pink, a greyish patch at the anal angle with dark streaks on it. Fore tibia terminated by a strong curved, horny spine.

Material examined : Nil.

Wing expanse : Male : 60-74 mm. female : 66-87 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Almora); W. Himalyas and S. India.

Elsewhere : Sri Lanka.

Remarks : Butler (1881), Cotes and Swinhoe (1887) reported this species from Almora, and Hampson (1892) also mentioned its distribution from Almora.

Genus ***Clanidopsis*** Rothschild & Jordan

1903. *Clanidopsis* Rothschild & Jordan, *Revision of Sphingidae*, : 294.

Remarks : Only on Indian species reported under this genus, which is dealt with here.

12. ***Clanidopsis exusta*** (Butler)

1875. *Basiana exusta* Butler, *Proc. zool. Soc. London*, : 252.

1937. *Clanidopsis exusta*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 207-209.

Diagnostic characters : Upperside reddish-brown, dorsum of thorax dark brown. Forewing with a pale, irregular, indistinct submarginal band. Hindwing with two indistinct post-median and prominent submarginal and marginal dark lines. Mid and hind tibia are greyish-white on upperside.

Material examined : 1ex., District : Pauri Garhwal, Srinagar, 3.ix.2006; (Coll. A.K. Sidhu and party).

Wing expanse : 79mm.

Distribution : India : Uttarakhand (Pauri Garhwal; Mussoorie); W. Himalayas.

Remarks : This species is first time recorded from Uttarakhand.

Genus ***Oxyambulyx*** Rothschild & Jordan

1903. *Oxyambulys* Rothschild & Jordan, *Revision of Sphingidae*, : 192.

Remarks : The genus is represented by fifteen Indian species/subspecies of which one subspecies is dealt with here.

13. ***Oxyambulys sericeipennis sericeipennis*** (Butler)

1875. *Ambulyx sericeipennis* Butler, *Proc. zool. Soc. London*, : 252.

1937. *Oxyambulyx sericeipennis sericeipennis*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 115-117.

Diagnostic characters : Upperside grey. Forewing with one sub-basal spot behind cell and a sub-basal costal spot, outer margin proportionately longer. Abdomen of male with patch on eighth tergite, a distinct mesial line on both sexes. Underside deep chrome.

Material examined : Nil.

Wing expanse : Male : 100-124 mm.; female : 110-124 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); W. Himalayas.

Remarks : Bell and Scott (1937) bred the species at Mussoorie at an elevation of about 6000 ft. the larva feeding on *Juglans regia* (Linn.) (Walnut); and Cotes and Swinhoe reported the species from Mussoorie.

Genus ***Cypa*** Walker

1864. *Cypa* Walker, *List. Lep. Insects., Brit. Mus.*, **31** : 41.

Remarks : Four Indian species/subspecies reported under this genus of which one subspecies is dealt with here.

14. ***Cypa pallens pallens*** Jordan

1962. *Cypa pallens pallens* Jordan, *Novitates Zoologicae*, **33** : 380.

1937. *Cypa pallens pallens*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 219-220.

Diagnostic characters : Second segment of palpus short. Upperside pale clay colour to cinnamon, hindwing tawny and distal margin of forewing dentate.

Material examined : Nil.

Wing expanse : Female : 34 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. Himalayas.

Remarks : Bell & Scott (1937) reported the species from Mussoorie.

Group **Semanophorae**

Key to the Subfamilies

1. Pilifer normal 2
   - Pilifer consisting of a terminal part with short bristle and proximal part with long bristle .... CHAEROCAMPINAE
2. Abdomen with tenth segment mesially divided ..... SESIINAE
   - Abdomen with the tenth segment not mesially divided ..... PHILAMPELINAE

Subfamily CHAEROCAMPINAE

Key to the Genera

1. Base of tongue exposed, second segment of palpi not contiguous 2
   - Base of tongue not exposed, second segment of palpi contiguous 3
2. Second segment of palpus obviously narrower in side view than first, more or less narrowing apically, inner surface naked .... ***Cechenena*** Rothschild & Jordan
   - Second segment of palpus not narrower than first, not narrowing towards end .... ***Rhagastis*** Rothschild & Jordan
3. Scaling at apex of first segment palpus, on inner side dense and regular 4
   - Scaling at apex of first segment of palpus on inner side not dense, irregular 6
4. Second segment of palpus, on inner side with apical tuft of scales directed proximal and ventrad 5
   - No such tuft ..... ***Hippotion*** Hubner
5. Scaling of first segment of palpus on outer side longest just below the apical cavity .... ***Rhyncholaba*** Rothschild & Jordan
   - Scaling longest proximally .... ***Theretra*** Huebner
6. Palpus rough, with long dispersed hairs .... ***Pergesa*** Huebner
   - Palpus without these hairs, or with very few ..... ***Celerio*** Oken

Genus ***Cechenena*** Rothschild & Jordan

1903. *Cechenena* Rothschild & Jordan, *Revision of Sphingidae*, : 799.

Remarks : Six Indian species and subspecies reported under this genus of which two subspecies are dealt with here.

Key to the Species

Forewing pinkish buff-grey, basal half below stigma rosy-pink, the median lines heavy, the others faint and ill defined; Hindwing basal half irregularly black and rest of the wing pale pinkish buff suffused with black .... *lineosa scotti* Rothschild

- Forewing green with eight lines in outer half; Hindwing black with pale submarginal band ..... *lineosa lineosa* (Walker)

15.a. ***Cechenena lineosa scotti*** Rothschild

1920. *Cechenena scotti* Rothschild, *Ann. Mag. Nat. Hist.*, (9)V : 481.

1937. *Cechenena lineosa scotti*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 489.

Material examined : Nil.

Wing expanse : Male : 74-96 mm.; female : 108 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); W. Himalayas (Dharmsala, Shimla).

Remarks : Bell & Scott (1937) reported the subspecies from Mussoorie.

15.b. ***Cechenena lineosa lineosa*** (Walker)

1856. *Chaerocampa lineosa* Walker, *List Lep. Insects., Brit. Mus.*, **7** : 144.

1937. *Cechenena lineosa lineosa*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 490-492.

Material examined : Nil.

Wing expanse : Male & female : 94-120 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); E. Himalayas (Sikkim, Khasi Hills).

Elsewhere : Bhutan, Malaya and South China.

Remarks : Hampson (1892) reported the subspecies from Mussoorie.

Genus ***Rhagastis*** Rothschild & Jordan

1903. *Rhogastis* Rothschild & Jordan, *Revision of Sphingidae*, : 791.

Remarks : Nine Indian species and subspecies reported under this genus of which one species is dealt with here.

16. ***Rhagastis confusa*** Rothschild & Jordan

1903. *Rhagastis confusa* Rothschild & Jordan, *Revision of Sphingidae*, : 795, pl. xiv, fig. 12.

1937. *Rhagastis confusa*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 473-474.

Diagnostic characters : Head and thorax brown with a sharply defined whitish-pink lateral band, which is shaded with brown near base of forewing. Metanotum with indistinct black mesial dot. Forewing dark buff, costal margin pale, fringe of hind margin white in middle, contiguous with the pinkish-white longitudinal line. Hindwing pale with broad pinkish band. External row of spines of first protarsal segment double only at base.

Material examined : Nil.

Wing expanse : Male : 84 mm., female : 90 mm. (Bell & Scott, 1937)

Distribution : India : Uttarakhand (Mussoorie); W. and E. Himalayas (Sikkim, Assam, Khasi Hills).

Remarks : Bell & Scott (1937) reported the species from Mussoorie.

Genus ***Celerio*** Oken

1815. *Celerio* Oken, *Lehrb. Naturg.*, **3**(1) : 761.

Remarks : The genus is represented by five Indian subspecies of which only one is dealt with here.

17. ***Celerio nicaea lathyrus*** (Walker)

1856. *Deilephila lathyrus* Walker, *List Lep. Insects., Brit. Mus.*, **8** : 172.

1937. *Celerio nicaea lathyrus*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 408.

Diagnostic characters : Forewing with postmedian band which is speckled with brown. Pulvillus present under surface of legs nearly as pale as upper surface, first protarsal segment with external spines not prolonged, the row doubled and trebled at base. Spines of comb of mid-tarsus little prolonged.

Material examined : Nil.

Wing expanse : Male : 72-78 mm., female : 90 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Nainital); W. Himalayas.

Remarks : Hampson (1892) and Bell & Scott (1937) reported the subspecies from Nainital.

Genus ***Hippotion*** Hubner

1822. *Hippotion* Hubner, *Verz. Bek. Schmett.*, : 134.

Remarks : Five Indian species reported under this genus of which two are dealt with here.

Key to the Species

Hind wing with base and anal angle bright pink, disc blackish, outer area ochreous-brown with a black sub-marginal line, veins black.. ..... *celerio* (Linnaeus)

- Hind wing red, base not black .... *boerhaviae* (Fabricius)

18. ***Hippotion celerio*** (Linnaeus)

1758. *Sphinx celerio* Linnaeus, *Syst. Nat. ed.*, **10** : 491.

1937. *Hippotion celerio*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 417-420.

1977. *Hippotion celerio*, Aroraetal *News Letter, Zoological Survey of India*, **3** : 389.

Material examined : Nil.

Wing expanse : 60-80 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Garhwal). The whole of India, W. and E. Himalayas, S. India.

Eleshwere : Africa, Australia, Borneo, Europte, Fiji, Java, Sri Lanka, and Timor. It occurs rarely In England.

Remarks : Arora *et al.* (1977) reported the species from Garhwal.

19. ***Hippotion boerhaviae*** (Fabricius)

1775. *Sphinx boerbaviae* Fabricius, *Syst. Ent.* : 542.

1937. *Hippotion boerhaviae,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 424-427.

Material examined : 1ex. District : Tehri Garhwal, Devaprayag, 10.ix.2006 (Coll A.K. Sidhu & Partys).

Wing expanse : 54 mm.

Distribution : India : Uttarakhand (Tehri Garhwal); W. and E. Himalayas, South India.

Eleshwere : Sri Lanka, to China, Malaya and the Philippines.

Remarks : The species is first time recorded from Uttarakhand.

Genus ***Rhyncholaba*** Rothschild & Jordan

1903. *Rhyncholaba* Rothschild & Jordan, *Revision of Sphingidae,* : 789.

Remarks : Only one Indian species reported under this genus, which is dealt with here.

20. ***Rhyncholaba acteus*** (Cramer)

1779. *Sphinx acteus* Cramer, *Pap. Exot.,* iii : 93, pl. cclviii, fig. A.

1937. *Rhyncholaba acteus,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 462-465.

Diagnostic characters : Forewing purplish-grey, a green oblique central area from below apex to inner margin with some indistinct line on it, an irregular dark outer area with some yellow inside it. Hindwing fuscous with an anal patch and submarginal band ochraceous.

Material examined : 1ex., District : Dehradun, Mussoorie, Camply falls; 16.ix.2006, (Coll. A.K. Sidhu and Party).

Wing expanse : 78mm.

Distribution : India : Uttarakhand (Dehradun); W. and E. Himalayas, South India.

Eleswhere : Myanmar to the Moluccas and South China, Sri Lanka.

Remarks : The species is recorded aa new to this area.

Genus ***Theretra*** Huebner

1822. *Theretra* Huebner, *Verz. Bek. Schmett.,* : 135 (part.).

Remarks : The genus is represented by fifteen Indian species and subspecies of which six species/subspecies are dealt with here.

Key to the Species

1. Hind wing red ..... *alecto* (Linnaeus)
- Hind wing not red 2
2. Thorax and abdomen green, sides of the abdomen golden. Fore wing costa green; Size large ..... *nessus* (Drury)
- Thorax, abdomen and forewing not green; Size not so large 3
3. Abdomen with black side patches on first segment 4
- Abdomen without black side patches 5
4. Fore wing with six lines, abdomen with five dorsal lines ..... *boisduvali* (Bugnion)
- Fore wing with only one distinct line, abdomen without dorsal lines ..... *clotho* (Drury)
5. Head, thorax and abdomen olive brown. Fore wing pale brown with pink tinge, hindwing fuscous ..... *lycetus* (Cramer)
- Head and thorax brown, abdomen greyish brown. Forewing greyish brown without pink tinge, hindwing dusky .... *oldenlandiae* (Fabricius)

21. ***Theretra alecto alecto*** (Linnaeus)

1758. *Sphinx alecto* Linnaeus, *Syst. Nat. ed.,* **10** : 492.

1937. *Theretra alecto alecto,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 440-443.

Material examined : 1 ex., District : Uttarkashi, Barkot, 20.ix.2005; 1ex., District : Pauri Garhwal, Srinagar, 4.ix.2006; 1 ex., District : Haridwar, 13.ix.2006 (Coll. A. K. Sidhu).

Wing expanse : 87-92 mm.

Distribution : India : Uttarakhand (Haridwar, Pauri Garhwal, Uttarkashi); W. and E. Himalayas.

Eleshwere : Myanmar, northward to Formosa, Eastward to the Key Islands.

Remarks : The species is first time recorded from Uttarakhand.

22. *Theretra nessus* (Drury)

1773. *Sphinx nessus* Drury, *Illustr. Exot. Ins.*, **2** : 46, pl. 1xxvi, fig. 1 and index.

1937. *Theretra nessus*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 430-443.

Material examined : 1 ex., District : Bageswar, Rakhauli, 27.ix.2003 (Coll. B. Mitra) 3 exs., District : Rudraprayag, Phata, 09.ix.2006; (A.K. Sidhu and Party).

Wing expanse : 116-123 mm.

Distribution : India : Uttarakhand (Bageshwar, Rudraprayag); W. and E. Himalayas, S. India.

Elsewhere : Myanmar, Sri Lanka to Japan, Malaya, Papussia and Australia.

Remarks : The species is first time recorded from Uttarakhand.

23. *Theretra boisduvali* (Bugnion)

1839. *Sphinx boisduvali* Bugnion, *Ann. soc. ent. France*, **8** : 115.

1937. *Theretra boisduvali*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 433-443.

Material examined : Nil.

Wing expanse : Male : 84-108mm; female : 98-108 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); E. Himalayas (Sikkim; Khasi Hills).

Elsewhere : Sri Lanka, westwards to Asia Minor and Turkey and eastward to Malaya.

Remarks : Cotes & Swinhoe (1887) reported the species from Mussoorie.

24. *Theretra clotho clotho* (Drury)

1773. *Sphinx clotho* Drury, *Illustr. Exot. Ins.*, **2** : 48, pl.xxviii, fig. 1.

1937. *Theretra clotho clotho*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 434-437.

Material examined : 1 ex., District : Nainital, Kahalquira Bhowali; 11.x.1974 (Coll. P.K. Maiti & Party); 1 ex., District : Dehradun, Narendranagar Forest Rest House, 28.x.2005; (Coll. A.K. Sidhu and Party).

Wing expanse : 90 mm.

Distribution : India : Uttarakhand (Dehradun and Nainital); W. and E. Himalayas, South India, Andaman Islands.

Elsewhere : China, Malaya, Myanmar, Philippines, Sri Lanka.

Remarks : Cotes & Swinhoe (1887) reported the species from Mussoorie.

25. *Theretra lycetus* (Cramer)

1775. *Sphinx lycetus* Cramer, *Pap. Exot.*, **1** : 96, pl. 61D.

1937. *Theretra lycetus*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 445-448.

Material examined : Nil.

Wing expanse : Male : 90-74 mm., female : 70-76 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); W. and E. Himalayas, South India.

Elsewhere : Myanmar, Sri Lanka, eastwards to Java.

Remarks : Hampson (1887) reported the species from Mussoorie.

26. *Theretra oldenlandiae oldenlandiae* (Fabricius)

1775. *Sphinx oldenlandae* Fabricius, *Syst. Ent.*, : 542.

1937. *Theretra oldenlandae oldenlandae*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 448-451.

Material examined : 1ex., District : Pauri Garhwal, Srinagar, 03.ix.2006; 1ex., District : Haridwar, 13.ix.2006 (Coll. A.K. Sidhu and Party).

Wing expanse : 56-69 mm.

Distribution : India : Uttarakhand (Haridwar, Pauri Garhwal); W. and E. Himalayas, South India.

Elsewhere : Sri Lanka, Maynmar, to Japan and New Guinea.

Remarks : This subspecies is first time recorded from Uttarakhand.

Genus *Pergesa* Walker

1856. *Pergesa* Walker, *List Lep. Insects., Brit. Mus.*, **8** : 149.

Remarks : Two Indian subspecies reported under this genus of which one is dealt with here.

27. *Pergesa elpenor rivularis* (Boisduval)

1875. *Chaerocampa rivularis* Boisduval, *Spec. Gen. Lep. Het.*, **1** : 280.

1937. *Pergesa elpenor rivularis*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 410-411.

Diagnostic characters : Head and thorax bronze green; antennae, and side of palpus pink; abdomen crimson with a broad bronze green subdorsal stripe with a pink and black lateral side patches. Forewing bronze green with pink bands, which is shaded over with cinnamon; hindwing basal half black, distal half rosy red.

Material examined : Nil.

Wing expanse : 66-82 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie); W. and E. Himalayas, (Chitral to Sikkim, Shimla).

Eleswhere : Karachi.

Remarks : Bell & Scott (1937) bred the subspecies at Mussoorie.

Subfamily SESIINAE

Key to the Genera

1. Wings hyaline; forewing less than twice length of antennae. Antennae strongly clubbed in both sexes 2
- Wings not hyaline. Forewing more than twice length of antennae. Antennae not clubbed in male but in female slightly clubbed ..... ***Sataspes*** Moore
2. Forewing vein M_1 given off after end of cell, hindwing vein Cula and M_3 and M_1 and Rs stalked ..... ***Cephonodes*** Huebner
- Forewing vein M_1 from end of cell, hindwing vein Cula and M_3 and M_1 and Rs from end of cell ..... ***Haemorrhagia*** Grote & Robinson

Genus ***Sataspes*** Moore

1857. *Sataspes* Moore, In Hersf. & Moore, *Cat. Lep. Insects., Mus. E.I.C.*, **1** : 261.

Remarks : Three Indian species reported under this genus of which one is dealt with here.

28. ***Sataspes scotti*** Jordan

1926. *Sataspes scotti* Jordan, *Novitates Zoologicae*, **33** : 381, fig. 5.

1937. *Sataspes scotti*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 257-258.

Diagnostic characters : Male : Body drab-grey. Forewing elongate, distal margin short and convex, colour drab-grey like that of thorax, termen dark hair-brown, this border about 1.5 mm. broad at tornus, gradually becoming broader and at costal margin from vein R1 suddenly being produced basad to middle, the grey area transversed by an obscure broad subbasal band, beyond one-fourth by a straight line, and in middle of wing by another somewhat broader line, which begins at middle of costa and ends a little beyond middle of hind margin, these lines the same colour as the terminal band. Hindwing like termen of fore wing, shaded with drab-grey from base to disc and anal angle, costal area (concealed) creamy, behind it some what hairs.

Material examined : Nil.

Wing expanse : Male : 48 mm.; female : 62 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Dehradun); W. Himalayas.

Remarks : Bell & Scott (1937) reported the species from Dehradun.

Genus ***Cephonodes*** Hubner

1822. *Cephonodes* Hubner, *Verz. Bek. Schmett.*, : 131.

Remarks : Two Indian subspecies reported under this genus, both are dealt with here.

Key to the Species

Fore tibia without an apical thorn ..... *hylas* (Linnaeus)

- Fore tibia ending in a prominent thorn ..... *picus* (Cramer)

29. ***Cephonedes hylas hylas*** (Linnaeus)

1771. *Sphinx hylas* Linnaeus, *Mant. Plant.*, : 539.

1937. *Cephonedes hylas hylas*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 247-250.

Material examined : 3exs., District : Bageshwar; Hardwarsina, Kausani, Baijnath Kausani; 27, 28, 30.ix.2004; (Coll. M. Ghosh and Party).

Wing expanse : 52-68mm.

Distribution : Throughout India Including : Uttarakhand (Bageshwar).

Eleshwere : Myanmar and Sri Lanka, Eastward to China and Japan.

Remarks : Bell & Scott (1937) reported the subspecies throughout Indian subregion and present record confirms its distribution from Uttarakhand.

30. ***Cephonedes picus*** (Cramer)

1777. *Sphinx picus* Cramer, *Pap. Exot.*, **2** : 38, pl. cxlviii, fig. B.

1937. *Cephonedes picus*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 250-251.

Material examined : Nil.

Wing expanse : Male : 50-66 mm.; female : 70 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. Himalayas, S. India.

Eleshwere : Sri Lanka eastwards to the Marshall Islands.

Remarks : Bell & Scott (1937) bred and reported the species from Mussoorie.

Genus ***Haemorrhagia*** Grote & Robinson

1865. *Haemorrhagia* Grote & Robinson, *Proc. Ent. Soc. Philad.*, : 149, 173.

Remarks : Three Indian species and subspecies reported under this genus of which one species is dealt with here.

31. ***Haemorrhagia saundersi*** (Walker)

1856. *Sesia saundersi* Walker, *List. Lep. Ins. Brit. Mus.*, **8** : 83.

1937. *Haemorrhagia saundersi*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 243-244.

Diagnostic characters : Upperside of head, body and abdomen olive-green, normally scaled, fourth and fifth abdominal tergites brownish-red and a mesial patch of the same on sixth tergite. Forewing hyaline with a dark-red marginal band about half as wide between M_1 and M_2 as this cellule is broad at margin, cell without scaled fold, discocellular not black. Hindwing without red border.

Material examined : Nil.

Wing expanse : Male : 50 mm.; female : 60 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Kumaon and Mussoorie); W. Himalayas, Gurais valley, Kashmir to Cochin.

Elsewhere : China.

Remarks : Cotes & Swinhoe (1887) reported the species from Mussoorie and Bell & Scott (1937) mentioned its distribution from Mussoorie.

Subfamily PHILAMPELINAE

Key to the Genera

1. Spines of first row of abdominal tergites not longer than broad 2
- Spines of first row of abdominal tergites longer than broad 3
2. Antennae gradually thickening to club .... ***Macroglossum*** Scopoli
- Antennae abruptly thickening to club .... ***Rhopalopsyche*** Butler
3. Fore tibia spinose ..... ***Gurelca*** Kirby
- Fore tibia simple 4
4. End segment of antennae elongate, more or less long, and filliform 5
- End segment of antennae short .... ***Ampelophaga*** Bremer & Grey
5. Mid and hind tibial spurs short with comb of bristles ..... ***Nephele*** Huebner
- Mid and hind tibial spurs short, without comb of bristles 6
6. End segment of antenna not scaled, with a number of very long bristles .... ***Panacra*** Walker
- End segment of antenna scaled .... ***Acosmeryx*** Boisduval

Genus ***Macroglossum*** Scopoli

1777. *Macroglossum* Scopoli, *Intr. Hist. Nat.*, : 414.

Remarks : Twenty eight Indian species and subspecies reported under this genus of which two species are dealt with here.

Key to the Species

Hind wing upperside with yellow band, underside greyish-white at base .... *bombylans* (Boisduval)

- Hind wing upperside with cadmium-yellow median band, basal and distal border blackish brown ..... *belis* (Linnaeus)

32. ***Macroglossum bombylans*** (Boisduval)

1875. *Macroglossa bombylans* Boisduval, *Spec. Gen. Lep. Het.*, **1** : 334.

1937. *Macroglossum bombylans*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 353-35.

Material examined : 1ex., District : Bageshwar, Baijnath Kausani; 27.ix.2004; (Coll. M. Ghosh and Party).

Wing expanse : 45 mm.

Distribution : India : Uttarakhand (Bageshwar, Dehradun), W. and E. Himalayas.

Elsewhere : China, Japan.

Remarks : Cotes & Swinhoe (1887) reported the species from Dehradun and Bell & Scott (1937) bred the species in Dehradun, and the present record confirms its distribution from Uttarakhand.

33. ***Macroglossum belis*** (Linnaeus)

1758. *Sphinx belis* Linnaeus, *Syst. Nat. ed.*, **10** : 493.

1937. *Macroglossum belis*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 365-36.

Material examined : Nil.

Wing expanse : 50-60 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Dehradun), W. Himalayas, S. India.

Elsewhere : Sri Lanka to China and Japan.

Remarks : Bell & Scott (1937) bred the species at Dehradun up to about 3,000 feet elevation.

Genus ***Rhopalopsyche*** Butler

1875. *Rhopalopsyche* Butler, *Proc. Zool. Soc. London*, : 239.

Remarks : The genus is represented by only one Indian subspecies which is dealt with here.

34. ***Rhopalopsyche nycteris nycteris*** (Kollar)

1848. *Macroglossa nycteris* Kollar, *In Hugel Kashmir und. das. Reich der. siek.*, **4** : 458, pl. xix, fig. 5.

1937. *Rhopalopsyche nycteris nycteris*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 394-396.

Diagnostic character : Head, thorax and abdomen greyish brown, abdomen with maize-yellow side patches on the first three segments, the penultimate segments fringed with white, four lateral tufts increasing in size posteriorly, anal tufts black. Forewing greyish-brown, some basal indistinct lines, an antemedian band recurved towards base at inner margin. Hindwing blackish brown with broad, maize-yellow band.

Material examined : 1ex., District : Nainital (Khairna, 38 km. away from Ranikhet); 25.ix.2004; (Coll. D. R. Maulik and Party).

Wing expanse : 38 mm.

Distribution : India : Uttarakhand (Nainital), W. and E. Himalayas.

Elsewhere : China and Myanmar.

Remarks : This species is first time recorded from Uttarakhand.

Genus ***Gurelca*** Kirby

1880. *Gurelca* Kirby, *Proc. Roy. Dublin Soc.*, (2)**ii** : 330.

Remarks : Four Indian species and subspecies reported under this genus of which one species is dealt with here.

35. ***Gurelca masuriensis*** (Butler)

1875. *Liphura masuriensis* Butler, *Proc. Zool. Soc. London*, : 244, pl. xxxvi, fig. 3.

1937. *Gurelca masuriensis*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 334-335.

Diagnostic character : Upperside grey, anal lobe of forewing short, the hind margin of fore wing deeply excised. Black border of hindwing narrowing behind, not sharply defined on inner side, diffused on the disc, the yellow area paler, particularly on underside, the outer half of the hind wing dark brown.

Material examined : Nil.

Wing expanse : Male : 42-82 mm.; female : 50 mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. Himalayas.

Remarks : Hampson (1892) reported the species from Mussoorie which is mentioned by Bell & Scott (1937).

Genus ***Ampelophaga*** Bremer & Grey

1852. *Ampelophaga* Bremer & Grey, *In Motsch. Et. Ent.*, **1** : 61.

Remarks : Five Indian species and subspecies reported under this genus of which one subspecies is dealt with here.

36. ***Ampelophaga rubiginosa fasciosa*** Moore

1888. *Ampelophaga fasciosa* Moore, *Proc. Zool. Soc. London*, : 39.

1937. *Ampelophaga rubiginosa fasciosa*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 280-282.

Diagnostic character : Antenna whitish, scaling of tip blackish at anterior side, head thorax and abdomen ruddy olive-brown, a white dorsal stripe from behind head to tip of abdomen. Forewing olive-brown with an indistinct basal band, a subbasal line, an antemedian band, an abbreviated discocellular band followed by a broad discal one, a discal line, usually dentate, and oblique apical line, more or less indistinctly continued in zigzag form to hind margin, interspaces greyish, all these lines and bands very indistinct, distal margin area glossy, a triangular patch on costa before apex. Hindwing fuscous, cilia nearly white. Underside salmon-buff or clayish, each wing with two faint transverse lines. No comb to mid-and hind tarsus. R_2 and R_3 of hind wing much further apart than R_3 and M_1.

Material examined : Nil.

Wing expanse : Male : 90mm.; female : 100mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. Himalayas, (Shimla, Kulu, Dharmsala and Bukleh).

Remarks : Bell & Scott (1937) bred the subspecies at Mussoorie at an elevation of 7,000 feet.

Genus ***Nephele*** Hubner

1822. *Nephele* Hubner, *Verz. Bek. Schmett.*, : 133.

Remarks : Only one Indian species occurring in two forms, both forms are dealt with here.

Key to the Forms

Fore wing with two silvery spots .... *didyma f. didyma* (Fabricius)

- Fore wing without silvery spots .... *didyma f. hespera* (Fabricius)

37.a. ***Nephele didyma f. didyma*** (Fabricius)

1775. *Sphinx didyma* Fabricius, *Syst. Ent.*, : 543.

1937. *Nephele didyma f didyma*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 325-327.

Material examined : 1ex., District : New Tehri, Ranichouri; 28.ix.2005; (Coll. A.K. Sidhu and Party).

Wing expanse : 76mm.

Distribution : Throughout India including Uttarakhand (New Tehri).

Elsewhere : Myanmar, Sri Lanka, extending to Malaya.

Remarks : Bell & Scott (1937) reported the form throughout Indian subregion and the present record confirms its distribution from Uttarakhand.

37.b. ***Nephele didyma f. hespera*** (Fabricius)

1775. *Sphinx hespera* Fabricius, *Syst. Ent.*, : 554.

1937. *Nephele didyma f hespera*, Bell & Scott, *Fauna Brit. India, Moths*, **5** : 328.

Material examined : 6exs., District : New Tehri, Rani Chouri; 25, 26.ix.2005; 1 ex., Distrct : Dehradun, Narendranagar Forest Rest House; 27.x.2005, (Coll. A.K. Sidhu and Party).

Wing expanse : 69-78mm.

Distribution : Throughout India. Including Uttarakhand (Dehradun, New Tehri).

Elsewhere : Myanmar, Sri Lanka, extending to Malaya.

Remarks : Bell & Scott (1937) reported the form throughout Indian subregion and the present record confirms its distribution from Uttarakhand.

Genus ***Panacra*** Walker

1856. *Panacra* Walker, *List Lep. Ins. Brit. Mus.*, **8** : 154.

Remarks : Twelve Indian species and subspecies reported under this genus of which two spcies/subspecies are dealt with here.

Key to the *Species*

Forewing with a bundle of fine discal lines, first and second line fused together, underside first discal line broad .... *sinuata* Rothschild & Jordan

- Forewing without such bundle of discal lines, first and second line not fused together, underside first discal line indistinct .... *metallica anfracta* Gehlen

38. ***Panacra sinuata*** Rothschild & Jordan

1903. *Panacra sinuata* Rothschild & Jordan, *Revision of Sphingidae,* : 539, pl. 6, fig. 13.

1937. *Panacra sinuata,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 308-309.

Material examined : 1ex., District : Rudraprayag, Phata; 09.ix.2006; (Coll. A.K. Sidhu and Party).

Wing expanse : 65mm.

Distribution : India : Uttarakhand (Rudraprayag), E. Himalayas.

Remarks : The species is first time recorded from Uttarakhand.

39. ***Panacra metallica anfracta*** Gehlen

1930. *Panacra metallica anfracta* Gehlen, *Ent. Zeitschr. Frank.,* xliv, nos : 9, **17** : 258, figs. 1, 2.

1937. *Panacra metallica anfracta,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 309-312.

Material examined : Nil.

Wing expanse : Male : 60-73mm., female : 73mm. (Bell & Scott, 1937).

Distribution : India : Uttarakhand (Mussoorie), W. Himalayas.

Remarks : Bell & Scott (1937) bred the subspecies at Mussoorie.

Genus ***Acosmeryx*** Boisduval

1875. *Acosmeryx* Boisduval, *Spec. Gen. Lep. Het.,* : 214.

Remarks : The genus is represented by five Indian species and subspecies of which one subspecies is dealt with here.

40. ***Acosmeryx anceus subdenata*** Rothschild & Jordan

1903. *Acosmeryx anceus subdentata* Rothschild & Jordan, *Revision of Sphingidae,* : 528.

1937. *Acosmeryx anceus subdentata,* Bell & Scott, *Fauna Brit. India, Moths,* **5** : 294-295.

Diagnostic characters : Palpus, breast and first two abdominal sternites pinkish. Forewing distinctly angulate at R_3, often with traces of teeth. Upperside tawny-cinnamon to chestnut brown, an oblique distal band diffuse posteriorly, first discal line heavy, continuous, greyish costal apical area stopping at R_1 or beyond it, a broad, curved, pinkish-grey submarginal line continuous with apical lunules of the same colour. Underside of forewing ochraceous clay colour, a subapical, triangular, costal chestnut patch extending to R_1, straight proximally, where it is bordered by a grey or pinkish-grey line or patch. Hindwing fuscous.

Material examined : 1ex., District : Mussoorie; 22.ix.2000; (Coll. G.C. Sen & party).

Wing expanse : 81mm.

Distribution : India : Uttarakhand (Mussoorie), E. Himalayas, South India.

Elsewhere : Malaya.

Remarks : The species is first time recorded from Uttarakhand.

SUMMARY

The paper incorporate the taxonomic account of the fauna belonging to the family Sphingidae of ten districts from Urrarakhand. Collected by different parties of Zoological Survey of India. Altogether 41 species/subspecies of 29 genera have been examined, of which 9 species have been recorded as new this area and 23 species have been reviewed from literature. Running key to the subfamilies, genera, species and subspecies have been provided. Besides, the distribution of all the species/subspecies, original references, and current references have been given.

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REFERENCES

Arora, G.S., Mondal, D.K. and Chaudhury, M. 1977. On scientific result of Swiss Zoological Expedition to India, Part II, Moths of Garhwal District- (N. W. Himalayas) News Letter, Zoological Survey of India, **3**(6) : 388-395.

Butler, A.G. 1875. Description of thirty three new or little known species of Sphingidae, in the Collection of the British Museum. Part-I-II, *Pro. Zool. Soc. Lond.*, : 3-27.

Butler, A.G. 1877, Revision of the Heterocerous Lepidoptera of the family Sphingidae. *Trans. ent. Soc. Lond.*, **9** : 511-644, pl. 90-94.

Bell, T.R. & Scott, E.B. 1937. The Fauna of British India including Ceylon and Burma, **5** : xviii + 537, 124 figs., 15 pls.

Cotes, E.C. and Swinhoe, C. 1887-1889. A. Catalogue of moths of India, : pp. 812.

Hampson, G.F. 1892. The Fauna of British India including Ceylon and Burma, **1** : 65-123.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 569-591.

INSECTA : LEPIDOPTERA : SATYRIDAE : RHOPALOCERA

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INTRODUCTION

Satyrids are mostly inconspicuous, dull brown or blackish butterflies of moderate size with usually short and broad wings, marked above and below with eye-like spots (called as ocelli in butterfly taxonomy). Certain Satyrid genera have dry and wet-season forms. The dry-season forms are characterized by the more angulate wings, the cryptic pattern of the underside and the reduced submarginal ocelli, whereas, in wet-season forms, the submarginal ocelli on the underside wings are well developed. Wynter-Blyth (1957) has also stated that nothing in the family is remarkable than the difference between seasonal forms in some genera, the Evening Browns, the Bush Browns and the Rings in particular. During the course of present studies, out of thirty-seven species referable to twelve genera, the dry and wet-season forms were found in eight species belonging to two genera viz., *Melanitis* Fabricius and *Ypthima* Hübner. Dry and wet-season forms were found in both the species of the genus *Melanitis*, in six species out of twelve species of the genus *Ypthima*.

The present paper deals with the systematic account of the family Satyridae, based on the collections made by different survey parties of Zoological Survey of India, collections received from outside correspondents and the old collections present in the National Zoological Collections.

Marshall and de Niceville (1883) dealt with, as many as, one hundred and seventy-five species referable to twenty-six genera of the subfamily Satyrinae and sixteen species pertaining to two genera of the subfamily Elymniinae under family Nymphalidae. Mackinnon and de Niceville (1897) reported as many as 44 species of Satyridae from Mussoorie and Dehradun. However, both Ollenbach (1929) and Shull (1957, 1962) collected and reported seventeen satyrid species from different spots from Mussoorie. Bingham (1905) dealt with one hundred and sixty-nine species pertaining to twenty-five genera of the subfamily Satyrinae under the family Nymphalidae. Hannyngton (1910) reported one hundred and fifty-four species of butterflies including fifty-two satyrid species referable to, as many as, thirteen genera from the Kumaon region in India. Antram (1924) reported about 130 species of s atyrids from India. Evans (1932) reported about one hundred and eighty-two species referable to twenty-five genera from India, burma and Ceylon. Talbot (1947) compiled an account of one hundred and eighty-six species belonging to twenty two genera. Wynter-Blyth (1957) gave brief diagnosis of one hundred and thirty-eight species belonging to twenty-two genera.

In the present paper 37 species and subspecies referable to twelve genera are recorded from the state.

SYSTEMATIC LIST

Order LEPIDOPTERA
Suborder RHOPALOCERA
Family SATYRIDAE
Genus ***Mycalesis*** Hübner

1. *Mycalesis francisca sanatana* Moore
2. *Mycalesis lepcha lepcha* (Moore)
3. *Mycalesis nicotia* Hewitson
4. *Mycalesis heri* Moore

Genus ***Zophoessa*** Doubleday

5. *Zophoessa sidonis* (Hewitson)

Genus ***Lethe*** Hübner

6. *Lethe baladeva aisa* Fruhstorfer
7. *Lethe verma verma* (Kollar)
8. *Lethe confusa confusa* Aurivillus
9. *Lethe insana insana* (Kollar)

10. *Lethe rohria rohria* (Fabricius)
11. *Lethe europa niladana* Fruhstorfer

Genus ***Neope*** Moore

12. *Neope pulaha pulaha* (Moore)

Genus ***Patala*** Moore

13. *Patala yama yama* (Moore)

Genus ***Lasiommata*** Westwood

14. *Lasiommata maerula maerula* Felder
15. *Lasiommata schakra schakra* (Kollar)

Genus ***Melanitis*** Fabricius

16. *Melanitis leda ismene* (Cramer)
17. *Melanitis phedima galkissa* Fruhstorfer

Genus ***Hipparchia*** Fabricius

18. *Hipparchia parisatis* (Kollar)

Genus ***Aulocera*** Butler

19. *Aulocera swaha swaha* (Kollar)
20. *Aulocera brahminus brahminus* (Blanchard)
21. *Aulocera sarswati* (Kollar)

Genus ***Ypthima*** Hübner

22. *Ypthima singala* Felder
23. *Ypthima baldus* (Fabricius)
24. *Ypthima indecora* Moore
25. *Ypthima sarkaghatensis* Rose & Sharma
26. *Ypthima nikaea* Moore
27. *Ypthima hannyngtoni* Eliot
28. *Ypthima sakra* Moore
29. *Ypthima kasmira* Moore
30. *Ypthima huebneri* Kirby
31. *Ypthima asterope* Klug
32. *Ypthima nareda* (Kollar)
33. *Ypthima newara* Moore

Genus ***Paralasa*** Moore

34. *Paralasa shallada shallada* (Marshall and de Niceville)

Genus ***Callerebia*** Butler

35. *Callerebia nirmala nirmala* (Moore)
36. *Callerebia annada* caeca Moore
37. *Callerebia hybrida* Butler

SYSTEMATIC ACCOUNTS

Key to the genera of the family Satyridae, presently studied

1. Eyes hairy 2

   Eyes glabrous 7

2. Forewing with veins 1A+2A and Cu (lower margin of discoidal cell) swollen ..... ***Mycalesis*** Hübner

   Forewing with veins 1A+2A not swollen, Cu more or less swollen 3

3. Hindwing with outer margin not evenly rounded, incurved between veins M_1 and M_3, generally caudate at vein M_3, tornus slightly but definitely incurved before vein Culb, antennal club very slender; male genitalia with aedeagus with dorsal teeth wanting 4

   Hindwing with outer margin evenly rounded from apex to tornus, antennal club pyriform; male genitalia with aedeagus with dorsal teeth present, prominent ..... ***Lasiommata*** Westwood

4. Hindwing with vein $Sc+R_1$ extends about half the length of vein Rs, hindwing underside without an ocellus in $Sc+R_1$; male genitalia with valva not produced into spine at distal. 5

   Hindwing with vein $Sc+R_1$ nearly as long as vein Rs, hindwing underside with an ocellus in $Sc+R_1$ or obscure; male genitalia with valva produced into spine at distal end 6

5. Forewing with upper angle of discal cell evenly rounded, vein Sc terminates at a point above upper angle of cell (also referred as end cell), forewing underside with marginal and submarginal lines obscure ..... ***Zophoessa*** Doubleday

   Forewing with upper angle of discal cell angled, vein Sc terminates at a point beyond upper angle of cell, forewing underside with marginal and submarginal lines prominent.... ***Lethe*** Hübner

6. Cell of the forewing underside crossed by greyish white bars, forewing cell more than half the length of wing, vein R_2 arises before upper angle of cell ..... ***Neope*** Moore

   Cell of forewing underside without bars, forewing cell less than half the length of wing, vein R_2 originate beyond upper angle of cell ..... ***Patala*** Moore

7. Forewing with vein Sc swoollen 8

Forewing without swollen veins; male genitalia with saccus very long; female genitalia with signa oval ..... ***Melanitis*** Fabricius

8. Hindwing with upperside marginal and submarginal areas white; Jullien's organ present ..... ***Hipparchia*** Fabricius

   Hindwing with upperside marginal and submarginal areas brown or dark brown; Jullien's organ wanting 9

9. Wings crossed by white or pale yellow band on both sides, hindwing with outer margin renulate ..... ***Aulocera*** Butler

   Wings not crossed by white or pale yellow band, hindwing with outer margin rounded or convex 10

10. Forewing with vein Cu swollen at base, vein R_2 always from vein R_5; male genitalia with brachia wanting ..... ***Ypthima*** Hübner

    Forewing with vein Cu not swollen at base, vein R_2 always from cell; male genitalia with brachia present 11

11. Antennal club spatulate; hindwing underside without ocelli; male genitalia with aedeagus long and slender ..... ***Paralasa*** Moore

    Antennal club slender; hindwing underside with ocelli; male genitalia with aedeagus long and broad, slightly curved in the middle ..... ***Callerebia*** Butler

Genus *Mycalesis* Hübner

1818. *Mycalesis* Hübner, *Zutr. z. Samml. exot. Schmett.* **1** : 17.

Type-species : *Papilio francisca* Stoll.

Key to the species of the genus *Mycalesis* Hübner

1. Forewing upperside in male with an elongate cavity, covered by hair pencil along the middle of vein 1 A+2A; male genitalia with uncus blunt at distal end; female genitalia with genital plate simple, not differentiated into lamella antevaginalis and lamella postvaginalis ..... *francisca* Stoll

   Forewing upperside in male without a cavity or hair pencil; male genitalia with uncus pointed at distal end; female genitalia with complex genital plate, differentiated into lamella antevaginalis and lamella postvaginalis 2

2. Forewing upperside with ocellus in Cu1a with white pupil present; male genitalia with tegumen without any notch or slightly notched dorso-anteriorly, female genitalia with lodix wanting 3

   Forewing upperside with ocellus in Cu1a without white pupil; male genitalia with tegumen deeply notched dorso-anteriorly, female genitalia with lodix nearly triangular. ..... *lepcha* Moore

3. Forewing upperside with a smaller ocellus in M_1; upperside hindwing with a well developed ocellus in Cu1a, very minute ocellus in Cu 1b rarely present; below proximal two-third area dark brown with numerous darker striae; male genitalia with uncus smaller than tegumen, brachia equal to uncus; female genitalia with central process of lamella antevaginalis small and conical, lamella postvaginalis membranous ..... *nicotia* Hewitson

   Forewing upperside with a larger ocellus in M_1; upperside hindwing with ocelli in Cu1a and M_3 well developed; underside proximal two-third area ochraceous brown, mottled with dark brown; male genitalia with uncus nearly equal to tegumen, brachia longer than uncus; female genitalia with central process of lamella antevaginalis elongated, lamella postvaginalis trapezoidal plate-like ..... *heri* Moore

1. *Mycalesis francisca* (Stoll)

Common name : The Liliacine Bushbrown.

1780. *Papilio francisca* Stoll, in Cramer, *Uitl. Kapellen*, **4**(28) : 75.

Mycalesis francisca sanatana Moore

1857. *Mycalesis francisca sanatana* Moore, *In Cat. Lep. Ins. E. India Co.* **1** : 231.

1883. *Mycalesis (Garesis) francisca sanatana* : Marshall & de Niceville, *Butts. India Burmah Ceylon* **1** : 107-108.

1905. *Mycalesis francisca sanatana* : Bingham, *Fauna of Brit. India, Butts* **1** : 55.

1932. *Mycalesis francisca sanatana* : Evans, *The Ident. Indian Butts.*, : 97.

1947. *Mycalesis francisca sanatana* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 121-124.

Diagnostic characters : Forewing upperside with a black, white pupil, ochraceous ringed ocellus in Cula, similar but smaller, subapical ocelli, sometimes obscure, varies from one to three, elongate cavity, covered by hair-pencil, along the middle of the vein1A+2A, below proximal two-third dark brown with silver dusting, distal one-third light brown, cell crossed by two, parallel, darker, slender lines, post-discal, purplish slender line, post-discal series of minute dots, sometimes obscure; hindwing upperside with an oval brand above vein Rs, below markings are similar as on the forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 4 exs., 2.vi.1993, 5 exs., 3.vi.1993, 1 ex., 5.vi.1993, 3 exs., 11.vi.94 (Coll. N. Sharma & party); Dehradun, Mussoorie, Murray Electric Pumping Station, 1720 m, 1 ex., 6.vi.1993 (Coll. N. Sharma & party); Nainital, Tiffon Top, 2400 m, 1 ex., 29.iv.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 25.0-27.0 mm.

Female : 25.0-27.0 mm.

Distribution : India : Uttarakhand, Himachal Pradesh (Kullu), Meghalaya (Khasi Hills), Sikkim.

Elsewhere : Myanmar.

2. ***Mycalesis lepcha*** (Moore)

Common name : The Lepcha Bushbrown.

1880. *Samanta lepcha* Moore, *Trans. ent. Soc. Lond.* : 167.

Mycalesis lepcha lepcha (Moore)

1880. *Samanta lepcha lepcha* Moore, *Trans. ent. Soc. Lond.* : 167.

1883. *Mycalesis (Samanta) lepcha lepcha* : Marshall & de Niceville, *Butts. India Burmah Ceylon* **1** : 128, 130.

1905. *Mycalesis malsara lepcha* : Bingham, *Fauna of Brit. India, Butts.* **1** : 65.

1932. *Mycalesis lepcha lepcha* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 101.

Diagnostic characters : Forewing dorsally with an indistinct pale, narrow, post-discal line, a blind black, ochraceous ringed ocellus in Cula always present, two, minute specks in interspaces M_3 and M_1 may or may not be present, below with brand black in 1A+2A, proximal two-third dark brown and distal one third light brown, speckled with black, a post discal, ochraceous, slender line, post-discal series of white dots, sometimes obscure; hindwing with brand and hair-pencil black on dorsal surface above vein Rs, outer margin scalloped, post-discal band obscure, minute black ocelli with yellow iris in interspaces Cula and M_3 may or may not be present; underside same as the forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 2 exs., 3.vi.1992, 1 ex., 2.vi.1993, 1ex., 3.vi.1993, 3 exs., 2.vi.96, 5 exs., 4.vi.96 (Coll. N. Sharma & party); Dehradun, Mussoorie, Kemptyfall, 1645 m, 1 ex., 13.vi.1994 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 26.0 mm.

Female : 26.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh (Kullu, Shimla).

Elsewhere : Nepal.

3. ***Mycalesis nicotia*** Hewitson

Common name : The Bright-Eye Bushbrown.

1851. *Mycalesis nicotia* Hewitson, *Gen. diurn. Lep.* : 394.

1883. *Mycalesis nicotia* : Marshall & de Niceville, *Butts. India Burmah Ceylon* **1** : 128, 129.

1891. *Samanta nicotia* : Moore, *Lep. Ind.* **1** : 206.

1905. *Mycalesis nicotia*: Bingham, *Fauna of Brit. India, Butts* **1** : 65.

1947. *Mycalesis nicotia* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 156-157.

Diagnostic characters : Forewing with a large, black, white pupil, yellow iris, ocellus in M_3, Cula, Culb, a similar but smaller ocellus in interspace M_1, marginal and submarginal pale lines, below proximal two-third dark brown with numerous darker striae, distal one-third light brown, crossed beyond the middle by a slender light yellow band, minute, black, white pupil ocellus in Cula may or may not be present, black brand along vein 1A+2A; hindwing upperside with small, white centred, yellow ringed ocellus in Cula, very minute

ocellus in Culb may be present or absent, brand and hair pencil black above vein Rs, near its origin, underside with two or three, minute, black, white pupilled tornal ocelli, rest all the markings as on the forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 1 ex., 2.vi.1993, 5 exs, 3.vi.1993, 1ex., 4.vi.96 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 22.0-26.0 mm.

Female : 26.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Manipur, Meghalaya (Khasi Hills), Nagaland, Sikkim, West Bengal.

Elsewhere : Myanmar.

4. *Mycalesis heri* Moore

Common name : Moore's Bushbrown.

1857. *Mycalesis heri* Moore, *In Cat. Lep. Ins. E. India Co.* **1** : 233.

1883. *Mycalesis heri* : Marshall & de Niceville, *Butts. India Burmah Ceylon* **1** : 128

1891. *Samanta heri* : Moore, *Lep. Ind.* **1** : 208

1905. *Mycalesis heri* : Bingham, *Fauna of Brit. India, Butts* **1** : 66.

1920. *Mycalesis heri* : Evans, *J. Bombay nat. Hist. Soc.* **27** : 361.

1947. *Mycalesis heri* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 155-156.

Diagnostic characters : Forewing with white centred, ochraceous ringed, large, black ocellus in M_3, Cula, Culb, another similar but smaller ocellus in M_1, marginal and submarginal lines pale brown, underside with proximal area ochraceous brown speckled with dark brown, distal half light brown, post-discal, narrow white line, marginal and submarginal lines pale, ocelli as on upperside but smaller, sometimes obscure ocelli in interspace M_2 and M_3, brand missing, a black, oval patch along vein 1A+2A; hindwing upperside with three black, white pupilled, yellow iris ocelli in M_2, M_3 and Cula. The ocellus in M_2 minute, brand black, hair pencil ochraceous along vein Rs, marginal and submarginal lines as on forewing, underside with a post-discal series of seven black, white pupilled, ochraceous ringed ocelli, the ocellus in Cula is the largest, post-discal white line not reaching inner margin, marginal and submarginal lines as on forewing.

Material examined : Nainital, Bhimtal, 1980 m, 5 exs., 1.vi.1994 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 26.0 mm.

Female : 26.0 mm.

Distribution : India : Uttarakhand (Kumaon), Sikkim.

Elsewhere : Bhutan.

Genus ***Zophoessa*** Doubleday

1849. *Zophoessa* Doubleday, *Gen. diurn. Lep.* (2) : Pl. 61.

Type-species : *Zophoessa sura* Doubleday.

5. *Zophoessa sidonis* (Hewitson)

Common name : The Common Woodbrown.

1863. *Debis sidonis* Hewitson, *Exot. Bitts.* **3** : 77.

1956. *Zophoessa sidonis* : de Lesse, *Ann. Soc. Ent. Fr.* **125** : 80.

Diagnostic characters : Upperside dark brown; forewing costa arched, termen nearly straight, an indistinct white spot near the apex, underside brown, white spot beyond the middle of costal margin, near apex, two, white centred black, cryptic ocelli, vertical near the apex, marginal and submarginal lines faintly marked; hindwing with outer margin wavy, underside crossed by basal, sub-basal, post-discal, sinuous, silvery white lines, an arched series of seven, white centred, yellow ringed ocelli in post-discal area in interspaces Rs, M_1, M_2, M_3, Cula, Culb and 1A+2A, the ocelli in Cula and Rs are the largest, in Culb and 1A+2A contiguous, a submarginal line of silvery white, narrow at the apex, much dilated at the anal angle, margin rufous, bordered on both sides with black.

Material examined: Nainital, Tiffen Top, 2400 m, 2 exs., 29.vi.1996 (Coll. N. Sharma & party); Dehradun, Chakrata, 2135 m, 2 exs., 15.vi.1994 (Coll. N. Sharma & party); Dehradun, Mussoorie, Bhilaru Pumping Station, 1710m, 1 ex., 02.vi. 1993 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 26.0 – 28.0 mm.

Distribution : India : Uttarakhand (Kumaon, Mussoorie), Assam, Himachal Pradesh (Kangra, Kullu), Manipur Nagaland, Sikkim, West-Bengal (Darjeeling).

Elsewhere : Nepal, Bhutan Tibet, Afganistan.

Genus ***Lethe*** Hübner

1819. *Lethe* Hübner, *Verz. bekannt. Schmett.* **4** : 56.

Type-species : *Papilio europa* Fabricius.

Key to the species of the genus *Lethe* Hübner

1. Antennal club spatulate; male genitalia with uncus bifid ..... *baladeva* Moore

   Antennal club slender; male genitalia with uncus not bifid (simple) 2

2. Forewing upperside with white band in both sexes; male genitalia with brachia bifid 3

   Forewing upperside without white band in male; white band distinct in female; male genitalia with brachia either absent or not bifid 4

3. Forewing upperside without subapical white spots; male genitalia with minute spines present on forked brachia; female genitalia with lodix rectangular in shape .... *verma* Kollar

   Forewing upperside with two subapical, obliquely placed, irregular white spots; male genitalia without minute spines present on forked brachia; female genitalia with lodix nearly oval in shape ..... *confusa* Aurivillus

4. Forewing upperside with one subapical, minute, white spot; hindwing underside ocelli without disintegrated centres; male genitalia with brachia more or less broadly slender, appendices angulares crescent shaped .... *insana* Kollar

   Forewing upperside with two subapical, white spots; hindwing underside ocelli with disintegrated centres; male genitalia with brachia either very slender or absent, appendices angulares long, spine-like or blunt at distal end 5

5. Forewing upperside with a bifid white spot nearly in middle of costal margin present in male; hindwing underside with discal, white sinuous line, centres of ocelli in spaces M_1, M_2 and M_3 disintegrated; male genitalia with brachia very slender, tegumen narrow, appendices angulares spine-like .... *rohria* Fabricius

   Forewing upperside with white spot on costal margin wanting in male; hindwing underside without discal line, all ocelli on underside hindwing with disintegrated centres; male genitalia with brachia missing, tegumen nodule-like, appendices angulares blunt and slightly incurved distally ..... *europa* Fabricius

6. *Lethe baladeva* (Moore)

Common name : The Treble Silverstripe.

1865. *Zophoessa baladeva* Moore, *Proc. zool. Soc. Lond.* : 769.

Lethe baladeva aisa Fruhstorfer

1911. *Lethe baladeva aisa* Fruhstorfer, *Fauna Indo-Austral.* **9** : 314.

1932. *Lethe baladeva aisa*: Evans, *The Ident. Indian Butts.*, (2nd ed.) : 104.

Diagnostic characters : Forewing upperside with the markings of underside showing through, yellow band and post-discal series of black dots clearly visible, below ochraceous brown, a broader paler band crossing the cell, two another, broader ochraceous white discal and submarginal bands, a post-discal silvery white band in between the latter two bands, a series of six, minute black ocelli with white pupil and ochraceous white iris, outwardly bordered with ochraceous transverse line, marginal lines fulvous; hindwing caudate at vein Culb and M_3, upperside with post discal series of yellow ringed black ocelli, ochraceous marginal line prominent and pale submarginal line poorly defined, underside irregularly blotched with dark brown and ochraceous, a sub-basal silvery white band extends from costal margin upto lower end of cell, another silvery white band between veins Culb and M_1, oblique streaks, slender marginal and submarginal lines ochraceous white, a strongly arched series of white-centred, ochraceous ringed black six ocelli, the ocellus in 1A+2A double white-pupilled, orange patch at tornus.

Material examined : Chamoli, Sonprayag, 850 m, 2 exs. 14. vi. 94 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 28.0 mm.

Female : 28.0 mm.

Distribution : India : Uttarakhand (Kumaon, Garhwal).

7. *Lethe verma* (Kollar)

Common name : The Straight Banded Treebrown.

1844. *Satyrus verma* Kollar, *in Hugel's Kashmir* **4** : 447.

Lethe verma verma (Kollar)

1844. *Satyrus verma verma* Kollar, *in Hugel's Kashmir* **4** : 447.

1883. *Lethe verma verma* : Marshall & de Niceville, *Butts. India Burmah Ceylon* **1** : 157, 158.

1905. *Lethe verma verma* : Bingham, *Fauna of Brit. India, Butts* **1** : 84.

1932. *Lethe verma verma* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 108.

1947. *Lethe verma verma* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 229.

Diagnostic characters : Forewing upperside with a conspicuous nearly straight white band extends from costa to vein Culb, two, slender, pale submarginal lines, underside lighter and rather brighter brown, band as an upperside, two small, contiguous black with white pupil and yellow iris, ocelli, above ocelli whitish streak near the costa, two greyish submarginal lines widening towards apex; hindwing upperside with outer margin slightly wavy, black ocelli with white pupil, yellow iris may or may not be present in interspaces M_2, M_3, Cula, submarginal lines as on forewing, underside with six perfect black ocelli, white centred, inner yellow iris and outer purplish iris, ocellus near the anal angle bipupilled, the ocellus near the apex is the largest, between the ocelli and the base are two narrow lilac grey lines, that near ocelli sinous, the other nearly straight, submarginal lines as on the forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 2 exs., 3.vi.1992, 3 exs., 5.vi.1992, 6 exs, 2.vi.1993, 4 exs, 3.vi.1993, 4 exs., 11.vi.1994, 1 ex., 13.vi.1994, 2 exs, 2.vi.1996 (Coll. N. Sharma & party); Dehradun, Mussoorie, Murray Electric Pumping Station, 1720 m, 4 exs., 6.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Kemptyfall, 1645 m, 2 exs., 5.vi.1993 (Coll. N. Sharma & party); Dehradun, Chakrata, 2135 m, 1 ex., 15.vi.1994, (Coll. N. Sharma & party); Uttarkasi, Yamnotri, Barkot, 2200 m, 2 exs., 21.ix.2005 (Coll. A.K. Sidhu & Party).

Wing expanse : Half; Male : 28.0 mm.

Female : 28.0 mm.

Distribution : India : Uttarakhand (Kumaon, Mussoorie), Himachal Pradesh (Kangra, Shimla), Jammu & Kashmir (Kashmir).

8. *Lethe confusa* Aurivillus

Common name : The Banded Treebrown.

1898. *Lethe confusa* Aurivillus, *Ent. Tidskr* **18** : 142.

Lethe confusa confusa Aurivillus

1898. *Lethe confusa confusa* Aurivillus, *Ent. Tidskr* **18** : 142.

1883. *Lethe rohria*: Marshall & de Niceville, *Butts India Burmah Ceylon* **1** : 144, 156.

1905. *Lethe confusa confusa* : Bingham, *Fauna of Brit. India, Butts.* **1** : 82.

1932. *Lethe confusa confusa* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 105.

Diagnostic characters : Forewing upperside with discal oblique, slightly curved, pure white band, run from costal margin to Cula, two subapical, obliquely placed, irregular white spots, below white band as on upper side, small, brown, narrow line present in the discal cell, two black, yellow ringed, small ocelli, third obscure ocellus in vertical order near apex, subapical white bar, marginal and submarginal pale lines; hindwing upperside blackish, ocelli of underside showing through, sub- marginal yellow line, dentate at vein M_3, underside with sub-basal and discal purplish irregular lines, a strongly arched series of six black, white centred ocelli, ringed with inner ochraceous, middle brown and outer purplish ring, marginal and submarginal lines as on the forewing upperside.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 1ex., 3.vi.1993, 1 exs., 5.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Murray Pumping Station, 1720 m, 1ex., 6.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Kemptyfall, 1645 m 1ex., 5.vi.1993 (Coll. N. Sharma & party); Rudrapryag, Kedarnath, 3584 m, 2 ex., 8.ix.2006 (A.K.Sidhu & Party.

Wing expanse : Half; Male: 28.0 mm.

Female : 28.0 mm.

Distribution : Uttarakhand (Kumaon, Mussoorie), Assam, Himachal Pradesh (Kangra), Meghalaya, Nagaland, Sikkim, West-Bengal.

Elsewhere : Nepal, Burma, Siam, Malaya, Southern and Western China, South-East Tibet.

9. *Lethe insana* (Kollar)

Common name : The Common Forester.

1844. *Satyrus insana* Kollar, *in Hugel's Kashmir* **4** : 448.

Lethe insana insana (Kollar)

1844. *Satyrus insana insana* Kollar, *in Hugel's Kashmir* **4** : 448.

1883. *Lethe hyrania* : Marshall & de Niceville, *Butts. India Burma Ceylon* **1** : 144.

1905. *Lethe insana insana* : Bingham, *Fauna of Brit. India, Butts* **1** : 81.

1932. *Lethe insana insana* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 107.

Diagnostic characters : Forewing subtriangular, costa somewhat rounded, above dark brown, discal band showing through, one subapical, minute, irregular white dot, marginal and submarginal lines obscure, underside basal half blackish, distal half paler, discal, oblique light yellow band extending from costal margin to inter space Culb, two purplish, parallel lines in the cell, subapical, ochraceous narrow band with two reduced ocelli, marginal ochraceous, submarginal brown lines; hindwing less caudate at vein M_3, outer margin wavy, upperside dark brown, arched series of four, unequal sized, black ocelli in M_1, M_2, M_3 and Cula, white centre may present in ocellus in Cula, ochraceous marginal, brown submarginal lines obscure, ventrally sub-basal and discal, slender, ferruginous lines, an arched series of post-discal, white centred, ringed with inner ochraceous, middle brown and outer pale, six black ocelli, the ocellus in interspace Culb and 1A+2A double, ochraceous marginal and brown submarginal lines prominent.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 3 exs., 5.vi.1992, 2 exs., 3.vi.1993, 1ex., 5.vi.1993, 3 exs., 11.vi.94 (Coll. N. Sharma & party); Nainital, China Peak, 2350 m, 1 ex., 26.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 28.0 mm.

Female : 27.0 -28.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh (Shimla, Chamba, Kullu, Kangra), Jammu & Kashmir (Kashmir).

10. *Lethe rohria* (Fabricius)

Common name : The Common Treebrown.

1787. *Papilio rohria* Fabricius, *Mant. Ins.* **2** : 45.

Lethe rohria rohria (Fabricius)

1787. *Papilio rohria rohria* Fabricius, *Mant. Ins.* **2** : 45.

1883. *Lethe dyrta* : Marshall & de Niceville, *Butts India Burmah Ceylon* **1** : 144, 152.

1932. *Lethe rohria rohria* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 105.

1947. *Lethe rohria rohria* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 200-201.

Diagnostic characters : Forewing costa arched, termen convex, upper surface dark brown, blackish on the outer half, two ill-defined white spots near the apex and bifid costal white spot; under surface ochraceous, two sinuous, white streaks, cross the cell more or less in the middle, a broad discal white band, narrow towards dorsum, a post-discal, irregular white band forming V-shaped with discal white band, four submarginal, blind, dusky black, fulvous ringed ocelli, submarginal, slender, whitish and broader marginal purplish lines; hindwing oval, caudate at vein M_3, ocelli of underside showing through, dark brown, yellow slender line present between two slender black lines, under surface with sub-basal and discal, white sinuous lines, a post-discal series of six black ocelli, white centre is present only in the ocellus in Rs, the centres of the ocelli in M_1, M_2, M_3 disintegrated, ringed with ochraceous ring, the ocellus in Culb and 1A+2A double, the whole series bordered on both sides by lilacine white lines, submarginal and marginal lines as on forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 2 exs., 2.vi.1993, 2 exs., 3.vi.1993, (Coll. N. Sharma & party); Dehradun, Mussoorie, Mossey Falls, 1630 m, 1 ex., 12.vi.1994 (Coll. N. Sharma & party); Dehradun, Chakrata, 2135 m, 1 ex., 15.vi.1994 (Coll. N. Sharma & party); Nainital, TiffonTop, 1930 m, 1 ex., 29.iv.1992, 1 ex., 29.vi.1994 (Coll. N.Sharma & party); Chamoli, Gopeshwar, 1308 m, 1 ex., 10.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half, Male : 26.0 – 30.0 mm.

Female : 28.0 – 32.0 mm.

Distribution : India : Uttarakhand (Kumaon, Garhwal), Himachal Pradesh (Kullu, Shimla, Kangra), Jammu & Kashmir, Meghalaya (Khasi Hills), Punjab, Sikkim, West-Bengal.

Elsewhere : Myanmar, Malaya, Java. Nepal.

11. *Lethe europa* (Fabricius)

Common name : The Bamboo Treebrown.

1775. *Papilio europa* Fabricius, *Syst. Ent.* : 500.

Lethe europa niladana Fruhstorfer

1911. *Lethe europa niladana* Fruhstorfer, *Fauna Indo Austral.* **9** : 315.

1883. *Lethe europa* : Marshall & de Niceville, *Butts India Burmah Ceylon* **1** : 143, 149.

1932. *Lethe europa niladana* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 105.

1947. *Lethe europa niladana* : Talbot, *The Fauna of Brit. India, Butterflies*, **1** : 189-199.

Diagnostic characters : Forewing costa arched, termen inwardly curved in the middle, an incomplete pale band from the middle of the costa, and coincident with the white band on the undersurface, two, irregular, prominent, subapical white spots, the upper one bifid, marginal ochraceous line obscure near apex, undersurface with the basal area dark umber brown, discal cell crossed by a prominent purplish streak, white, oblique, discal band, joined at the middle by narrow, pale band from apex, forming together a Y-shaped figure, row of six grey with black pupil, circled with pale brown, ocelli on the outer pale band, apex grey, two ochreous marginal lines and a black line in between them; hindwing with ochreous marginal line on upperside, dentate at vein M_3, below discal line as on the forewing, a post- discal series of confluent, disintegrate, silvery speckled, irregular centred brown, six ocelli, bordered on both sides by purplish lunular lines, marginal lines as on the forewing.

Material examined : Nainital, Bhimtal, 1980 m, 1 ex., 26.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 32.0 mm.

Distribution : India : Uttarakhand (Kumaon, Mussoorie), Assam, Punjab, Sikkim.

Elsewhere : Burma, Siam, Assam.

Genus *Neope* Moore

Common name : Labyrinths.

1866. *Neope* Moore, *Proc. Zool. Soc. Lond.* **1865**(3) : 770.

Type-species : *Lasiommata bhadra* Moore

12. *Neope pulaha* (Moore)

Common name : The Veined Labyrinths.

1857. *Lasiommata pulaha* Moore, *in Horsefield & Moore, Cat. Lep. Ins. E. India Co.* **1** : 227.

Neope pulaha pulaha (Moore)

1857. *Lasiommata pulaha pulaha* Moore, *in Horsefield & Moore, Cat. Lep. Ins. E. India Co.* **1** : 227.

1892. *Blanaida pulaha pulaha*: Moore : *Lep. Ind.* **1** : 303.

1894. *Blanaida pulaha pulaha*: de Niceville, *Sikk. Gaz.* : 126.

Diagnostic characters : Forewing dorsally with basal half of veins 1A+2A and Culb, Cu entirely ochraceous white, discal and marginal, more or less straight rows of ochraceous white spots from costa to vein Culb; three other similar spots present, one in the cell near discocellulars, one in M_2 in between the rows and the last one in 1A+2A, underside nearly resemble to the upperside, spots faintly marked, basal half of areas Culb and Cula ochraceous white; hindwing upperside with outer margin more or less arched, discal and post-discal, irregular, curved rows of ochraceous white spots, underside irregularly marked, freckled with dark umber brown, irregular bands and lines, ocelli obscure, marginal and submarginal lines indistinct.

Material examined : Nainital, Tiffen Top, 1930 m, 1ex, 29.iv.1992, (Coll. N. Sharma & party).

Wing expanse : Half; Male : 28.0 mm.

Female : 28.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh (Shimla), Sikkim.

Elsewhere : Bhutan, Nepal.

Genus *Patala* Moore

Common name : Lybyrinths.

1892. *Patala* Moore, *Lep. Ind.* **1**(2): 305.

Type-species : *Zophoessa yama* Moore.

13. *Patala yama* (Moore)

Common name : The Tailed Lybyrinths.

1857. *Zophoessa yama* Moore, in Horsefield & Moore, *Cat. Lep. Ins. E. India Co.* **1** : 221.

Patala yama yama (Moore)

1857. *Zophoessa yama yama* Moore, in Horsefield & Moore, *Cat. Lep. Ins. E. India Co.* **1** : 221.

Diagnostic characters : Forewing upperside with a post-discal, more or less parallel to outer margin, row of four dark ocelli, borderd on outer side by lunar, ochraceous, faintly marked line, two subapical, white irregular spots, marginal area blackish, underside paler, cell with a greyish white band at base and crossed by three greyish white, irregular bars, subapical white spots as on upperside, post-discal row of four black ocelli with white pupil, yellow iris, lying in the post-discal, ochraceous band, marginal and submarginal black and paler lines; hindwing outer margin dentate, upperside with a post-discal, slightly arched series of six black ocelli, obscurely ringed with brown, submarginal area blackish, underside with proximal area variegated by medially ochraceous bands bordered on both sides by paler lines, post-discal row of seven black ocelli with white pupil, with inner ochraceous and outer black iris, the ocellus near the anal angle double, marginal and submarginal black and brown lines.

Material examined : Nainital, Bhimtal, 1980 m, 2 exs, 27.vi.1994.

Distribution : Uttarakhand (Mussoorie, Kumaon), Assam, Meghalaya (Shillong, Khasi Hills), Nagaland, Sikkim.

Elsewhere : Myanmar, Bhutan,

Genus *Lasiommata* Westwood

Common name : The Walls.

1841. *Lassiomata* Westwood, in Humphreys & Westwood, *Brit. Butt.* Transformations [ed. 1] : 65.

Type species : *Papilio megera* Linnaeus.

Key to the species of the genus *Lasiommata* Westwood

1. Forewing upperside without brand in male; male genitalia with aedeagus comparatively short, with four pairs of spines at posterior end ..... *maerula* Felder

   Forewing upperside with brand in male from inner margin to vein M2; male genitalia with aedeagus relatively long, with spines absent at posterior end ..... *schakra* Kollar

14. *Lasiommata maerula* Felder

Common name : The Scarce Wall.

1867. *Lasiommata* Felder, *Reise Novara, Lep.* **2** : 496.

Lasiommata maerula maerula Felder

1867. *Lasiommata maerula maerula* Felder, *Reise Novara, Lep.* **2** : 496.

Diagnostic characters : Forewing upperside with post-discal, four, orange spots, the size of spots increase from tornus towards the apex, the subapical largest with black, white pupilled ocellus, brand missing, submarginal, ill-defined band, underside pale with fulvous patch extending into the cell, two dark lines crossing the cell, discal, oblique brown zigzag line extend from costa to vein Culb, subapical black, white-pupilled ocellus with uncomplete rings of inner pale and outer brown, marginal and submarginal dark brown lines; hindwing upperside with black, white pupilled, ochraceous ringed ocelli in Cula, M_3, M_2, the ocellus in M_2 sometimes absent or minute, ochraceous dot may present in M_1, underside greyish white, basal and discal, irregular, slender, orange brown lines, post-discal, strongly arched, series of six, black, white pupilled with iris of ochraceous and brown, two of each alternately in Rs, M_1, M_2, M_3, Cula, the ocellus in Culb bipupilled, ocelli in Culb, Cula, M_3 and Rs large, marginal and submarginal brown lines.

Material examined : Nainital, China Peak, 2350 m, 2 exs., 28.iv.92, (Coll. N. Sharma & party); Nainital, Tiffon Top, 2400 m, 2 exs., 29.iv.92, (Coll. N. Sharma & party).

Wing expanse : Half; Male : 27.0-28.0 mm.

Female : 28.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh (Shimla), Jammu & Kashmir.

15. *Lasiommata schakra* (Kollar)

Common name : The Common Wall.

1844. *Satyrus schakra* Kollar, *In Hugel's Kashmir* (4)**2** : 446.

Lasiommata schakra schakra (Kollar)

1844. *Satyrus schakra schakra* Kollar, *In Hugel's Kashmir* (4)2 : 446.

Diagnostic characters : Upperside fuscous; post-discal area with four orange, unequal spots, the size of the spots increases towards apex, the subapical spot largest with a black, white pupil ocellus, marginal ill-defined, pale and submarginal darker lines, brand extends from the inner margin to vein M_3, underside grey, fulvous patch near anal angle, cell crossed by two orange bars, discal, oblique, orange brown line reaching upto vein Culb, black with white pupil, ringed with broad pale and narrow brown, subapical ocellus, a similar but minute ocellus fused with it near apex, marginal pale and submarginal dark line; hindwing upperside with three black, white pupilled, broadly ochraceous ringed ocelli in Cula, M_3 and M_2, minute ochraceous dot with or without black centre may present or wanting in Culb, M_2, M_1 and Rs, marginal, submarginal lines as on the forewing, underside greyish white, basal and discal, irregular, slender, orange brown lilnes, extending between costal margin and inner margin, a small, oblique line in discocellular area, a post-discal arched series of six, black, white-pupilled ocelli with rings of ochraceous and brown, two of each alternately, marginal and submarginal lines as on the forewing.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 3exs., 2.vi.93 (Coll. N. Sharma & Party); Dehradun, Mussoorie, Spring Road, 2005 m, 4exs.,7.vi.93 (Coll. N.Sharma & Party); Dehradun, Mussoorie, Murray Electric Pumping Station, 1645 m,1ex., 5.vi.93(Coll. N. Sharma & Party); Dehradun, Dhanolti, 2250 m, 1ex., 8.vi.93 (Coll. N. Sharma & Party); Dehradun, Dhanolti, Bandhal Nadi, 640 m, 2exs., 9.vi.93 (Coll. N.Sharma & Party); Dehradun, Chakrata, 2100 m, 2exs., 15.vi.94, 4 exs., 13.vi.95 (Coll. N. Sharma & Party); Nainital, Ranikhet, 1829 m, 8 exs., 3.vii.94 (Coll. N. Sharma & Party); Nainital, Tiffon Top, 2400 m, 4 exs., 29.iv.92 (Coll. N. Sharma & Party); Almora, Artola, 2 exs., 29.ix.2001 (Coll. P. Mukhopadhyay & Party); Almora, Binsar, 2236 m, 2 exs., 30.ix. 2001 (Coll. P. Mukhopadhyay & Party); Almora, Ranikhet, 1829 m, 5 exs., 26.ix. 2001 (Coll. A. Bal & Party); Almora, Brechhina, 1770 m, 2 exs., 5.x.2004 (Coll. D.R. Maulik & Party).

Wing expanse : Half; Male : 26.0-27.0 mm

Female : 25.0-29.0 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh, Punjab, West-Bengal (Darjeeling).

Elsewhere : Pakistan (Baluchistan, Chitral).

Genus ***Melanitis*** Fabricius

1807. *Melanitis* Fabricius, *Mag. Y. Insektenk (Illinger)* 6 : 282.

Type-species : *Papilio leda* Linnaeus.

Key to the species of the genus *Melanitis* Fabricius

1. Wet-season form : Wings larger; forewing with outer margin incurved below vein M_2; undersurface with large, distinct ocelli. Dry-season form : forewing less falcate at vein M_2, upperside with fulvous bar not extending to costa; male genitalia with uncus slightly curved venrally, aedeagus straight; female genitalia with ductus bursae broad near genital plate ..... *leda* Linnaeus

   Wet-season form : Wings smaller; forewing with outer margin nearly straight; undersurface with ocelli smaller. Dry-season form : forewing more falcate at vein M_2, upperside with ochraceous bar extending to costa, sometimes ill defined; male genitalia with uncus prominently curved venrally, aedeagus slightly upturned distally; female genitalia with ductus bursae narrower near genital plate ..... *phedima* Stoll

16. ***Melanitis leda*** (Linnaeus)

Common name : The Common Evening Brown.

1758. *Papilio leda* Linnaeus, *Syst. Nat.* (ed. 10) 1 : 474.

Melanitis leda ismene (Cramer)

1775. *Papilio leda ismene* Cramer, *Pap. Exot.* 1 : 40.

1782. *Papilio mycena* Stoll : *in Cramer, Pap. Exot.* 4 : 7.

1883. *Melanitis leda ismene* : Marshall & de Niceville, *Butts India Burma Ceylon* 1 : 251, 256.

1886. *Melanitis deteminata* Butler : *Proc. R. ent. Soc. Lond.* : 6.

1905. *Melanitis leda ismene* : Bingham, *Fauna of Brit. India, Butts* 1 : 159.

1947. *Melanitis leda ismene* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 366-369.

Diagnostic characters : Dry-season form : Forewing costa arched, apex obtuse, more or less falcate, outer margin sharply inwardly curved at vein M_2, upperside with a large, black subapical spot with two white dots, ochraceous lunules, inwardly bordering the black spot may be prominent or obsolete, underside ground colour variable *i.e.*, very pale, fuscous, fulvous, ferruginous; hindwing upperside may be with one white spot in Culb, two in Cula, Culb,three in M_3, Cula, Culb or four in M_2, M_3, Cula and Culb, outer margin dentate at vein M_3, underside similar to forewing; wet-season form: upperside brown; forewing with costa arched, apex subacute, outer margin slilghtly angulate at vein M_2, forewing with two, subapical black spots may be large and prominent or small and cryptic, ochraceous lunules inwardly bordering the black subapical spots may present or absent, underside paler, densely striated with brown, three, sometimes four ocelli present in R_5, M_1, M_3, Cula, ocelli may absent, only white dots may present; hindwing upperside with a large black, white pupilled, yellow iris ocellus in Cula, similar but smaller additional ocellus may present in M_3, two in Culb, M_3, three in Culb, M_3, M_2, underside with six, black, white pupilled, yellow ringed submarginal ocelli, the anal ocellus with double white pupil.

Material examined : Dehradun, 695 m, 2 exs., DSF, 30.x.91, 2 exs., WSF, 10.vi.1993 (Coll. N. Sharma); Almora, 1690 m, 2 exs., DSF, 1.x. 2004 (Coll. D.R. Maulik & Party); Almora, Lalkuan, 1630 m, 2 exs., DSF, 7.x. 2004 (Coll. D.R. Maulik & Party);

Wing expanse : Half; Male : 33.0-39.0 mm.

Female : 35.0-40.0 mm.

Distribution : India : Throughout India including Andaman and Nicobar Islands.

Elsewhere : Burma, Ceylon, Japan, Formosa, Malaya, Sumatra, Borneo, China.

17. ***Melanitis phedima*** (Stoll)

Common name : The Dark Evening Brown.

1732. *Papilio phedima* Stoll, in Cramer, *Pap. Exot.* **4** : 165-252.

Melanitis phedima galkissa Fruhstorfer

1911. *Melanitis phedima galkissa* Fruhstorfer, *Fauna Indo-Austral.* **9** : 364.

1932. *Melanitis phedima galkissa* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 126.

1947. *Melanitis leda ismene* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 366-369.

Diagnostic characters : Forewing costal margin arched, outer margin falcate at vein M_2, inwardly curved, outer, subapical portion ashy grey, black, subapical spot large with white pupil and lower smaller pupil, ochraceous markings on the inner side of blck spot extend to costa or obsolete, underside ground colour variable *i.e.*, ferruginous, pale, fulvous; hindwing outer margin dentate at vein M_3, upperside with white dots in M_2, M_3 Cula may or may not be present, underside similar to forewing; wet-season form: upperside blackish brown, forewing costa arched, apex subacute, outer margin nearly straight, minute white dot in M_3, underside light brown, freckled with dark brown, two minute, apical, brown, white pupilled ocelli, brown, submarginal, cryptic line; hindwing outer margin produced outwardly from vein M_3 to vein 1A+2A, minute white dot present in Cula, underside with curved, post-discal series of black, ochraceous ringed, white pupilled six ocelli, ocelli in Rs, M_3 and Cula are larger, submarginal dark area.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 1ex., DSF, 2.vi.1992, 3 exs., DSF, 3.vi.1993, 6 exs., DSF, 5.vi.1993, 1 ex., DSF, 6.vi.93 (Coll. N. Sharma & party); Nainital, Ranikhet, 1980 m, 2 ex., WSF, 3.vii.1994 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 33.0-37.0 mm.

Female : 38.0-40.0 mm.

Distribution : India : Uttarakhand (Kumaon, Mussoorie), Himachal Pradesh (Kullu, Kangra), Jammu & Kashmir.

Genus ***Hipparchia*** Fabricius

Common name : The Rockbrowns.

1807. *Hipparchia* Fabricius, *Mag. Insektenk. (illiger)* **6** : 281.

18. ***Hipparchia parisatis*** (Kollar)

Common name : The White-Edged Rockbrowns.

1850. *Satyrus parisatis* Kollar, *Denkschr. Akad. Wiss. Wien* **1** : 52.

1851. *Hipparchia macrophtalmus* Eversmann : *Bull. Soc. nat. Mosc.* **24**(1) : 615.

1913. *Satyrus parisatis parsis* Le Cerf : *Ann. Hist. nat. Deleg. Perse* **2** : 39.

Diagnostic characters : Forewing outer white margin does not reach the apex, white margin may be obscure or prominent, outer half of the costal margin may be whitish and broader towards apex, black spots with white pupil in Cula and M_1 prominent, obscure or without white pupil, two white dots in M_3 and Cula either present, reduced or absent, black brand above the cell, underside pale grey, profusely covered and mottled with whitish, a discal, narrow, broken in the middle, white band, inwardly bordered with slender black line, ocelli as on upperside but large and ochraceous ringed, the ocellus in M_1 with white pupil, large, ocellus without white pupil in Cula, small, sometimes obscure, marginal and submarginal narrow slender brown lines; upperside hindwing with broad outer white margin, outer margin scalloped, a small, black with white pupil ocellus in Culb, white pupil may absent, below discal band as on forewing but more sinuous, inwardly bordered with broad, black line, large, black white pupilled, yellow iris, ocelli in Cula and M_1, marginal submarginal, wavy, slender brown lines. Androcornia neomorphic, numerous.

Material examined : Chakrata, 2135 m, Water Falls, 1 exs., 12.vi.1995.

Wing expanse : Half; Male : 340-360 mm.

Female : 340-36 mm.

Distribution : India : Uttarakhand (Mussoorie, Kumaon), Himachal Pradesh (Shimla, Pangi, Kotgarh, Chamba, Bajoura), Jammu & Kashmir.

Elsewhere : Pakistan, Afganistan, Turkey, Armenia, Azerbaydzhan, Central Asia.

Genus *Aulocera* Butler

Common name : The Banded Satyrs.

1867. *Aulocera* Butler, *Ent. Mon. Mag.* **4** : 121.

Type-species : *Satyrus brahminus* Blanchard.

Key to the species of the genus *Aulocera* Butler

1. Forewing upperside with brand distinct..... ..... *swaha* Kollar

   Forewing upperside with brand indistinct..... 2

2. Forewing upperside with white spots well separated and small; hindwing upperside band narrow; underside bronzy-brown with white striations; male genitalia with uncus long, slightly curved at distal end; female genitalia with central process of lamella antevaginalis long with trilobed distal end, signa smaller... ..... *brahminus* Blanchard

   Forewing upperside with white spots larger and narrowly spaced, hindwing upperside band broad; below very pale with numerous greyish white striae; male genitalia with uncus very long, curved ventrally; female genitalia with central process of lamella antevaginalis reduced, deeply notched posteriorly, signa longer ..... *saraswati* Kollar

19. *Aulocera swaha* (Kollar)

Common name : The Common Satyr.

1844. *Satyrus swaha* Kollar, *in Hugel's Kashmir* **4**(2) : 444.

Aulocera swaha swaha (Kollar)

1844. *Satyrus swaha* Kollar, *in Hugel's Kashmir* **4**(2) : 444.

1883. *Aulocera swaha swaha* : Marshall & de Niceville, *Butts. India Burma Ceylon* **1** : 195, 197.

1905. *Aulocera swaha swaha* : Bingham, *Fauna of Brit. India, Butts* **1** : 126.

1932. *Aulocera swaha swaha* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 117.

1947. *Aulocera swaha swaha* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 309.

Diagnostic characters : Forewing upperside with discal, broader, white or bright yellow band, subapical, black spot, less prominent, surround by four, irregular, white spots, white spots on the inner side not continued to costa, spots well separated and outwardly conical, white, costal, dashes near apex may present or absent, blackish brand in middle, without androcornia, underside bronzy brown with less white striae, white band and subapical black spot as on the upperside, but black spot with white pupil and inner white spots continue to costa; hindwing outer margin wavy, upperside white band continued from costa, may or may not reach inner margin, underside with prominent white striations, white band as on upperside but always reaching inner margin.

Material examined : Uttarkasi, Bank of Yamuna, 1158 m, 1 ex., 22.iv.2005 (A.K.Sidhu & Party); Almora, Binsar, 2480 m, 2 exs., 1.x.2004 (Coll. D.R. Maulik & Party).

Wing expanse : Half; Male : 28.0 – 34.0 mm.

Female : 30.0 – 36.0 mm.

Distribution : Uttarakhand (Mussoorie), Himachal Pradesh, North-West Punjab, Sikkim.

20 ***Aulocera brahminus*** (Blanchard)

Common name : The Narrow-Banded Satyr.

1844. *Satyrus brahminus* Blanchard, In Jacquemont, *Voy. Inde* 4(Zool.) : 22.

Aulocera brahminus brahminus (Blanchard)

1844. *Satyrus brahminus brahminus* Blanchard, In Jacquemont, *Voy. Inde* 4 (Zool.) : 22.

1883. *Aulocera brahminus brahminus*: Marshall & de Niceville, *Butts India Burmah Ceylon* 1 : 195, 198.

1932. *Aulocera brahminus brahminus* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 116.

1947. *Aulocera brahminus brahminus* : Talbot, *The Fauna of Brit. India, Butterflies* 2 : 289.

Diagnostic characters : Forewing dorsally with a discal, narrow band of white irregular spots, a subapical, rounded, black spot interrupt white discal band, bordered by white spots, two or three, short white dashes continue the inner white spot to costa, anterior four or five white spots of the band well separated and conical or blunt outwardly, underside bronzy brown with white striations, white band as on upperside, black subapical ocellus with white centre; hindwing upperside with white band attenuated from forewing, crossed by black veins, not reaching inner margin, underside with white band reaching inner margin, two minute white spots beyond the band.

Material examined : Rudrapryag, Kedarnath, 2exs., 8.ix.2006 (A.K. Sidhu & Party).

Distribution : Uttarakhand (Mussoorie), Himachal Pradesh (Kullu, Koksar, Keylong, Mandi, Pangi), Jammu & Kashmir.

21. ***Aulocera sarswati*** (Kollar)

Common name : The Striated Satyr.

1844. *Satyrus sarswati* Kollar, in Hugel's Kashmir 4(2) : 445.

1883. *Aulocera sarswati* : Marshall & de Niceville, *Butts India Burmah Ceylon* 1 : 195, 200.

1932. *Aulocera sarswati* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 117.

1947. *Aulocera sarswati* : Talbot, *The Fauna of Brit. India, Butterflies* 2 : 295-96.

Diagnostic characters : Forewing with discal broad, more or less straight band of white spots, subapical black spot bordered by four, irregular, white spots, the white spot on inner edge may be present, well developed or wanting, not continued to costa, black brand above cell; below paler with numerous greyish white striae, discal white band same as on upperside, white spot on inner edge of black, white pupilled spot continued to costa, submarginal dark brown band; hindwing outer margin scalloped, upperside with discal, white band nearly straight, underside discal band as on upperside, post-discal, narrow, dark brown band.

Material examined : Almora, Binsar, 2480 m, 2 exs., 1.x.2004 (D.R. Maulik & Party); Almora, Ranikhet, 1860 m, 1 ex., 26.ix.2004 (D.R. Maulik & Party).

Wing expanse : Half, Male : 30.0-33.0 mm.

Female : 32.0- 40.0 mm.

Distribution : Uttarakhand (Kumaon, Mussoorie), Himachal Pradesh (Shimla, Pangi, Kullu), Jammu & Kashmir, Sikkim.

Elsewhere : Nepal.

Genus ***Ypthima*** Hübner

Common name : The Rings.

1818. *Ypthima* Hübner, *Zutr. z. Samml. exot. Schmett.* 1 : 17.

Type species : *Ypthima huebneri* Kirby.

Key to the species of the genus *Ypthima* Hübner

1. Forewing with vein R_1 arising beyond end of cell (*philomela*) 2

   Forewing with vein R_1 arising before end of cell 5

2. Hindwing underside with double ocellus (WSF) or black dots (DSF) in space culb in line with ocelli in spaces M_3 and cula; male genitalia with appendices angulares, small, stumpy, blunt

at distal end, vinculum more or less incurved; female genitalia with ductus bursae smaller ..... *singala* Felder

Hindwing underside with double ocellus (WSF) or black dots (DSF) in space culb out of line with ocelli in spaces M_3 and Cula; male genitalia with appendices angulares more or less curved, pointed distally, vinculum nearly straight; female genitalia with ductus bursae comparatively longer 3

3. Forewing upperside with brand prominent, underside with white striations; humeral vein arched; male genitalia with valva deeply notched at distal end; female genitalia with ductus seminalis attaching ductus bursae nearly in middle ..... *baldus* Fabricius

Forewing upperside with brand moderately developed, underside with greyish brown striations; humeral vein T-shaped; male genitalia with valva slightly concave or slightly notched at distal end; female genitalia with ductus seminalis attaching ductus bursae near corpus bursae 4

4. Upperside darker, submarginal and discal fasciae less prominent; male genitalia with uncus less curved ventrally; female genitalia with ductus bursae sharply curved and broader ..... *indecora* Moore

Upperside paler, submarginal and discal fascia prominent; male genitalia with uncus strongly curved ventrally; female genitalia with ductus bursae nearly straight and narrower .... *sarkaghatensis* Rose & Sharma

5. Moderate or large species; underside hindwing with five ocelli; male genitalia with aedeagus strongly curved dorsally (*sakra group*) 6

Moderate or small species; underside hindwing with four or less than four ocelli or dots; male genitalia with aedeagus more less straight, or curved ventrally anteriorly 8

6. Hindwing underside with submarginal fascia prominent; male genitalia with tegumen longer than vinculum ..... *nikaea* Moore

Hindwing underside with submarginal fascia obscure; male genitalia with tegumen shorter than vinculum 7

7. Forewing upperside with brand distinct; hingwing upperside always with an ocellus in M_1; androconia much longer; male genitalia with valva axe-shaped at distal end .... *hannyngtoni* Eliot

Forewing upperside with brand indistinct; hindwing upperside ocellus in M_1 generally wanting; androconia moderately long; male genetalia with valva nearly rounded at distal end ..... *sakra* Moore

8. Hindwing underside with four ocelli or dots; male genitalia with valva with serrations latero-distally; female genitalia with lamella antevaginalis long and forked distally (*huebneri* group) 9

Hindwing uuderside with three ocelli or dots; male genetalia with valva with serrations either absent or present distally; female genitalia with lamella antevaginalis either triangular, rounded or small and forked posteriorly 10

9. Hindwing underside with three ocelli in M_3, Cula and Culb contiguous, androconia less broader and slightly notched at base; male genitalia with vinculum smaller; female genitalia postvaginalis with semicircular plate ..... *kasmira* Moore

Hindwing underside with three ocelli in M_3, Cula and Culb not fused, ocelli in M_3 and Cula may fuse or not; androconia broader and notched at base; male genitalia with vinculum longer; female genitalia with lamella postvaginalis roughly triangular .... *huebneri* Kirby

10. Small species; forewing length 18.0 mm; male genitalia with juxta U-shaped, aedeagus slightly upturned anteriorly (*asterope* group) ..... *asterope* Klug

Moderate species; forewing length 18.0 mm or even longer; male genitalia with juxta V-shaped, aedeagus not upturned but curved ventrally 11

11. Hindwing with humeral vein triangle-like; androconia produced into a stalk at base; male genitalia with anterior half of uncus and posterior half of tegumen expanded dorsally; female genitalia with corpus bursae without signum (*nareda* group) ..... *nareda* Kollar

Hindwing with humeral vein forked distally; androconia broader proximally; male genitalia with anterior half of uncus and posterior half of the tegumen narrower dorsally; female genitalia with paired signa present (*newara* group) ..... *newara* Moore

22. *Ypthima singala* Felder

Common name : The Jewel Fourring.

1868. *Ypthima singala* Felder, *Verh. Zool.-bot. Wien.* **18** : 283.

1994. *Ypthima singala* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Wet season form: upperside brown; forewing upperside with subapical, black, ringed with yellow or not, bipupilled ocellus may or may not be present, brand indistinct, underside greyish brown with white striations, subapical, black, bipupilled, yellow-ringed, ocellus always present, discal and submarginal fasciae distinct; upperside hindwing with black, blind, weakly yellow-ringed ocelli in Cula and M_3 or ocellus with white centre and diffuse yellow-ringed ocellus may present in Cula, sometimes obscure or only black dots present, underside with greyish white striations, white centred, yellow-ringed, black ocelli present in Culb, M_3, M_1 and Rs, ocelli in Culb minute, commonly yellow ringed, in Cula and M_3 nearly equal and separated or contiguous, in Rs and M_1 unequal or equal, fused or separated; dry-season form : similar to wet-season form except that ocelli on underside of hindwing reduced.

Material examined : Srinagar, Garhwal University, 579 m, 6 exs., DSF., 8.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 17.0 mm.

Female : 17.0 mm.

Distribution : India : Uttarakhand, Jammu & Kashmir, Central and Southern India.

Elsewhere : Ceylon, Western Nepal.

23. *Ypthima baldus* (Fabricius)

Common name : The Common Fivering.

1775. *Papilio baldus* Fabricius, *Syst. Ent.* (3) **1** : 829.

1994. *Ypthima baldus* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Wet season form : Forewing upperside with black, bipupilled, yellow iris, subapical ocellus, proximal half dark brown with long and broad brand, outer distal half paler, submarginal fascia prominent, underside grey with whitish striations, ocellus as above but yellow ring broader, submarginal fascia distinct, indistinct near apex; hindwing upperside with discal and marginal fasciae prominent. Area enclosed between them paler, two black, single pupilled, nearly equal in size, separated or contiguous ocelli with yellow-ring in Cula and M_3, and additional minute ocellus may present in Culb, underside greyish with more, very fine, white striations, five black, single pupilled, yellow- ringed ocelli in Rs, M_1, M_3, Cula and Culb, the ocellus in Culb bipupilled, ocelli in M_3, Cula nearly equal, contiguous, in Rs, M_1 unequal, fused, ocellus in M_1 larger, marginal fascia distinct; dry-season form : similar to wet-season form except that the underside more paler and the ocelli on the ventral side of hindwing obsolete.

Material examined : Dehradun, Forest Research Institute, 695 m, 3 exs., WSF., 6.ix.1992, 1 ex., WSF, 9.vi.1993 (Coll. N. Sharma).

Wing expanse : Half; Male : 17.0 mm.

Female : 19.0 mm.

Distribution : India : Throughout India.

Elsewhere : Nepal, Burma, Hainan, Hong Kong, Taiwan, Malay Peninsula, Borneo, Sumatra, Java.

24. *Ypthima indecora* Moore

Common name : The Western Fivering.

1882. *Ypthima indecora* Moore, *Proc. zool. Soc. Lond.* : 238.

1883. *Ypthima indecora* : Marshall & de Niceville, *Butts India Burmah Ceylon* **1** : 214, 218.

1932. *Ypthima indecora* : Evans, *The Ident. Indian Butts.*, (2nd ed.) : 122.

1947. *Ypthima indecora* : Talbot, *The Fauna of Brit. India, Butterflies*, **2** : 336.

1994. *Ypthima indecora* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Wet-season form : Forewing upperside with black, bipupilled, yellow-ringed ocellus, the ocellus may be oblique or rounded, marginal fascia prominent, brand moderately developed, present more or less in the middle, underside chestnut brown, striated with yellow, submarginal and discal fasciae darker, form

loop around subapical ocellus, the space in loop with fine white striations; hindwing upperside with two black, white pupilled, ocelli in Cula, M_3, sometimes an additional ocellus may present in M_1, the ocelli in Cula, M_3 may be equal or unequal, fused or separated, marginl fascia distinct, underside greyish with whitish striations in the distal half, proximal half densely striated with grey, discal fascia prominent, black, yellow-ringed, single pupilled ocelli in Culb, Cula, M_3, M_1 and Rs, the ocellus in Culb bipupilled, geminate, marginal fascia distinct; dry-season form: similar to wet-season form except that the underside ocelli on the ventral side of hindwing obsolete.

Material examined : Chamoli, Gopeshwar, 1308 m, 7 exs., WSF, 10.vi.1992 (Coll. N. Sharma); Pithoragarh, Didighat, 1645 m, 2exs., WSF, 24.ix.2004 (Coll. B. Mitra & Party); N. Tehri, Kaudiala, 2 exs. DSF, 11.04.2003 (B.G. Kundu & Party.

Wing expanse : Half; Male : 13.0 mm.

Female : 13.0 mm.

Distribution : Uttarakhand (Kumaon, Mussoorie), Himachal Pradesh, Jammu & Kashmir.

Elsewhere : Nepal.

25. ***Ypthima sarkaghatensis*** Rose & Sharma

1998. *Ypthima sarkaghatensis* Rose & Sharma, *Geobios new Reports*, **17**(2) : 105-112.

Diagnostic characters : Dry-season form : Forewing dorsally with nearly rounded, subapical, black, bipupilled, yellow iris, ocellus, marginal fasciae distinct, discal fascia indistinct, brand moderately developed, marginal area darker, underside pale with fine greyish striations, ocellus as on upperside, discal and marginal fasciae distinct, the area enclosed between them more paler; upperside hindwing with proximal half darker than distal half, marginal and discal fasciae prominent, two, nearly equal, black, single pupilled, spaced or contiguous, yellow ringed ocelli present in Culla and M_3, sometimes, a minute ocellus may present in M_1, underside pale with striations as on the forewing, marginal fascia wanting, discal fasciae ill defined, ocelli cryptic or only minute black dots present.

Material examined : Mussoorie, Bhilaru Pumping Station, 1710m, 1 exs., DSF, 3.vi.1993 (Coll. N. Sharma).

Wing expanse : Half; Male : 17.0-18.0 mm.

Female : 18.0-20.0 mm.

Distribution : Uttarakhand, Himachal Pradesh.

26. ***Ypthima nikaea*** Moore

Common name : The Himalayan Fivering.

1874. *Ypthima nikaea* Moore, *Proc. zool. Soc. Lond.* : 576.

1994. *Ypthima singala* : Varshney, *Oriental Insects*, **28** : 159.

1994. *Ypthima nikaea* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Forewing dorsally with bipupilled, yellow-ringed, black subapical ocellus, submarginal fascia moderately developed, brand ill-defined, underside greyish, coarsely striated with yellowish brown, ocellus as an upperside, inner margin without any striation, rather fuscous; hindwing upperside with two, single pupilled, with yellow iris, ocelli in Cula and M_3, ocellus in M_3 sometimes without pupil or cryptic, minute ocellus, underside striated more coarsely with yellowish brown, single pupilled, black, yellow-ringed, ocelli in Culb, Cula, M_3, M_1 and Rs, ocellus in Culb bipupilled, ocelli in Cula and M_3 unequal, spaced, iocelli in M_1 and Rs separated by common yellow band, submarginal fasciae distinct, whitish striations between marginal fasciae and cell.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 6 exs., 5.vi.1992, 4 exs., 5.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Kemptyfalls, 1645 m, 5exs., 6.vi.1992. 6 exs., 5.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Murray Pumping Station, 1645 m, 7 exs., 6.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Aglar Valley, 800 m, 2 exs., 4.vi.1992 (Coll. N. Sharma); Dehradun, Dhanolti, Bandhal Nadi, 695 m, 1 exs., 9.vi.1993 (Coll. N. Sharma)

Wing expanse : Half; Male : 23.0 mm.

Female : 23.0 mm.

Distribution : Uttarakhand, Himachal Pradesh, Punjab.

Elsewhere : Nepal.

27. ***Ypthima hannyngtoni*** Eliot

Common name : Hannyngtons Fivering.

1967. *Ypthima hannyngtoni* Eliot, *Entom.* **100** : 54.

1994. *Ypthima hannyngtoni* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Forewing with black, bipupilled, yellow iris, subapical ocellus, marginal and discal fasciae obscure, brand distinct, underside greyish, striated with yellow, ocellus as an upperside, marginal and discal fasciae obscure; hindwing upperside with two, black, single pupilled, nearly equal, spaced ocelli in Cula and M_3, another but smaller, blind ocellus present in M_1, marginal discal fasciae wanting, below greyish, closely striated with yellowish brown, five single pupilled, yellow-ringed, black, ocelli in Culb, Cula, M_3, M_1 and Rs, ocellus in Culb may be divided by a yellow line into lower blilnd, minute and upper larger white pupilled ocellus, ocelli in Cula and M_3 nearly equal and spaced, ocelli in M_3 and Rs and more or less equal with common yellow band in them; fasciae wanting.

Material examined : Dehradun, Chakrata, 2100 m, 2 exs., 15.vi.1994 (Coll. N. Sharma); Almora, Loharkhet to Dhakuri, 4 exs., 17.vi.1994 (Coll. N. Sharma).

Wing expanse : Half; Male : 20.0-22.0 mm.

Female : 20.0-24 mm.

Distribution : Uttarakhand, Himachal Pradesh.

28. *Ypthima sakra* Moore

Common name : The Himalayan Fivering.

1957. *Ypthima sakra* Moore, in Horsfield & Moore, *Cat. Lep. Ins., E. India Co.* **2** : 236.

1994. *Ypthima sakra* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Forewing with black, bipupilled, yellow-ringed, subpaical ocellus, ocellus sometimes ill-defined, brand obscure, underside greyish, finely striated with yellowish brown, fascia missing, ocellus as on upperside; upperside hindwing with black, yello-ringed ocelli in Culb, Cula, M_3, M_2 and M_1, ocellus in Cula single pupilled and largest, other ocelli vary in size, may be small or minute, fasciae wanting, underside coarsely striated with yellowish brown, five black, single pupilled, yellow ringed ocelli in Culb, Cula, M_3, M_1 and Rs either separated by yellow band or yellow band wanting, and additional ocellus may fused on inner side to ocellus in M_1, fasciae wanting.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 17 exs., 3.vi.1992, 6 exs., 5.vi.1992, 12 exs., 2.vi.1993, 10 exs., 3.vi.93, 13 exs., 5.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Murray Pumping Station, 1645 m, 2 exs., 6.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Company Garden, 2005 m, 6 exs., 4.vi.1992 (Coll. N. Sharma & party); Dehradun, Mussoorie, Aglar Valley, 800 m, 4 exs., 2.vi.1992 (Coll. N. Sharma & party); Bageshwar, Kausani, Baijnath, 1666 m, 2 exs., 16.ix.2002 (Coll. P.H. Roy & Party); Uttarkasi, Yamnotri, Barkot, 2 exs., 21.ix.2005 (A.K. Sidhu & Party).

Wing expanse : Half; Male : 24.0-25.0 mm.

Female : 24.0-25.0 mm.

Distribution : Uttarakhand, Assam, Himachal Pradesh (Shimla, Pangi Chamba), Sikkim, West-Bengal.

Elsewhere : Nepal, Burma, South-Eastern Tibet, China.

29. *Ypthima kasmira* Moore

Common name : The Kasmir Fourring.

1884. *Ypthima kasmira* Moore, *J. asiat. Soc. Bengal* **53**(2) : 17.

Diagnostic characters : Wet-season form : Forewing upperside with subapical black, bipupilled, ringed with diffuse yellow, rounded or slightly oblique ocellus, marginal and discal fasciae indistinct, brand obscure, underside with coarse brownish striations, submarginal fasciae present, subapical ocellus as on upperside but the ring, broader and prominent; upperside hindwing with two, black, single pupilled, weakly ringed ocelli in M_3 and Cula, sometimes and additional ocellus may present in Culb, fasciae obscure, underside with brownish white striations, fasciae as on forewing underside, small, single pupilled yellow-ringed, black ocelli in Rs, M_3, Cula and Culb, the ocelli in M_3, Cula and Culb contiguous; dry-season form: not studied.

Material examined : Almora, Binsar, 2 exs., 2480 m, 1.x.2004 (D.R.Maulik & Party); Bageshwar, 3 ex., 29.ix.2004 (D.R. Maulik & Party); Haridwar, Jawalapur, 800 m, 2 exs., 14.ix.2006 (Coll. A.K. Sidhu & Party).

Wing expanse : Half; Male : 16.0 mm

Female : 19.0 mm.

Disrtibution : Uttarakhand, Himachal Pradesh (Mandi, Chamba, Khajjiar), Jammu & Kashmir.

Elsewhere : Nepal.

30. ***Ypthima huebneri*** Kirby

Common name : The Common Fourring.

1871. *Ypthima huebneri* Kirby, *Syn. Cat. Diurn. Lep.* : 95.

1994. *Ypthima huebneri* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Wet-season form : Forewing upperside with rounded or oblique, black, bipupilled, subapical ocellus, ringed with yellow or diffuse yellow, submarginal fascia obscurely marked, underside with greyish white striations, subapical ocellus as on upperside but the yellow-ring more prominent and broader, submarginal fascia as on upperside; hindwing upperside with a small, single pupilled ocellus in Cula or two ocelli in Cula and M_3, underside with greyish white striatoins, submarginal fascia present, single pupilled, black, yellow-ringed ocelli in Rs, M_3, Cula and Culb, ocelli in M_3 and Cula may be contiguous or spaced; dry-season form: ocelli on the underside of hindwing reduced to minute ocelli or black dots; otherwise as in wet-season form.

Material examined : Dehradun, Vikasnagar, Dakpathar, 750 m, 7 exs., WSF, 18.vi.1992 (Coll. N. Sharma & party); Dehradun, Vikasnagar, 750 m, 10 exs., WSF, 21.vi.1992 (Coll. N. Sharma & party); Almora, Binsar, 2480 m, 2 exs., WSF, 1.x.2004 (Coll. D.R. Maulik & Party); Haridwar, Jawalapur, 800 m, 4 exs., WSF, 14.ix.2006 (Coll. A.K.Sidhu & Party).

Wing expanse : Half; Male : 15.0-17.0 mm.

Female : 18.0 mm.

Distribution : Throughout India.

Elsewhere : Nepal, Assam, Myanmar, Thailand, Viet-Nam, Malay Peninsula.

31. ***Ypthima asterope*** (Klug)

Common name : The Common Threering.

1832. *Hipparchia asterope* Klug, *Symb. Phys.* : Pl. 29., Figs. 11-14.

Ypthima asterope mahratta Moore

1884. *Ypthima asterope mahratta* Moore, *J.asiat. Soc.Bengal* **53**(2) : 16.

1888. *Ypthima alemola* Butler : *Ann. Mag. nat. Hist.* **1**(6) : 137.

Diagnostic characters : Dry-season form : Forewing upperside with black, bipupilled, yellow-ringed, subapical ocellus, submarginal fascia distinct, underside greyish, with white striations, ocellus as on upperside but more prominent, dark brown loop around subapical ocellus, inner margin without white striations; hindwing upperside with black, single pupilled, yellow iris, ocellus in Cula, underside greyish brown with less white striations, ocelli represented by black dots only; wet-season form: upperside similar to dry-season form, underside forewing with more greyish brown striations; hindwing underside finely striated with greyish brown, three small, black, single pupilled, yellow-ringed ocelli in Rs, Cula, Culb, ocellus in Rs smaller, marginal brown line.

Material examined : Srinagar, Garhwal University, 579 m, 6 exs., WSF, 1 exs., DSF, 8.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 16.0 mm.

Female : 18.0 mm.

Distribution : Uttarakhand, Assam, Himachal Pradesh, Punjab, Jammu & Kashmir.

Elsewhere : Africa, Pakistan, Kashmir, India, Burma, Thailand, Viet-Nam, China, Celebes.

32. ***Ypthima nareda*** (Kollar)

Common name : The Large Threering.

1844. *Satyrus nareda* Kollar, *in Hugel's Kashmir* **4** : 451.

1994. *Ypthima nareda* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Forewing upperside with subapical black, bipupilled ocellus may be rounded or oblique, sometimes obscure, submarginal fasciae usually distinct, discal fasciae obscure, brand absent, underside greyish with fine, dense yellow striations, ocellus as on upperside, sometimes without pupil, submarginal fascia narrow and obscure on apex, broader towards inner margin, inner margin fuscous; hindwing upperside with rather small, yellow-ringed, single

white pupilled ocellus in Cula, sometimes very small ocellus in Culb, submarginal fascia sometimes prominent or obscure, underside with black, white pupilled, yellow iris ocelli in Rs, Cula, Culb, the ocellus in Rs largest, the two ocelli in Cula, Culb may be well separated or contiguous, submarginal fasciae sometimes weakly developed.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 6 exs., 5.vi.1992, 1 exs., 3.vi.1993, 4 exs., 5.vi.93. 1 ex., 11.vi.1994 (Coll. N. Sharma & party); Dehradun, Mussoorie, Mossey Falls, 1400 m, 4 exs., 7.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Murray Pumping Station, 1645 m, 3 exs., 6.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Kemptyfalls, 1645 m, 3 exs., 5.vi.1993 (Coll. N. Sharma & party); Dehradun, Mussoorie, Aglar Valley, 800 m, 2 exs., 2.vi.1992 (Coll. N. Sharma & party); Dehradun, Dhanolti, Bandhal Nadi, 700 m, 2 exs., 9.vi.1993 (Coll. N. Sharma & party); Dehradun, Chakrata, 2100 m, 1 exs., 15.vi.1994 (Coll. N. Sharma & party); Dehradun, Forest Research Institute, 695 m., 6.ix.1992 (Coll. N. Sharma & party); Chamoli, Gopeshwar, 1308 m, 4 exs., 15.vi.1992, (Coll. N. Sharma & party).

Wing expanse : Half; Male : 18.0-19.0 mm.

Female : 21.0 mm.

Distribution : Uttarakhand (Kumaon, Mussoorie), Himachal Pradesh (Kullu, Pangi, Shimla, Theog, Kangra, Mandi) Jammu & Kashmir.

Elsewhere : Nepal, Pakistan.

33. *Ypthima newara* Moore

Common name : The Newar Threering.

1874. *Ypthima newara* Moore, *Proc. zool. Soc. Lond.* : 567.

1994. *Ypthima newara* : Varshney, *Oriental Insects*, **28** : 159.

Diagnostic characters : Forewing upperside with black, bipupilled, yellow-ringed, subapical ocellus, the shape of ocellus vary *i.e.*, rounded or oblique, sometimes cryptic without pupil, submarginal fascia usually distinct, male brand not prominent, underside yellowish grey, striated with brown, ocellus as on the upperside, submarginal fascia broader towards inner margin, obscure at apex; hindwing upperside with black, single pupilled, yellow iris, prominent or obscure ocellus in Cula, sometimes very minute ocellus present in Culb, marginal fasciae prominent or cryptic, below with three black, single pupilled, yellow-ringed ocelli in Rs, Cula, Culb, ocellus in Rs largest, the ocelli in Cula, Culb may be well separated or contiguous, submarginal fasciae distinct, outer discal fascia indistinct, submarginal area from tornal ocellus to apical ocellus striated more coarsely with white.

Material examined : Chamoli, Gopeshwar, 1308 m, 9 exs., 10.vi.1992 (Coll. N. Sharma & party).

Wing expanse : Half; Male : 18.0-19.0 mm.

Female : 21.0 mm.

Distribution : Uttarakhand, Assam, Himachal Pradesh, Sikkim.

Elsewhere : Burma, China, Nepal.

Genus *Paralasa* Moore

Common name : The Mountain Argus.

1893. *Paralasa* Moore, *Lep. Ind.* **2**(16) : 103.

Type-species : *Erebia kalinda* Moore.

34. *Paralasa shallada* (Marshall and de Niceville)

Common name : The Mountain Argus.

1880. *Erebia shallada* Marshall and de Niceville, *J. asiat. Soc. Bengal* **49**(2) : 247.

Paralasa shallada shallada (Marshall and de Niceville)

1880. *Erebia shallada shallada* Marshall and de Niceville, *J. asiat. Soc. Bengal* **49**(2) : 247.

Diagnostic characters : Forewing upperside with subapical, black, white pupilled ocellus, post-discal ferruginous area smaller, underside ochraceous red, costa, apex, outer and inner margins dark brown, subapical, black, white centred, yellow ringed ocellus; hindwing upperside with small, submarginal, ferruginous patch, underside blackish brown, coarsely striated with greyish white, post-discal curved series of white dots.

Wing expanse : Half; Male : 26.0-28.0 mm.

Female : 26.5-28.0 mm.

Material examined : Dehradun, Dhanolti, 1 exs., 08.vi.1993 (Coll. N. Sharma & party).

Distribution : Uttarakhand, Himachal Pradesh (Shimla, Kangra, Kullu), Jammu & Kashmir.

Genus ***Callerebia*** Butler

1867. *Callerebia* Butler, *Ann. Mag. nat. Hist.* **20**(3): 217.

Type-species : *Erebia* scanda Kollar.

Key to the species of the Genus *Callerebia* Butler

1. Hindwing underside submarginal and post-discal band or lines not prominent .... *nirmala* Moore.

   Hindwing underside submarginal and post-discal bands or lines prominent 2

2. Upperside with distal area paler; hindwing underside with prominent sub- marginal and post-discal bands, mottled with white nearly throughout, two tornal ocelli without white pupil; male genitalia with uncus long, nearly straight; female genitalia with lamella antevaginalis squarish plate .... *annada* Moore

   Upperside uniformly dark brown; hindwing underside with prominent sub-marginal and post-discal lilnes (not bands) without white dusting, tornal ocelli with or without white pupil; male genitalia with uncus very long, weakly curved ventrally; female genitalia with lamella antevaginalis rectangular plate like .. .. *hybrida* Butler

35. ***Callerebia nirmala*** (Moore)

Common name : The Common Argus.

1865. *Erebia nirmala* Moore, *Proc. Zool. Soc. Lond.* : 501.

Callerebia nirmala nirmala (Moore)

1865. *Erebia nirmala* Moore, *Proc. Zool. Soc. Lond.* : 501.

Diagnostic characters : Forewing upperside with black, subapical, oblique or rounded, with ferruginous iris, bipupilled, ocellus, iris more prominent on the outer side, below dark ferruginous, costal margin, apex, outer margin and inner margin fuscous, ocellus as on upperside but the ring more prominent; hindwing upperside with similar ocellus as on forewing but smaller and single pupilled in Cula, similar but smaller ocelli than ocellus in Cula may present in M_1 and Culb, underside pale, submarginal and post-discal brown line ill-defined, post-discal series of black, white pupilled, fulvous-ringed ocelli in Culb, Cula, M_3, M_2, M_1 and Rs, ocelli in Culb and Cula, M_2 and M_1 either contiguous or separated, ocellus in Cula always present, white ocelli in Culb, M_3, M_2, M_1 and Rs either present, absent or represented by white dots only.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 4 exs., 3.vi.1992, 6 exs., 5.vi.1992, 8 exs., 3.vi.1993, 5 exs., 5.vi.93, 7 exs.,11.vi.1994 (Coll. N. Sharma); Dehradun, Chakrata, 2100 m, 6 exs., 15.vi.1994 (Coll. N. Sharma); Gobinddham, Chamoli, 1308 m, 2 exs., 13.vi.1992 (Coll. N. Sharma).

Wing expanse : Half; Male : 25.0-28.0 mm.

Female : 26.0-28.0 mm.

Distribution : Uttarakhand, Himachal Pradesh.

36. ***Callerebia annada*** (Moore)

Common name : The Ringed Argus.

1857. *Erebia annada* Moore, in Horsfield & Moore, *Cat. Lep. Ins., E. India Co.* **1** : 226.

Callerebia annada caeca Watkins

1925. *Callerebia annada caeca* Watkins, *Ann. Mag. Nat. Hist. Soc.* **16**(9) : 236.

Diagnostic characters : Forewing with subapical, black, bipupilled, ringed with purple red, ocellus, apex, marginal and submarginal area paler, submarginal dark band indistinct, sometimes another similar, single pupilled but smaller ocellus in Cula, underside ochraceous red brown, ocelli as on the upperside of the wing, apex and marginal area paler, marginal and submarginal lines obscurely marked; hindwing with anal angle more falcated, upperside with single white pupilled, ringed with purple red, ocellus in Cula, sometimes a similar but smaller ocellus may present in Culb, marginal area paler, underside mottled with white nearly throughout, post-discal and submarginal dark brown band, two black, fulvous ringed ocelli in Cula and Culb, these ocelli either spaced or contiguous.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 16 exs., 3.vi.1992, 6 exs., 5.vi.1992, 18 exs., 2.vi.1993, 2

exs., 6.vi.93 (Coll. N. Sharma); Dehradun, Mussoorie, Kemptyfalls, 1645 m, 4 exs., 5.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Company Garden, 2005 m, 4 exs., 4.vi.1992 (Coll. N. Sharma); Nainital, Tiffon Top, 2400 m, 6 exs., 29.iv.1992 (Coll. N. Sharma); Nainital, Bhimtal, 1800 m, 2 exs., 27.iv.1992 (Coll. N. Sharma); Nainital, 1829 m, 4 exs., 28.iv.1992 (Coll. N. Sharma); Nanital, Jeolkota, 1200 m, 1 ex., 23.ix.2002 (Coll. P. Mukhopadhyay & Party); Nanital, Ranibag, 1950 m, 1 ex.,8.x.2001 (Coll. P. Mukhopadhyay & Party); Bageshwar, Kafligar, 1 ex., 4.x.2001 (P. Mukhopadhyay & Party) Almora, Artola, 3 exs., 29.ix.2001 (Coll. P. Mukhopadhyay & Party); Almora, Binsar, 2236 m, 3 exs., 30.ix. 2001 (Coll. P. Mukhopadhyay & Party); Almora, Binsar, 2236 m, 7 exs., 26.ix. 2001 (Coll. A. Bal & Party); Almora, Binsar, 2480 m, 2 exs., 1 ex. 2004 (Coll. D.R. Maulik & Party); Almora, Ranikhet, Bijkali, 1860 m, 2 exs., 24.ix.2004 (Coll. D. R. Maulik).

Wing expanse : Half; Male : 28.0-30.0 mm.

Female : 30.0-32.0 mm.

Distribution : Uttarakhand, Himachal Pradesh (Kangra, Chmaba, Shimla), Jammu & Kashmir.

Elsewhere : Nepal.

37. ***Callerebia hybrida*** Butler

Common name : The Hybrid Argus.

1880. *Callerebia hybrida* Butler, *Proc. Zool. Soc. Lond.* : 147.

Diagnostic characters : Forewing costal arched, apex rounded, outer margin more or less rounded, inner margin nearly straight, upperside with subapical black, bipupilled, ferrugiouns-ringed, large ocellus, below greyish brown, submarginal and discal dark ferruginous lines prominent, underside ocellus as on upperside of the forewing; hindwing upperside with similar, single pupilled but smaller ocellus in Cula, as on forewing, another small ocellus may present in Culb, underside with prominent marginal and discal lines, black, white pupilled fulvous-ringed ocelli in Cula and Culb, white dots either present or absent in M_2, M_1 and Rs.

Material examined : Dehradun, Mussoorie, Bhilaru Pumping Station, 1710 m, 6 exs., 5.vi.1992, 4 exs., 3.vi.1993, 8 exs., 6.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Kemptyfalls, 1645m, 14 exs., 6.vi.1992, 11 exs., 5.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Mossey Falls, 1400m, 5 exs., 7.vi.1993 (Coll. N. Sharma); Dehradun, Mussoorie, Aglar Valley, 800 m, 20 exs., 4.vi.1992 (Coll. N. Sharma); Chamoli, Gobinddham, 3250 m, 2 exs., 13.vi.1992 (Coll. N. Sharma).

Wing expanse : Half; Male : 28.0-30.0 mm.

Female : 30.0 mm.

Distribution : Uttarakhand, Himachal Pradesh.

SUMMARY

The present paper incorporates a systematic account of thirty-seven species and subspecies referable to twelve genera from Uttarakhand. Dry and wet-season forms were recorded in eight species under two genera. Keys to the genera and species alongwith diagnostic characters, distribution, have been included in the present work.

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REFERENCES

Antram, C.B. 1924. Butterflies of India, xvi+ 226pp., figs 412, pl.1-Calcutta and Shimla (Thacker, Spink and Co.).

Bingham, C.T. 1905. *The Fauna of British India including Ceylon and Burma, Butterflies,* 1. London : Tayler & Francis : 1-511, Pls. 1-10.

Evans, W.H. 1932. *The Identification of Indian Butterflies,* 2nd ed. Bombay Natural History Society, Bombay : x+ 454 pp., 32 pls., 9 figs.

Hannyngton, F. 1910.The Butterflies of Kumaon. *J. Bombay nat. Hist. Soc.*, **20**(1) : 130-142; (2) : 361-372.

Mackinnon, P.W. and L. de Niceville. 1897. A list of butterflies of Mussoorie in the Western Himalayas and neighboring region. *J. Bombay nat. Hist. Soc.*, **11** : 205-221; 368-389; 585-605.

Marshall, G.F.L. and De Niceville, L. 1883. *The butterflies of India, Burmah and Ceylon,* Vol. 1. Reprinted by A.J. Reprints Agency, New Delhi : 327 pp.

Ollenbach, O.C. 1929. Butterfly collecting grounds at Mussoorie, India. *J. Bombay nat. Hist. Soc.*, **34** : 836-840.

Shull, E.M. 1957. My highest catch of butterfly species in a single day (4th June, 1957) at Mussoorie, India. *Lepid. News*, **11** : 167-168.

Shull E.M. 1962. Over one hundred butterfly species caught in a single day (3rd June, 1961) at Mussoorie, India. *Lepid News*, **16** : 143-145.

Talbot, G. 1947. *The Fauna of British India including Ceylon and Burma*. Butterflies volume-2. Taylor and Francis, London : 506pp.

Wynter-Blyth, M.A. 1957. *Butterflies of the Indian region. Bombay nat. Hist.Soc.*, : xx + 523pp 72pls.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, 18(Part-2), 2010 : 593-609.

INSECTA : LEPIDOPTERA, NYMPHALIDAE (DANAINAE), LASIOCAMPIDAE AND LYMANTRIIDAE

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INTRODUCTION

Of the 17,000 species of butterflies known from the World, about 1,500 species (8.66%) are recorded from India. Northern part of India is rich in butterfly diversity. Presently, 46 species / subspecies of butterflies of family Papilionidae, Nymphalidae (Danainae), Lasiocampidae and Lymantriidae are treated from the state of Uttarkhand.

At present, the studies on the butterflies is based upon on the specimens collected by the several Scientist of Zoological Survey of India during their surveys of the state of Uttarkhand and old collections of N.Z.C. The specimens available in the old collections of Zoological Survey of India have also examined. As a result, 46 species representing 19 genera under two families of butterflies, Papilionidae and Nymphalidae (Danainae) and two families of moth, Lasiocampidae and Lymantriidae have been dealt with from the state of Uttarkhand.

SYSTEMATIC ACCOUNT

Family PAPILIONIDAE

Antennae comparatively short and usually with a distinct club; probosis well developed; palpi short and pressed to frons (accept and projecting in teinopalpus); fore legs fully developed , fore tibiae with spur on innerside, hind tibiae with middle spur, claws simple, rarely with toothed, paronychium and pulvillus absent. Cell closed in both sexes. Fore wing with 12 veins, in addition vein 3A ending on inner margin, a short transverse vein also present near the base of wing between cell and vein 2A (with few exceptions) (vein 7, 8 stalked, vein 2 arising before middle of cell, four veins arising from outer lower edge of the cell. Hind wing usually with a tail at vein 4 which may be slender or broad and spatulate, inner margin of hind wing being frequently folded over and within the fold, in male bearing a patch of specialized scales or scent scales (androconia). Vein 2A absent, the basal cell and precostal vein present.

Subfamily Papilioninae
Key to Tribes

1. Tibiae and tarsi scaled ..... **Leptocircini**
– Tibiae and tarsi unscaled 2
2. Tibiae and tarsi with ventral rows of spines separated from dorsal rows by an impressed spineless space; Hind wing precosta simple, curved distated ..... **Papilionini**
– Tibiae and tarsi with ventral rows of spines not separated from dorsal rows by an impressed spineless space; Hind wing precosta forked, curved distated ..... **Troidini**

Tribes **Leptocircini**
Genus ***Graphium*** Scopoli

1777. *Graphium* Scopoli, *Intr. Hist. Nat.*, 433.

Subgenus ***Graphium*** Scopoli
Key to species

Fore wing upperside with double cell spot; Tail short ..... *agamemnon* Linnaeus

1. ***Graphium agamemnon*** (Linnaeus, 1758)
Graphium (Graphium) agamemnon agamemnon (Linnaeus, 1758)

1758. *Graphium agamemnon* Linnaeus, *Syst. Nat. ed.* **10** : 462.

2007. *Graphium (Graphium) agamemnon agamemnon* (Linnaeus) : Maulik, *State Fauna Series 5 : Andhra Pradesh (Part-3) Zool. Surv. India*, : 522.

Material examined : Uttarkhand, Almorah district, Kapakhan, 15 km. South of Binsar Wildlife

Sanctuary Forest Guest House, Stn, 13, alt. 2345m. 1ex., 02.x.2004, Coll. by D.R. Maulik and party; Derha Dun district, Botanical Garden, F.R.I., Stn. 1, 1ex., 18.09.2005, coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 78, ♀ 90 mm.

Distribution : INDIA : Uttarkhand (Almorah, Derha Dun), Arunachal Pradesh, widely distributed in India (Talbot 1939).

Elsewhere : Bangaladesh, Bhutan, Myanmar, Nepal and Sri Lanka. (Talbot, 1939).

Remarks : The nominated species is common throughout India.

Eurypylus Group.

2. ***Graphium doson axion*** (C. & R. Felder)
Graphium (Graphium) doson axion (C. & R. Felder)

1864. *Papilio axion* C. & R. Felder, *Verb. zool-bot. Ges. Wien.*, **14** : 305.

2003. *Graphium (Graphium) doson axion* (C. & R. Felder) : Maulik, *State Fauna Series 9 : Fauna of Sikkim (Part –4), Zool. Serv. India,* : 3.

Material examined : Uttarkhand, Almorah district, Takula, 35 km. away from Binsar Wilflife Sanctuary, stn. 3. alt. 2150 m. 2exs., 2.x.2004, Coll. by D.R. Maulik and party; Derha Dun district, Rishikesh, Narendranagar F.R.H. campus, stn.7. 1ex., 28.x.2005, coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 78 mm.

Distribution : INDIA : Uttarkhand (Almorah, Derha Dun), Arunachal Pradesh, Manipur, Mehalaya, Orissa, Sikkim, West Bengal and West Himalaya.

Elsewhere : Myanmar, South East China, Thailand and Vietnam.

Remarks : This species is new record for this State.

sarpedon group

3. ***Graphium sarpedon luctatius*** Fruhstofer
Graphium (Graphium) sarpedon luctatius (Fruhstofer)

1907. *Graphium sarpedon luctatius* (Fruhstofer), *Ent. Zeit.*, **21**(30) : 183.

1998. *Graphium (Graphium) sarpedon luctatius* (Fruhstofer) : Mondal & Maulik, *State Fauna Series 4 : Fauna of Meghalaya (Part-6), Zool. Serv. India,* : 241.

Material examined : Uttarkhand, Bageswar district, Wayyula F.R.H., stn. 9, alt. 1590 m. 1ex., 28.ix.2004; Someswar, 35 km. away from Wayyula F.R.H., stn. 10, alt. 1636 m., 1ex., 29.ix.2004, Coll. by D.R. Maulik and party; Uttarkasi district, Brahambal, way to Uttarkasi, stn. 9, 2exs., 23.ix.2005, Coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 78, ♀ 90 mm.

Distribution : INDIA : Uttarkhand (Bageswar, Uttarkasi), Andhra Pradesh, Arunachal Pradesh, Meghalaya, West Bengal and also East to North West Himalya.

Elsewhere : Myanmar, Hainan, Lesser Sunda, Philippines, Sundland and Vietnam.

Remarks : This species is new record for this State.

4. ***Graphium cloanthus cloanthus*** (Wesrwood)
Graphium (Graphium) cloanthus cloanthus (Wesrwood)

1841. *Papilio cloanthus* Westwood, *Arc. Entom.*, **1** : 42.

1982. *Graphium (Graphium) cloanthus cloanthus* (Wesrwood) : Hancock, *Smerthesia*, **2** : 47.

Material examined : Uttarkhand, Rudraprayag district, Bhala Rail Campus, 1ex., 26.ix.2006, Coll. by A.K. Sidhu and party.

Fore wing length : ♂ 80 mm.

Distribution : INDIA : Uttarkhand (Rudraprayag), Kashmir, widely distributed throughout North and North East Himalaya.

Elsewhere : Myanmar.

Tribe **Troidini**

Key to genera

Pattern black with white red spot. Fore wing with R1 arising opposite CuA1. Hind wing tailed, never with golden transparent scales ..... ***Atrophaneura*** Reakrit

Genus ***Atrophaneura*** Reakrit

5. ***Papilio aristolochiae*** Fabricius
Atrophaneura (Atrophaneura) aristolochiae aristolochiae (Fabricius)
(Common Rose)

1775. *Papilio aristolochiae* Fabricius, *Syst. Ent.* (3)**1** : 443.

2003. *Atrophaneura (aristolochiae) aristolochiae* (Fabricius) : Maulik, *State Fauna Series 9 : Fauna of Sikkim (Paart-4), Zool. Surv. India,* : 4.

Material examined : Uttarkhand, Bageswar district, Wajyula F.R.H., stn. 9, alt. 1590 m. 1ex., 28.ix.2004; Almorah district, Kaprakhan, 15 km. South of Binsar Wildlife Sanctuary Forest Guest House, Stn, 13, alt. 2345m. 2exs., 02.x.2004, Coll. by D.R. Maulik and party.

Fore wing length : ♂ 85, ♀ 95 mm.

Distribution : INDIA : Uttarkhand (Almorah, Bageswar), Arunachal Pradesh, Andhra Pradesh, Assam Manipur, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Bangladesh, Bhutan, Nepal, Sri Lanka (Talbot 1939).

Remarks : This nominated species is new record for the State of Uttarkhand.

Tribe **Papilionini**

Genus ***Chilasa*** Moore

1881. *Chilasa* Moore, *Lep. Ceyl.*, **1** : 153.

Subgenus ***Chilasa*** Moore

Pattern mimetic of Danainae or Uraniidae or moasly blue; tail reduced or absent; frons, thorax and abdomen often with pale line or spots.

6. ***Chilasa clytia*** Linnaeus, 1758.
Chilasa (Chilasa) clytia clytia (Linnaeus, 1758.)

1758. *Papilio clytia* Linnaeus, *Syst. Nat., ed.* **10** : 479.

1998. *Chilasa (Chilasa) clytia clytia* (Linnaeus) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India,* : 525.

Material examined : Uttarkhand, Almorah district, Kosi, 25 km. west of Dinapani F.R.H., stn. 16. Alt. 1690 m., 1ex., 04.x.2004, Coll. by D.R. Maulik and party; Derha Dun district, Yamuna bridge, on the way to Barkot, stn 3, 1ex., 19.ix.2005, Coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 52, mm.

Distribution : INDIA : Uttarkhand (Almorah, Derha Dun), Arunachal Pradesh, Andhra Pradesh, Manipur, Mizoram, Nagaland, Sikkim and widely distributed in India.

Elsewhere : Bangladesh, Bhutan, Myanmar, Nepal, Sri Lank and Myanmar.

Remarks : Hampson (1889) describe nominated species under the genus *Chilasa* Hancock (1983) stated nominated species and subspecies under the genus *Chilasa* and subgenus *Chilasa.*

Genus ***Papilio*** Linnaeus, 1758

1758. *Papilio* Linnaeus, *Syst. Nat.* **10** : 448.

machaon group

7. ***Papilio machaon*** Linnaeus
Papilio machaon anne (Gistal)

1857. *Papilio machaon* Linnaeus, *Syst Nat.* ed **10** : 460; ssp. *anne* Gistal, *Vacuna* **2**(2) : 603.

1982. *Papilio machaon anne* (Gistal) : Maulik, *State Fauna Series 9 : Fauna of Sikkim (Part 4), Zool. Surv. India,* : 7.

Material examined : Uttarkhand, Bageswar district, Bageswar in and around, stn. 9, alt. 1785m. 1ex, 30.ix.2004, coll. D.R. Maulik and Party.

Fore wing length : ♂ 92 mm.

Distribution : INDIA : Uttarkhand (Bageswar) distributed in Himalyan Region.

Elsewhere : Asia, Europe, Australia etc.

Remarks : Linnaeus (1757) describe nominated species *machaon*. Gistal (1857) stated nominated species *annae* and Hemming (1925) mentioned nominated species *machaon.* Talbot (1939) stated the subspecies *annae* occurring in the state Sikkim.

Genus ***Princeps*** Huebner

1807. *Princeps* Huebner, *Samml. Schmett.* **1** : pl. (116) Ausgber.

Subgenus ***Menelaides*** Huebner

1819, *Menelaides* Huebner *Samml. Schmett.* : 74.

Polytes group

Hind wing in male black with a broad or narrow white discal band; male without androconia.

8. ***Papilio polytes romulus*** Cramer, 1775
Princeps (Menelaides) polytes romulus
(Cramer, 1775.)

1775. *Papilio polytes* Linnaeus, *Syst. Nat., ed.* **10** : 460, *ssp. romulus* (Cramer, 1775).

2003. *Princeps (Menelaides) polytes romulus* (Cramer) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India,* : 526.

Material examined : Uttarkhand, Almorah district, Kaprakhan, 15 km. South of Binsar Wildlife Sanctuary Forest Guest House, Stn, 13, alt. 2345m. 6exs., 02.x.2004; Almorah district, Dinapani, Bare Chhina 25 km. away from Dinapani F.R.H, stn. 11, 2exs., 5.x.2004; Dwarhat, 41 km. away from Binsar Wildlife Sanctuary, stn. 7, alt. 1630m. 3exs., 28.ix.2004, Coll. by D.R. Maulik and party; Derha Dun district, Sahashra, Dhara 25 km, South East of Derha Dun, stn. 1, 2exs, 18.ix.2005; Mussoorie, Kampty Falls, stn. 2, 5exs., 19.05.2005 Mussoorie, Yamuna bridge, on the way to Barkot, stn. 2, 2exs., 19.ix.2005, Coll. by Uttarkasi district, Brahambal, way to Uttarkasi, stn. 4, 2exs., 23.ix.2005, Coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 85, ♀ 96 mm.

Distribution : INDIA : Uttarkhand, (Almorah, Bageswar, Derha Dun, Uttarkasi), Arunachal Pradesh, Andhra Pradesh, Assam, Manipur, Mizoram, Nagaland , Sikkim and widely distributed in India.

Elsewhere : Malaya Penninsula, Myanmar, Sri Lanka, Tonkin, Natua, and Lingga Island.

Remarks : Talbot (1939) describe this nominated species under the genus *Papilio* and Hancock (1983) describe this species and subspecies under the genus *Princeps* and subgenus *Menelaides.*

Subgenus ***Menelaides*** Huebner

9. ***Papilio protenor euprotenor***, Fruhstorfer
Princeps (Menelaides) protenor euprotenor
(Fruhstorfer)

1775. *Papilio protenor euprotenor*, Fruhstorfer., *Ent. Zeit. Sttat.*, **22**(11) : 46-47.

2003. *Princeps (Menelaides) protenor euprotenor* (Fruhstorfer) : Maulik, *State Fauna Series 9 : Fauana of Sikkim (Part-4), Zool. Serv. India,* : 775.

Material examined : Uttarkhand, Nainital district, 20 km from Bhawali F.R.H., stn. 1, alt. 1920 m. 1ex., 02.x.2004; Almoreah district, Takula, 35 km. from away from Binsar Wildlife Sanctuary F.R.H, stn. 14, alt. 2150 m., 1ex., 22.x.2004, Coll. by D.R. Maulik and party; Uttarkasi district, Yamunatri, Barkot F.R.H., 'at light' stn. 4, alt. 1390 m., 2exs., 23.ix.2005, Coll. by K. Sidhu , D.R. Maulik and party.

Distribution : INDIA : Uttarkhand (Almorah, Nainital), Arunachal Pradesh, Assam, Andhra Pradesh, Himachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland Sikkim, Uttar Pradesh and West Bengal Widely distributed in India.

Elsewhere : Bali, Philippines and South China.

Remarks : Talbot (1939) describe this species and subspecies under the genus *Papilio* and Hancock (1983) describe this species under the genus *Princeps* and subgenus *Menelaides.*

Subgenus ***Princeps*** Huebner

1807. *Princeps* Huebner, *Samml. Schmett.*, **1** : pl. (116). Augsber.

demoleus group

Sexes similar, non-mimetic, black with postdiscal bands and submarginal spots; basal area with dispersed yellow scales; tail reduced or absent; hind wing red and blue spot present; male without androconia.

10. ***Papilio demoleus*** (Linnaeus, 1758)
Princeps (Princeps) demoleus demoleus
(Linnaeus, 1758)

1758. *Papilio demoleus* Linnaeus, *Syst. Nat. ed.* **10** : 464.

1998. *Princeps (Princeps) demoleus demoleus* (Linnaeus) : Maulik, *State Fauna Series 5 : Fauna of Andhra (Paart –3), Zool. Surv. India,* : 527.

Material examined : Uttarkhand, Almorah district, Kaprakhan, 15 km. South of Binsar Wildlife Sanctuary Forest Guest House, Stn, 13, alt. 2345m. 1ex., 02.x.2004; Kosi, 20 km. West of Dinapani F.R.H., stn. 16, alt. 1690 m., 1ex., 4.x.2004, Coll. by D.R. Maulik and party; Derha Dun district, Rishikesh F.R.I., Stn.7, 1ex., 28.ix.2004, coll. by D.R. Maulik and party.

Fore wing length : ♂ 78, ♀ 90 mm.

Distribution : Uttarkhand (Almorah, Derha Dun). Widely distributed throughout India.

Elsewhere : Arabia; Bangladesh, Bhutan, Persia, Myanmar and Sri Lanka.

Remarks : Talbot (1939) describe this species and subspecies under the genus *Papilio* and Hancock (1983) describe this species under the genus *Princeps* anid subgenus *Princeps*.

paris group

Sexes similar, non-mimetic, black with or without metallic blue or green patch; underside with dispersed basal cream scales, upperside with dispersed metallic scales; tail present or absent; hind wing red and blue spots present; blue scales on inner surface of red scales.

11. ***Papilio krishna*** Moore
Princeps (Princeps) krishna krishna Moore

1857. *Papilio krishna* Moore, *Cat. Lep. Mus. East India co.*, 1 : 110, pl. 2a. fig. 6.

1983. *Princeps (Princeps) krishna krishna* Moore : Hancock, *Smerthesia*, 2 : 48.

Material examined : Uttarkhand, Almorah district, Dinapani, Bare Chhina 25 km. away from Dinapani F.R.H, stn. 11, 2exs., 5.x.2004; Dwarhat, 41 km. away from Binsar Wildlife Sanctuary, stn. 7, alt. 1630m. 3exs., 28.ix.2004, Coll. by D.R. Maulik and party; Derha Dun district, Sahashra, 25 km, South East of Derha Dun, stn. 1, 2exs, 18.ix.2005, Coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 84-95 mm.

Distribution : INDIA : Uttarkhand, (Almorah, Derha Dun), Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland, West Bengal, Sikkim, widely distributed in India.

Elsewhere : Bangladesh, Bhutan, Myanmar, Sri Lanka (Talbot 1939).

Remarks : Bingham (1907) first reported this subpsecies from Rangrum Forest, Darjeeling. Talbot (1939) mention this species and subspecies under the genus *Papilio* and Hancock (1983) describe this species under genus *Princeps* and subgenus *Princeps*.

paris group

12. ***Papilio ganesa*** Doubleday
Princeps (Princeps) polyctor ganesa (Doubleday)

1842. *Papilio ganesa* Doubleday, In Gray's *Zool. Miscell.*, : 73.

2003. *Princeps (Princeps) polyctor ganesa* (Doubleday) : Maulik, *State Fauna Series 9 : Fauna of Sikkim, (Part-4), Zool. Serv. India*, : 6.

Material examined : Uttarkhand, Uttarkasi district, Yamunatri, 1 km. from Barkot F.R.H., stn. 4, 3ex. s, 20.ix.2005; Yamunatri, Barkot F.R. H., stn. 3, 2exs., 21.ix.2005; Yamunatri, Barkot, Bed of Yamuna river, stn. 3, 1ex., 22.ix.2005; Brahmabal on the way to Uttarkasi, stn. 4, 2exs,. 23.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 110, ♀ 130 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi). Widely distributed in North and North East India.

Elsewhere : Chiana (Tibet) and Myanmar.

Remarks : Talbot (1939) mention this species and subspecies under the genus *Papilio* and Hancock (1983) describe this species under genus *Princeps*. and subgenus *Princeps*.

Family NYMPHALIDAE
Subfamily DANAINAE

Antennae not scaled; eyes nacked; fore legs imperfect, useless for walking in both sexes; both wing simple and margin not dented or curved, both wing of cell are closed by tubular vein; fore wing all veins present, vein 2A bifurcated at base, hind wing with precostal vein present. This subfamily is represented in India by nine genera and 71 species of which four genera and 8 species are treated from the state of Uttarkhand.

Key to Tribe

Pulvilli and paronychia of mid- and hind legs vestigial; Tarsal claws almost straight, curved only at tip ..... **Danaini**

Pulvilli and paronychia of mid- and hind legs distinct; Tarsal claws evenly curved throughout their length ..... **Euploeini**

Tribe **Danaini**
Key to species

1. Upperside of fore wing fulvus or white and without vitreous spot and stripes .... *Danaus* Kluk

– Upperside of fore wing pale blue and with vitreous spot and stripes 2

2. Fore wing cell close by a transverse black bar ..... *Tirumala* Moore

– Fore wing cellnot close by a transverse black bar ..... *Parantica* Moore

Genus ***Danaus*** Kluk

1802. *Danaus* Kluk, *Zierzet. Hist. Nat. Poez. Gospod.*, **4** : 84.

1984. *Danaus* Kluk : Ackery & Vane-Wright, *Milkweed Butterflies* : 201.

Subgenus ***Salatura*** Moore (1880)

13. ***Papilio genutia*** Cramer

Danaus (Salatura) genutia genutia (Cramer)

1779. *Papilio genutia* Cramer, *Pap. Exot.* **3** : 23, pl. 200, figs. C.D.

2007. *Danaus genutia genutia* (Cramer) : Maulik, *State Fauna Series 5 : Fauna of Ahdhra Pradesg (Part-3), Zool. Serv. India.*, : 529.

Material examined : Uttarkhand, Bageswar district, Someswar, 35 km away from Wajyula F.R.H., stn. 10, alt. 1636 m., 1ex., 29.ix.2004, coll. by D.R. Maulik and party. Derha Dun district, Rishikesh, Narendranagar F.R.H campus, stn. 7, 1ex., 28.x.2005, coll. by A.K. Sidhu, D.R. Maulik and party.

Fore wing length : ♂ 70, ♀ 78 mm.

Distribution : Uttarkhand (Bageswar, Derha Dun) widely distributed throughout India.

Elsewhere : Annam, Asia Minor, Bangladesh, China, Japan, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Sumatra, Thailand, Tonkin, and Yunnan.

Subgenus ***Anosia*** Huebner (1816)

14. ***Papilio chrysippus*** Linnaeus, 1758

Danaus (Anosia) chrysippus chrysippus (Linnaeus, 1758)

1758. *Papilio chrysippus* Linnaeus, *Syat. Nat. ed* **10** : 471.

2007. *Danaus chrysippus chrysippus* (Linnaeus) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India* : 529.

Material examined : Uttarkhand, Nainital district, Bhattia, 40 km from Bhawali F.R.H., alt. 1762m. 2exs., 22.ix.2004; Bageswar district, Someswar, 35 km. away from Wajyula F.R.H., stn. 10, alt. 1638 m. 1ex., 29.ix.2004; Almorah district, Kaprakhan, 15 km. South of Binsar Wildlife Sanctuary Forest Guest House, Stn, 13, alt. 2345m. 2exs., 22.x.2004; Takula, 35 km. away rom Wajyula F.R.H. of Binsar Wildlife Sanctuary Forest Guest House, Stn, 14, alt. 2150m. 2exs., 22.ix.2004; Kosi, 20 km. West of Dinapani F.R.H., stn.16, alt. 1690m., 1ex., 4.x.2004, Coll. by D.R. Maulik and party Derha Dun district, Rishikesh, Narendranagar F.R.H. Campus, Stn. 7, 1ex., 28.x.2004, coll. by D.R. Maulik and party; Harduwar district, Jawalapur, stn. 5, Camp-3, 1ex., 14.ix.2006, Coll. by A.K. Sidhu and party.

Fore wing length : ♂ 70, ♀ 84 mm.

Distribution : INDIA : Uttarkhand, (Almorah, Bageswar, Derha Dun, Nainital), widely distributed throughout India.

Elsewhere : Asia Minor, Bangladesh, Barneo, China, Japan, Malaya, Myanmar, Nepal, Pakistan, Sri Lanka. and Sumatra.

Genus ***Tirumala*** Moore, 1880a

1880a. *Tirumala* Moore, *Lep. Ceyl.*, **1**(1) : 4.

Key to the species

Larger species being less boldly marked .... *septentrionis* (Butler)

Smaller species being more boldly marked ..... *limniace* (Cramer)

15. ***Danais limniace ver leopardus*** Butler, 1866b

Tirumala limniace leopardus (Butler, 1866b)

1866b. *Danais limniace ver leopardus* Butler, *Proc. Zool. Soc. London.* **1866b.** : 52.

2007. *Tirumala limniace leopardus* (Butler) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India* : 530.

Material examined : Uttarkhand : Bageswar district, Someswar, 35 km away from Wajyula F.R.H., stn. 10, alt. 1636 m., 1ex., 29.ix.2004, coll. by D.R. Maulik and party; Paurigarwal district, Srinagar, 1ex., 04.ix.2006, Coll. by A.K. Sidhu and party.

Fore wing length : ♂ 75, ♀ 90 mm.

Distribution : INDIA : Uttarkhand, (Bageswar, Paurigarwal), almost throughout the rest of mainland and also Andaman & Nicobar Island and Peninsular India.

Elsewhere : Asia Minor, Bangladesh, China, Indo-China; Java; Malaya, Myanmar, Nepal, Pakistan and Sri Lanka.

16. ***Tirumala septentrionis*** (Butler, 1874)
Tirumala septentrionis septentrionis (Butler)

1874. *Tirumala septentrionis* Butler, *Ent. Mo. Mag.*, **11** : 163.

1998. *Tirumala septentrionis septentrionis* (Butler) : Mondal & Maulik, *State Fauna Series 4 : Fauna of Meghalaya (Part-6) Zool. Surv. India,* : 235.

Material examined : Uttarkhand, Bageswar district, Someswar, 35 km. away from Wajyula F.R.H., stn. 10, alt. 1638 m. 1ex., 29.ix.2004; Almorah district, Kaprakhan, 15 km. South of Binsar Wildlife Sanctuary Forest Guest House, Stn,13, alt. 2345m. 2exs., 22.x.2004; Takula, 35 km.away from Binsar Wildlife Sanctuary Forest Guest House, Stn, 14, alt. 2150m. 2exs., 22.ix.2004, coll. by D.R. Maulik and party; Paurigarwal district, Srinagar, 1ex., 04.ix.2006, Coll. by A.K. Sidhu and party.

Fore wing length : ♂ 65, ♀ 70 mm.

Distribution : INDIA : Uttarkhand (Almorah, Bageswar, Paurigarwal), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Nagaland, Orissa, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Bhutan, Myanmar (Burma), China, Maaya, Nepal, Vietnam, Sumatraand Thailand.

Remarks : Ackery & Vane –Wright (1984) describe this species under the genus Trimala.

Genus ***Parantica*** Moore

1880. *Parantica* Moore, *Lep. Ceylon,* **1** : 7.

Key to the species

Fore R1 and Sc anastomised; wing pattern element white ..... *aglea* (Stoll)

Fore R1 and Sc separate; wing pattern not element white ..... *melaneus* (Cramer)

17. ***Papilio aglea*** Stoll

Parantica aglea melanoides Moore, 1883

1883. *Parantica melanoides* Moore, *Proc. Zool. Soc. London.* 1883 : 247.

2003. *Parantica aglea melanoides* (Moore) : Gupta & Maulik, *State Fauna Series 12 : Fauna of Nagaland, Zool. Surv. India.* : 21.

Material examined : Uttarkhand, Nainital district, Bhattia, 40 km from Bhawali F.R.H., alt. 1762m. 2exs., 22.ix.2004; Bageswar district, Someswar, 35 km away from Wajyula F.R.H, stn. 10, alt. 1636 m., 1ex., 29.ix.2004, coll. by D.R. Maulik and party; Paurigarwal district, Srinagar, 1ex., 04.ix.2006, Coll. by A.K. Sidhu and party.

Fore wing length : ♂ 73, ♀ 86 mm.

Distribution : INDIA : Uttarkhand (Bageswar, Nainital, Paurigarwal), widely distributed throughout India.

Elsewhere : Annam, Bangladesh, China, Hainan, Myanmar, Nepal, Thailand and Vietnam.

18. ***Parantica melaneus*** (Cramer, 1775)
Parantica melaneus plataniston (Fruhstorfer)

1910. *Parantica melaneus plataniston* (Fruhstorfer), In Seitz. *Macrolep World,* **9** : 210.

1998. *Parantica melaneus plataniston* (Fruhstorfer) : Mondal & Maulik, *State Fauna Series 4 : Fauna of Meghalaya (Part-6), Zool. Surv. India,* : 234.

Material examined : Uttarkhand, Nainital district, Bhattia, 40 km from Bhawali F.R.H., alt. 1762m. 2exs., 22.ix.2004, coll. by D.R. Maulik and Party. Uttarkasi district, Yamunatri, 1 km. from Barkot F.R.H., stn. 4, 3ex. s, 20.ix.2005; Yamunatri, Barkot, stn. 3, 1ex., 21.ix.2005; Yamunatri, Barkot, Bed of Yamuna river, stn. 3, 1ex., 22.ix.2005; Brahmabal on the way to Uttarkasi, stn. 4, 3exs,. 23.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 60, ♀ 72 mm.

Distribution : INDIA : Uttarkhand (Nainital, Uttarkasi), Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : China, Myanmar, Indo-China and Thailand.

Genus ***Euploea*** Fabricius, 1807

1807. *Euploea* Fabricius, *Magazin fur Insekten Kunde (Illger), Brunschweig,* **6** : 281.

Key to the species

Male androconial brand elongate and proximally aligned with the point of origin of Cu1b..... ..... *mulciber* (Cramer)

Male androconial brand short, distally displaced from the point of origin of Cu1b..... ..... *core* (Cramer)

19. ***Papilio core*** Cramer, 1780
Euploea core core (Cramer)

1780. *Papilio core* Cramer, *Pap. Exot.*, **3** : 133. Pl. 266, figs. EF.

2007. *Euploea core core* (Cramer) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India.* : 532.

Material examined : Uttarkhand, Bageswar district, Someswar, 35 km away from Wajyula F.R.H., stn.10, alt. 1636 m., 7exs., 29.ix.2004, coll. by D.R. Maulik and party.

Fore wing length : ♂ 60, ♀ 70 mm.

Distribution : INDIA : Uttarkhand (Bageswar), widely distributed throughout India.

Elsewhere : Bali, Banladesh, Java, China, Myanmar, Nepal, Pakistan and Sri Lanka (Talbot 1939).

Remarks : This subspecies is mimicked by the female of *Hypolimnias bolina* (Linnaeus) of the subfamily Nymphalinae and *Chilasa* spp. of the Family Papilionidae (Talbot 1939).

20. ***Papilio mulicber*** Cramer (1777)
Euploea mulciber mulciber (Cramer, 1777)
(Striped Blue Crow)

1777. *Papilio mulicber* Cramer, *Pap. Exot.*, **2** : 45, pl. 127, figs. C.D.

1998. *Euploea mulciber* (Cramer) : Maulik. *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India.* : 533.

Material exmined : Uttarkhand, Nainital district, Bhattia, 40 km from Bhawali F.R.H., alt. 1762m. 4exs., 22.ix.2004, coll. by D.R. Maulik and Party.

Fore wing length : ♂ 85, ♀ 100 mm.

Distribution : INDIA : Uttarkhand (Nainital), Andaman and Nicober Island, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Himachal Pradesh, Nagaland, Sikkim and West Bengal.

Elsewhere : China, Malaya Peninsula, Myanmar, Nepal, Sumatra, Sunda Island and Vietnam.

Family LASIOCAMPIDAE

Antennae bipectinate in both sexes, eyes small, palpi porect and usually long, proboscis absent, legs usually with short special pairs of spurs to mid and hind tibiae, fore wing vein 3A not forked with vein 2A, 3A rarely present, cell middle in position, veins M1 and R5 from angle of cell, vein R3 and R2 always stalked and before the apex of the cell; hind wing with two internal veins, M1 and Rs arising very near the base, vein Sc + R1 curved and almost touching or connected with it by a bar forming a precostal cell, accessaory costal veinlet usually present; frenulum present.

This family is represented in India by 20 genera and 57 species of which four genera and 5 species are treated from the state of Uttarkhand.

Genus ***Labeda*** Walker (1855)

1855. *Labeda* Walker, *Cat. Lep. Het. Brit. Mus.*, **6** : 1457.

21. ***Labeda nobilis*** Walker

1855. *Labeda nobilis* Walker, *Cat. Lep. Het. Brit. Mus.*, **6** : 1457.

1936. *Labeda nobilis* : Collier, *Lep. Cat.*, **73** : 322.

1997. *Labeda nobilis* Walker : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India,* : 648.

Material exmined : Uttarkhand, Almorah ddistrict, Ranikhet, Kalika F.R.H. 'at light', stn. 5, alt. 2160 m. 2exs., 27.ix.2004; Bageswar district, Wajyula F.R.H., stn. 9, alt. 1596 m. 2exs. 28.ix.2004. coll. by D.R. Maulik and Party; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 6exs., 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 70, ♀ 98 mm.

Distribution : INDIA : Uttarkhand (Almorah, New Teri), almost throughout the rest Himalayas.

Elsewhere : Bangaladesh and Nepal.

Genus ***Dendrolimus*** Kirby (1892)

1818. *Metanastria* Huebner, *Verz.* : 186.

1892. *Dendrolimus* Kirby, *Cat. Lep. Het.*, **1** : 814.

22. ***Dendrolimus latipennis*** (Walker)

1855. *Labeda latipennis* Walker, *Cat. Lep. Het. Brit. Mus.*, **6** : 1457.

1892. *Dendrolimus latipennis* Kirby, *Cat. Lep. Het.*, **1** : 814.

1997. *Dendrolimus latipennis* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India,* : 650.

Material exmined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 1ex., 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 78 mm.

Distribution : INDIA : Uttarkhand (New Teri), Himachal Pradesh, Meghalaya, Sikkim and West Bengal.

Elsewhere : Barneo, Sri Lanka (Hampson, 1891), and Sundaland.

Remaks : The nominated species is new record for the state of Uttakhand. This species was earlier recorded by Cotes & Swinhoe (1887) and from Calcutta by Hampson (1892).

23. ***Dendrolimus hyrtaca*** Cramer, 1780

1780. *Bombyx hyrtaca* Cramer, *Pap. Exot.*, **3** : 249.

1936, *Metanastria hyrtaca* Cramer : Collier, *Lep. Cat.*, **73** : 310.

1997. *Dendrolimus latipennis* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India,* : 650.

Material examined : Uttarkhand, Uttarkasi district, Yamunatri, 1 km. from Barkot F.R.H., stn. 4, 3exs, 20.ix.2005; Yamunatri, Barkot, stn. 3, 1ex., 21.ix.2005; Yamunatri, Barkot, Bed of Yamuna river, stn. 3, 1ex., 22.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 48, ♀ 60 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi), Assam, Maharastra, Meghalaya, Sikkim, Jharkhand, Orissa, Uttar Pradesh, Punjab, Tamil Nadu.

Elsewhere : China, Sri Lanka (Hampson ,1891) and Sundaland

Remarks : This species was earlier known from West Bengal (vide Mandal & Maulik, 1997).

Genus ***Trabala*** Walker

1856. *Trabala* Walker, *Cat. Lep.Het. Brit. Mus.*, **7** : 1785.

Palpi somewhat short and slight. Antennae with branches shorter in female than in male; mid and hind tibiae with a minute terminal pairs of spurs. Fore wing with broad, the outer margin rounded, the cell open; the stalk of veins 9 and 10 very long. Hind wing with cell open; veins 6 and 7 very near the base; no accessory costal veinlets.

24. ***Trabala vishnou*** (Lefebrve, 1827)

1827. *Gastropacha vishnou* Lefebrve, *Zool. Journ.*, **3** : 207.

1997. *Trabala vishnou* Lefebrve : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Benga, (Part-7), Zool. Surv. India* : 646.

Material examined : Uttarkhand, Uttarkasi district, Uttarkasi F.R.H. stn. 6, alt. 1680m., 10exs., 23.ix.2005; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 10ex., 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 51, ♀ 65 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi, New Teri), Andamans Island, Assam, Meghalaya, Sikkim, West Bengal, Himachal Pradesh, Maharastra and Tamil Nadu.

Elsewhere : Bangladesh, Bhutan, China, Java, Myanmar and Sri Lanka.

Genus ***Crinocraspeda*** Hampson (1892)

1870. *Crinocraspeda* Hampson, *Fauna. Brit, India including Ceylon and Burma,* **1** : 420.

25. ***Crinocraspeda torrida*** Moore (1879)

1879. *Crinocraspeda torrida* Moore, *Descr. New Indian. Lep. Ins. Coll. Atkison,* **1** : 76, pl.3.

1936. *Crinocraspeda torrida* : *Collier, Lep. Cat.*, **73** : 155.

1997. *Crinocraspeda torrida* Moore : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Benga, (Part-7), Zool. Surv. India* : 646.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 7, alt. 1800m., 2exs., 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 46, ♀ 50 mm.

Distribution : INDIA : Uttarkhand (New Teri), Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Nepal (Collier, 1936).

Remarks : This nominated species is new record for the State Uttarkhand.

Family LYMANTRIIDAE

A family of moths generally of nocturnal flight., mostly clothed with hair-like scales and with very highly developed pectinations to the antennae in the male, the branches often having long terminal spines, and spines to retain them in position; the females often have a largely developed anal tuft of hair for covering the eggs.

Proboscis absent; legs hairy; frenulum present Fore wing with vein 1 a not anastomosing with 1 b; 1 c absent; 5 from close to lower angle of cell. Hind wing with two internal veins; 5 from close to lower angle of cell; 8 nearly touching 7 at middle o£ cell and connected with it by a bar.

Genus *Aroa* Walker

1855. *Aroa* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 791.

1865. *Bazisa* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 398.

26. *Aroa pyrrhochroma* Walker, 1865

1865. *Aroa pyrrhochroma* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 329.

1934. *Aroa plana* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 89.

Material examined : Uttarkhand, Uttarkasi district, Uttarkasi F.R.H. stn. 6, alt. 1680m., 1ex., 23.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wings length : ♂ 30 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi), Assam, Meghalaya, Himachal Pradesh, Sikkim, West Bengal, throughout India.

Elsewhere : Bhutan; Java (Hampson, 1891; Bryk, 1943).

Remarks : This nominated species is new record for the State of Uttarkhand.

Genus *Dasychira* Stephens, 1829

1829. *Dasychira* Stephens, *Ill. Brit. Ent. Haust.*, **2** : 58.

Palpi porrect, the 2nd joint heavily fringed with hair; antennre with the branches long in male, short in female; legs hairy. Fore wing with the outer margin oblique; neuration as in preceding genera. Hind wing with veins 3, 4, 5 from close to angle of cell; 6 and 7 stalked.

27. *Dasychira horsfieldi* Saund, 1848

1848. *Dasychira horsfieldi* Saund, *Trans Ent. Soc. Lond.*, (2)**1** : 162, pl. 12, fig. 1-3.

2007. *Dasychira horsfieldi* Saund : Maulik, *State Fauna Series 5: Fauna of Andhra Pradesh (Part-3), Zool. Surv. India*, : 536.

Material examined : Uttarkhand, Uttarkasi district, Uttarkasi F.R.H. stn. 6, alt. 1680m., 1ex., 23.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wings length : ♂ 38 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi), Andhra Pradesh, Meghalaya, Himachal Pradesh, Sikkim; Tamil Nadu, West Bengal, throughout India.

Elsewhere : Bhutan, Java, Myanmar and Sri Lanka.

Remarks : Apparently rare and new record for Uttarkhand.

28. *Dasychira bhana Moore*

1865. *Dasychira bhana* Moore, *Proc. Zool. Soc. Lond.*, **1865** : 805.

2003. *Dasychira bhana* Moore :Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India*, : 536.

Material examined : Uttarkhand, Uttarkasi district, Uttatkasi F.R.H. stn. 5, alt. 1680 m. 1ex., 23.ix.2005; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 9exs., 25.ix.2005, coll.by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 38 mm.

Distribution : INDIA : Uttarkhand (New Teri, Uttatkasi), Andhra Pradesh, Meghalaya, Sikkim, Tamil Nadu, West Bengal,

Elsewhere : Bhutan.

Remarks : This nominated species is new record for the State of Uttarkhand.

29. *Dasychira moerens* Felder

1865. *Dasychira moerens* Felder, *Reis. Novara. Lep.*, **2** : pl. 99, fig. 4.

1887. *Dasychira moerens* : Cotes & Swinhoe, *Moths of India*, **1**(2) : 150.

1934. *Dasychira moerens* Felder : Bryk, *Lep. Cat.*, **20**(62) : 27.

Material examined : Uttarkhand, Derha Dun district, Rishikesh, Narendranagar F.R.H., stn. 7, 1ex., 28.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 41 mm.

Distribution : INDIA : Uttarkhand (Derha Dun).

Elsewhere : Sri Lanka.

Remarks : Apparently rare and new to India and new record for Uttarkhand.

Genus ***Lymantria*** Huebner

1818. *Lymantria* Huebner, *Verz. Brk. Schmett.*, : 160.

.♂, Palpi porrect and hairy; antennre with the branches long. Fore wing with veins 3, 4, 5 from close to angle of cell 6 from below upper angle; 7, 8, 9, 10 stalked, 7 being given off further from the cell than 10. Hind wing with veins 3, 4, 5 from close to angle of cell; 6 and 7 from npper angle.

♀, Antenna serrate; wings either fully developed, or partially aborted, or reduced to scales.

30. ***Lymantria obsoleta*** Walker
f. sobrina Moore

1855. *Lymantria obsoleta* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 880.

1934. *Lymantria obsoleta* Walker : Bryk, *Lep. Cat.*, **20**(62) : 158.

Material examined : Uttarkhand, Uttarkasi, Barkot F.R.H., 'at light', stn. 3, 1ex., 21.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 42 mm.

Distribution : INDIA : Uttarkhand (Uttarkasi), Assam, Himachal Pradesh, Punjab, Maharastra, Sikkim and Tamil Nadu.

Elsewhere : Bhutan, China, Hongkong and Sri Lanka.

Remarks : This psecies is new record for the State Uttarkhan. Bryk (1934) synomised this species with *L. serva* Fabr. and *f. albolunulata* Moore (1879) treated as subspecies.

31. ***Lymantria ascetria*** Huebner (1818)

1818. *Lymantria ascetria* Huebner, *Sammig. Exot. Scmett.* : **2** : figs 1-4.

1934. *Lymantria ascetria* Walker : Bryk, *Lep. Cat.*, **20**(62) : 167.

1997. *Lymantria ascetria* Walker : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 669.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 1ex., 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 42 mm.

Distribution : INDIA : Uttarkhand (New Teri), Assam, Arunachal Pradesh, Jharkhan, Sikkim and West Bengal.

Elsewhere : Java and Myanmar.

Remarks : Apparently rare and new record for Uttarkhand.

32. ***Lymantria beatrix*** Stollen (1791)

1791. *Bombyx beatrix* Stollen, *Cram. Suppl. Pap. Exot.*, **50** : 173, pl. 40.

1934. *Bombyx beatrix* (Stollen) : Bryk, *Lep. Cat.*, **20**(62) : 167.

Material examined : Uttarkhand, Bageswar district, Someswar, 35 km away from Wajyula F.R.H., stn. 10,alt. 1734m, 1ex., 29.ix.2004, D.R. Maulik and Party; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 6exs, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 42, ♀ 50 mm.

Distribution : INDIA : Uttarkhand (Bageswar, New Teri), Andhra Pradesh, Assam, Jharkhand, Jammu & Kashmir, Maharastra, Meghalya, Punjab and Uttar Pradesh and West Bengal.

Elsewhere : Bhutan, Bangladesh and Java.

33. ***Lymantria moesta*** Swinhoe

1903. *Lymantria moesta* Swinhoe, *Trans. Ent. Soc. London*, : 484, pl. D, fig. 22.

1905. *Lymantria moesta* Swinhoe : Hampson, J. Bombay Nat. Soc., **16** : 216.

1934. *Lymantria moesta* Swinhoe : Bryk, *Lep. Cat.*, **20**(62) : 198.

Material examined : Uttarkhand, Nainital district, Bhawali F.R.H. stn. 1, alt. 1781 m., 2exs., 22.ix.2004, D.R. Maulik and Party; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 3exs, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 30, ♀ 39 mm.

Distribution : INDIA : Uttarkhand (Nainital, New Teri), Punjab, Kasauli, Kangra Valley.

Remarks : This species is new record for Uttarkhand.

34. ***Lymantria mathura*** Moore

1865. *Lymantria mathura* Moore, *Proc. Zool. Soc. Landon*, **1865** : 85.

1934. *Lymantria mathura* Moore : Bryk, *Lep. Cat.*, **20**(62) : 151.

1997. *Lymantria mathura* Moore: Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 666.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 1ex, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 40 mm.

Distribution : INDIA : Uttarkhand (New Teri), Meghalaya, Sikkim, North-West Himalaya and West Bengal.

Elsewhere : Bangladesh, China, Japan, Korea, and U.S.S.R

35. ***Lymantria viola*** Swinhoe

1889. *Lymantria viola* Swinhoe, *Proc. Zool. Soc. Landon*, **1889** : 406.

1891. *Lymantria viola* Swinhoe : Hampson, *Fauna of British India including Burma and Ceylon*, **1** : 464.

1934. *Lymantria viola* swinhoe : Bryk, *Lep. Cat.*, **20**(62) : 153.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 1ex, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 46 mm.

Distribution : INDIA : Uttarkhand (New Teri), Maharatra.

Remarks : This nominated species is new record for the State of Uttarkhand.

36. ***Lymantria lepcha*** Moore

1879. *Lymantria lepcha* Moore, *Cat. Lep. Indian Ins. Coll. Atkinson*, **1** : 54.

1934. *Lymantria lepcha* Moore : Bryk, *Lep. Cat.*, **20**(62) : 164.

1997. *Lymantria lepcha* Moore : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 668.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 1ex, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 46 mm.

Distribution : INDIA : Uttarkhand (New Teri), Maharatra.

Remarks : This nominated species is new record for the State of Uttarkhand.

Genus ***Euproctis*** Huebner, 1818

1818. *Euproctis* Huebner, *Verz.* : 150.

37. ***Euproctis divisa*** Walker (1855)

1855. *Euproctis divisa* Walker *Cat. Lep. Het. Brit. Mus.*, **4** : 836.

1934. *Euproctis divisa* Walker : Bryk, *Lep. Cat.*, **20**(62) : 239.

2004. *Euproctis divisa* Walker : Mondal & Maulik, *State Fauna Series 10 : Fauna of Manipur, Zool. Surv. India* : 587.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680m. 1ex. 23.ix.2005; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 2exs, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 34, ♀ 54 mm.

Distribution : INDIA : Uttarkhand (New Teri,Uttatkasi), Arunachal, Manipur, Meghalaya, Punjab, Sikkim, Tripura and West Bengal.

Elsewhere : Bhutan, Bangladesh, China, West China, Nepal and Vietnam.

Remarks : This nominated species is widely distributed throughout India.

38. ***Euproctis latifascia*** Walker (1855)

1855. *Leucoma latifascia* Walker *Cat. Lep. Het. Brit. Mus.*, **4** : 831.

1934. *Euproctis latifascia* Walker : Bryk, *Lep. Cat.*, **20**(62) : 221.

2004. *Euproctis latifascia* Walker : Mondal & Maulik, *State Fauna Series 10 : Fauna of Manipur, Zool. Surv. India* : 587.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680 m. 1ex., 23.ix.2005; coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 34, mm.

Distribution : INDIA : Uttarkhand (Uttatkasi), Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Punjab, Sikkim and West Bengal.

Elsewhere : Nepal, Hongkong, Taiwan and Vietnam.

Remarks : This nominated species is widely distributed throughout India.

39. ***Euproctis subfasciata*** (Walker, 1865)

1865. *Artaxa subfasciata* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 332.

1934. *Euproctis subfasciata* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 230.

1998. *Euproctis subfasciata* (Walker) : Mondal & Maulik, *State Fauna Series 4 : Fauna of Meghalaya (Part-6), Zool. Surv. India* : 482.

Material examined : Uttarkhand, Bageswar district, Bageswar., 35 km away from Wajyula F.R.H., 'at light' stn 9, alt. 1734m. 1ex., 29.ix.2004, coll. by D.R. Maulik and Party; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 3exs, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 32, ♀ 46 mm.

Distribution : INDIA : Uttarkhand (Bageswar, New Teri), Arunachal Pradesh, Jammu & Kashmir, Mharastra, Manipur, Meghalaya, Punjab, Sikkim and West Bengal.

Elsewhere : Nepal, Formosa, Hangkong, Taiwan, Tonkin and Vietnam.

40. ***Euproctis semisignata*** Walker(1865)

1865. *Cispia semisignata* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 356.

1934. *Euproctis semisignata* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 235.

1997. *Euproctis semisignata* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 676.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680m. 1ex. 23.ix.2005; New Teri district, Ranichowri F.R.H., 'at light' stn, 6, alt. 1800m. 26.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party

Fore wing length : ♂ 30 mm.

Distribution : INDIA : Uttarkhand (New Teri, Uttatkasi), Assam, Karnatak, Maharastra and Tamil Nadu.

Remarks : This nominated species is new record for the State of Uttarkhand.

41. ***Euproctis howra*** (Moore 1870a) ***Euproctis howra rhoda*** Swinhoe

1870a. *Artaxa howra* Moore, *Descr. New. Indian Ins. Lep. Coll. Atkinson*, **1** : 51.

1891. *Euproctis howra rhoda* Swinhoe, *Trans. Ent. Soc. London*, **1891** : 138.

1934. *Euproctis howra rhoda* Swinhoe : Bryk, *Lep. Cat.*, **20**(62) : 230.

1997. *Euproctis howra rhoda* Swinhoe : Mondal & Maulik, *State Fauna Series 4 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 676.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680m. 1ex. 23.ix.2005; coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 32 mm.

Distribution : INDIA : Uttarkhand (Uttatkasi), Andaman and Nicobar Island, Karnatak, Tamil Nadu and West Bengal.

Elsewhere : Sri Lanka.

Remarks : This nominated species is new record for the State of Uttarkhand.

42. ***Euproctis digramma*** (Guerin)

1829-38. *Bombyx digramma* Guerin, In *Cuvier, Icon. R. Anim. Ins.*, 7 : 508, pl86, fig. 4.

1934. *Euproctis digramma* (Guerin) : Bryk, *Lep. Cat.*, **20**(62) : 229.

1998. *Euproctis digramma* (Guerin) : Mondal and Maulik, *State Fauna Series 4 : Fauna of Meghalaya, Part- 6, Zool. Surv. India*,: 487.

Material examined : Uttarkhand, Bageswar district, Bageswar., 35 km away from Wajyula F.R.H., 'at light' stn 9, alt. 1734 m. 1ex., 29.ix.2004, coll. by D.R. Maulik and Party; Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680 m. 1ex. 23.ix.2005; coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 30 mm.

Distribution : INDIA : Uttarkhand (Bageswar, Uttatkasi), Arunachal district, Assam, Manipur, Meghalaya, Sikkim, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, Birma, Barneo, Bhutan, China, Java, Myanmar, Nepal and Sri Lanka.

Remarks : This nominated species is new record for the State of Uttarkhand.

43. ***Euproctis guttata*** Walker, 1855

1855. *Artaxa guttata* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 795.

1934. *Euproctis guttata* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 239.

2007. *Euprotis guttata* (Walker) : Maulik, *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India*, : 538.

Material examined : Uttarkhand, Uttatkasi district, Yamunatri, Barkot F.R.H, 'at light' stn. 3, alt. 1680 m. 1ex. 21.ix.2005; coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 32, mm.

Distribution : INDIA : Uttarkhand (Uttatkasi), Andhra Pradesh, Assam, Karnatak, Manipur, Meghalaya, Mizoram, West Bengal.

Elsewhere : Bangladesh; China, Java, (Burma) Myanmar Nepal and (Ceylon) Sri Lamka.

Genus ***Porthesia*** Stephens

1829. ***Porthesia*** Stephens, *Ill. Brit. Ent. Haust.*, **2** : 58.

Palpi long, slender, and obliquely pointed; antennle with the branches long in male. Fore win with veins 3,4, 5 from angle of cell; 6 from upper augle; 7,8,9,10 stalked, 10 and often 7 also being given off towards apex. Hind wing with veins 3 and 4 from angle of cell; 5 absent; 6 and 7 stalked.

44. ***Parthesia scintillans*** Walker, 1855

1855. *Somena scintillans*, Walker, 1855. *Cat. Lep. Het. Brit. Mus.*, **7** : 1734.

1934. *Parthesia scintillans* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 239.

2004. *Parthesia scintillans* (Walker) : Gupta & Maulik, 2004. *State Fauna Series 11: Fauna of Mizoram, Zool. Surv. India.* : 20.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680 m. 4exs. 23.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 33-25 mm.

Distribution : INDIA : Uttarkhand (Uttatkasi), Andaman and Nicobar Island, Andhra Pradesh, Assam, Himachal Pradesh, Maharastra, Mizoram, Sikkim and West Bengal.

Elsewhere : Java, Pakistan, Myanmar (Burma), Philippines, Sri Lanka, Sulawesi and Western Malayasia.

Remarks : Hampson (1891) describe this species under the genus Euproctis but Bryk (1934) treated this species under the genus *Porthesia.*

Genus ***Leucoma*** Stephens

1829. *Leucoma* Stephens, *Ill. Brit. Ent. Haust.*, **2** : 64.

Palpi upturned, reaching vertex of head. antennm bipectinated in both sexes, the branches longer in male than female. Hind tibiae with two pairs of spurs. Fore wing with vein 3 before anngle of cell; 4 and 5 from angle; 6 from upper angle; 7, 8, 9 stalked. Hind wing with vein 3 before angle of cell; 5 from above angle; 6 and 7 stalked or from cell.

45. ***Leucoma submarginata*** Walker, 1855

1855. *Redoa submarginata* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 836.

1934. *Leucoma submarginata* (Walker) : Bryk, *Lep. Cat.*, **20**(62) : 128.

1998. *Leucoma submarginata* (Walker) : Mondal & Maulik, *State Fauna Series 4: Fauna of Meghalaya, Part-6, Zool. Surv. India*, : 486.

Material examined : Uttarkhand, Uttatkasi district, Uttarkasi F.R.H, 'at light' stn. 5, alt. 1680m. 1ex. 23.ix.2005; New Teri district, Ranichowri F.R.H. stn. 6, alt. 1800m., 3exs, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 34mm.

Distribution : INDIA : Uttarkhand (New Teri, Uttarkasi), Andaman and Nicobar Islands, Andhra Pradesh, Assam, Manipur, Meghalaya, Tripura, Sikkim and West Bengal.

Elsewhere : Australia, Bangladesh, Barneo, Bhutan, Java, (Burma) Myanmar, Papua, Perak, Philippines, (Ceylon) Sri Lank, Sarawak, West China and Western Malaya.

Remarks : This nominated species is new record for the State of Uttarkhand.

Genus ***Stilpnotia*** Westwood & Humphreys (1841)

1841. *Stilpnotia* Westwood & Humphreys, *British butterflies* :

Palpi minute and porrect. Antennae bipectinated, the branches longer in male than female. Hind tibiae with one pair of spurs. : Fore wing with vein 3 before angle of cell; 4 and 5 from angle; 6 from upper angle; 7, 8, 9 stalked. Hind \ving with vein 3 before angle of cell; 4 and 5 from angle; 6 and 7 from upper angle.

46. *Stilpnotia cygma* (Moore)

1879. *Stilpnotia cygma* (Moore), *Proc. Zool. Soc. Landodn*, **1879** : 401.

1934. *Stilpnotia cygma* (Moore) : Bryk, *Lep. Cat.*, **20**(62) : 117.

1997. *Stilpnotia cygma* (Moore) : Mondal & Maulik, *State Fauna Series 4 : Fauna of West Bengal (Part-7), Zool. Surv. India* : 660.

Material examined : Uttarkhand, New Teri district, Ranichowri F.R.H. stn. 6, alt.1800m., 1ex, 25.ix.2005, coll. by A.K. Sidhu, D.R. Maulik and Party.

Fore wing length : ♂ 40 mm.

Distribution : INDIA : Uttarkhand (New Teri), Andaman and Nicobar Islands, Arunachal Pradesh, Meghalaya and West Bengal.

Elsewhere : Bhutan, Chin, Cenkenen, Japan, Ost-Asien India, Sri Lanka and Vietnam.

Remarks : This nominated species is new record for the State of Uttarkhand.

SUMMARY

Fourty six species/subspecies of butterflies and moths belonging to four families viz, Papilionidae, Nymphalidae (Danainae), Lasiocampidae and Lymantriidae are dealt with from Uttarkhand The family Papilionidae includes 12 species/subspecies in 4. genera whereas family Nymphalidae (Danainae) represents 8 species in 4 genera and Lasiocampidae includes 5 species of 4 genera and Lymantriidae includes 21 species in 7 genera. Out of 46 species/subspecies spseies 14 are new records from the state and 1 species is new to India, all these species are definitive records from the State Uttarkhand.

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REFERENCES

Annoymous, 1999. The Wild Life (Protection) Act, 1972 with Wild Life (Protection) Rules, (Published by Law Publishers (India) Pvt. Ltd. Allahabad).

Asahina, S. 1960. Notes on relationship between Himalayan and Japaneese Insect-Fauna. *J. Bengal. Nat. Hist. Soc.*, **31** : 69-75.

Bingham, C.T. 1905. The Fauna of British India including Ceylon and Burma, Butterflies, **1** : viii + 537, pls. (Published by Taylor and Francis, Ltd., London).

Bingham, C.T. 1907. The Fauna of British India including Ceylon and Burma, Butterflies, **2** : xviii + 537, pls. (Published by Taylor and Francis, Ltd., London).

Bryk, F. 1934. *Lepidopterorum Catalogue,* **20**(62) : 1-442.

Butler, A.G. 1866. Description of new Heterocerous Lepidoptera from Japan. *Trans. Ent. Soc. London,* **29** : 9-12.

Butler, A.G. 1877. *Illustration of typical specimens of Lepidoptera (Heterocera) in British Museum London,* Part-II, **2** : 53-56.; 1881, **5** : 48-59.; **7** : 35-38.

Collenette, C.L. 1934. Notes on genus *Laelia* Stephens (Lepidoptera, Lymantriidae) with description of new species. *Ann. Mag. Nat. Hist. London,* (10)**13** : 216- 217.

Collenette, C.L. 1951. Some new species of Lymantriidae in the British Museum (Natural History). *Ann. Mag. Nat. Hist. London,* (12)**4** : 216-217.

De Niceville, L. 1883. Butterflies of India, Burmah and Ceylon. **1** : vii + 327 pp., 17 pls.

De Niceville, L. 1886. Butterflies of India, Burmah and Ceylon. **2** : iv + 332 pp., 18-24 pls.

Evans, W.H. 1932. *The Identification of Indian Butterflies* (2nd edition). 454 pp., 32 pls., (Published by Bombay Natural History Society, Bombay).

Fabticius, J.C. 1775. *Ent. Syst.*

Felder, C. & R. 1864. "*Species Lepidopterorum*" *Verz. Zool.-bot. Ges. Wien.,* **14** : 305.

Fruhstorfer, H. 1097c. "Neue Papilio Rassen aus dem Indo-Australschen Gebiet" *Ent. Zeit,* **21**(30) : 182-4.

Gupta, S.L., Farooq, S.I., and Choudhury, H.S. 1980. Taxonomic studies on some of the syntypes of Indian Lymantriidae in British Museum (Natural History) London (Noctouidea : Lepidoptera) 1. *Aroa* spp. *Bull. Ent.,* **21**(1-2) : 55-61.

Gupta, S.L. et. el. 1980. Taxonomic studies on some of the syntypes of Indian Lymantriidae in British Museum (Natural History) London (Noctouidea Lepidoptera) 2. *Dasychira* spp. *Bull. Ent.,* **22** (1-2) 1981 : 15-24. 3. *Euproctis* spp. *Bull. Ent.,* **22**(1-2) 1981 : 46-60.

Hampson, G.F. 1892. *The Fauna of British India including Ceylon and Burma. Moths,* **1** : 432-494.

Hampson, G.F. 1896. *The Fauna of British India including Ceylon and Burma. Moths,* **4** : 489.

Hampson, G.F. 1897. "Moths of India" Supplementaary paper to the volumes in "Fauna of Britsih India " Part II. *J. Bombay nat. Hist. Soc.,* **11** : 294-296.; 1900. Paart II. **13** : 213-235.; 1905. Part II. **16** : 193-216.; 1910. Series IV. Part I. **20** : 112-114.; 1930. **34** : 778-787.

Haribal, M. 1992. The Butterflies of Sikkim Himalaya. 217 pp., 60 pls. (Published by Sikkim Nature Conservation Foundation).

Linnaeus, C. 1758. *Syst. Nat. ed* **10** :

Huebner, J. 1804. *Eur. Schmett.* P. 120.

Huebner, J. 1818. *Verzeichnia bekannter Schmetterling.*, p. 159-164.

Maulik, D.R. 2003. Insecta : Lepidoptera : Papilionidae, Danaine (Nymphalidae), Lasiocampidae, Lymantriidae and Ratardiae. *State Fauna Series 9 : Fauna of Sikkim* (Part – 4), *Zool. Surv. India,* : 1 – 25.

Maulik, D.R. 2007. Insecta : Lepidoptera : Papilionidae, Danaine (Nymphalidae), Lasiocampidae, Lymantriidae and Ratardiae *State Fauna Series 5 : Fauna of Andhra Pradesh (Part-3), Zool. Surv. India,* : 521-544.

Mondal, D.K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Noctuidae. *Fauna of Orissa.. State Fauna Series,* No. 1, *Bull. Zool. Surv. India,* (3) : 209 – 226.

Mondal, D.K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Heterocera : Sphingidae and Geometridae. *Fauna of Orissa. State Fauna Series,* No. 1, *Bull. Zool. Surv. India* (3) : 227 – 233.

Mondal, D.K. & Maulik, D.R. 1991. Insecta : Lepidoptera : Rhopalocera : Nymphalidae; Danaidae. *Fauna of Orissa. State Fauna Series,* No. 1, *Bull. Zool. Surv. India* (3) : 2235 – 238.

Mondal, D.K. & Maulik, D.R. 1997. Insecta : Lepidoptera : Heterocera : Sphingidae, Lasiocampidae, Lymantriidae and Ratardidae. *State Fauna Series 3 : Fauna of West Bengal,* Part – 7, *Zool. Surv. India* : 613 – 687.

Mondal, D.K. & Maulik, D.R. 1997. Insecta : Lepidoptera : Rhopalocera : Papilionidae and Nymphalidae (Danainae). *State Fauna Series 3 : Fauna of West Bengal,* Part – 7, *Zool. Surv. India* : 755 – 793.

Mondal, D.K. Bhattachaya D.P., & Maulik, D.R., and Majumder, M. 1997 Lepidoptera : Papilionidae and Hesperidae. *State Fauna Series 6 : Fauna of Delhi, Zool. Surv. India.* : 393 – 407.

Mondal, D.K. & Maulik, D.R. 1998. Insecta : Lepidoptera : Rhopalocera : *State Fauna Series 4 : Fauna of Meghalaya.* Part – 6, *Zool. Surv. India.* : 223-242.

Mondal, D.K. & Maulik, D.R. 1998. Insecta : Lepidoptera : Heterocera : Lasiocampidae, Lymantriidae and Ratardidae. *State Fauna Series, 4 : Fauna of Meghalaya.* Part – 6, *Zool. Surv. India.* : 467–488.

Mondal, D.K. & Maulik, D.R. 3004. Insecta : Lepidoptera : Papilionidae : Danainae (Nymphalidae), Lasiocampidae, Lymantriidae and Ratardidae. *State Fauna Series 10 : Fauna of Manipur, Zool. Surv. India.* : 581-590.

Moore. F. 1857. A Catalogue of the Lepidopterous insects in the Museum of Natural History of Hon. *E.I. Co. London,* **2** : 336-367.

Moore. F. 1865. "On the Lepidopterous insects of Bengal" *Proc. Zool. Soc. London,* p. 803-806.

Moore. F. 1879. "Description of new India Lepidopterous from the collection of Mr. W.S. Atkinson, Heterocera" Calcutta. *Lep. Atk.*, xi + 299.

Swinhoe, C.C. 1889. "On the New Indian Lepidoptera" *Proc. Zool. Ssoc. London* : 405-406.

Swinhoe, C.C. 1893. A list of Lepidoptera of the Khasi Hills. Part III. *Trans. Ent Soc. London,* pp. 267-330.

Swinhoe, C.C. 1895. A list of Lepidoptera of the Khasi Hills. Part III. *Trans. Ent Soc. London,* (3) : 1-75.

Swinhoe, C.C. 1907. New species of Eastern and African Heterocera *Ann. Mag. Nat Hist. London,* (6)**19** : 203.

Talbot, G. 1939. Fauna of British India including Ceylon and Burma, Butterflies, **1** : xviii + 537, pls. (Published by Taylor and Francis, Ltd., London).

Talbot, G. 1947. Fauna of British India including Ceylon and Burma, Butterflies, **2** : xv + 506 pp., 2 pls., 1 map. (Published by Taylor and Francis, Ltd., London).

Tytler, H.C. 1911. Notes on butterflies from Naga Hills, Part II. J. Bombay nat. Hist. Soc., **21**(2) : 48-65, pl.A.

Tytler, H.C. 1912. Notes on butterflies from the Naga Hills, Part II. J. Bombay nat. Hist. Soc., **21** : 588-606, pl. B.

Tytler, H.C. 1915. Notes on some new and interesting butterflies from the Naga Hills, Part II. *J. Bombay nat. Hist. Soc.,* **23** : 502-515.

Varshney, R.K. 1994. Index Rhopalocera India. Part II. Genera of Butterflies from India and neighbouring countries. (Lepidoptera : (B) Papilionidae, Pieridae and Danaidae. Oriental Insects, **27** : 347-372.

Walker, F. 1855. List of the specimens of Lepidopterous insects in the collection of the British Museum. *Cat. Lep. Het. Brit. Mus.*, **3** : 663; **4** : 786-883; 1856, **5** : 1172-1176; **7** : 1731-1737; 1862, **25** : 1483; **26** : 11689; 1864, **31**; 321; 1865; 1177, **32** : 325-397.

Walker, F. 1855. Characters of undescribed Heterocerous Lepidoptera. *Journ. Linn Soc. London,* **9** : 181-199.

Westwood, J.O. *Arc. Entom.*, **1** : 42.

Wynter-Blyth, M.A. 1957. Butterflies of the Indian Region. 523 pp. + (Published by Bombay Natural History Society, Bombay).

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 611-689.

LEPIDOPTERA : RHOPALOCERA

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INTRODUCTION

More than 17,000 species of butterflies known in the world, 1501 occur in India of which 321 are skippers, 107 Swallowtails, 109 whites and Yellows, 521 Brush-footed butterflies and 443 Blues. In the Uttarakhand State about 600 species of butterflies recorded of which 171 are represented by three families viz.Hesperiidae, Riodinidae and Nymphalidae.

The butterflies of the Indian Region, including those from western Himalayas, were named and described by Linnaeus and Fabricius for the first time during the eighteenth century. Doherty (1886) published a list of butterflies, exclusively from Kumaon, for the first time, followed by F. Hannyngton (1910-11) who published an account of 373 butterflies.

Mackinnon and De Niceville (1897-98) published a list of 323 butterflies from Mussoorie and neighbouring region from the western Himalayas followed by Ollenbach (1930-31) who collected, identified and published a list of 143 butterflies from Mussoorie. The other important works referable to the study of Garhwal Himalayas are by Stempffer (1952); Bernardi (1952) and Lesse (1952).

Wynter-Blyth (1957) recorded as many as 415 species from western Himalayas out of which 323, species were listed from Uttarakhand. Subsequently Arora and Mandal (1977) recorded 45 species from Garhwal; Mandal and Chaudhary (1977) recorded 10 species from Valley of flowers, Chaturvedi (1981) and Mandal (1984) recorded 17 species from Garhwal Himalayas and adjoining slopes of Tons valley forest. Arora (1994) recorded 68 species from Rajaji National Park; Singh (1994) recorded 148 species from New forest campus, Dehra Dun; Arora, Ghosh and Chaudhary (1995) recorded 223 species from western Himalayas. Arora (1997) identified 80 species of butterflies collected from Nanda Devi Biosphere. Singh and Bhandari (2003) recorded 183 species from lower western Himalayan forests of Doon Valley; Kumar and Kumar (1998) identified 21 species from Panchchuli (Dist. Pithoragarh); Kumar and Gupta (2004) recorded 48 species from Govind Pashu Vihar, Uttarkashi district.; Western Doon Shiwaliks 36 species and 43 species from Corbett Tiger Reserves.

The butterflies are well known colourful beauties of nature visiting flowers, herbs and shrubs for completion of their life cycle and acting as a pollinator for some plants. The Butterflies can be easily differentiated from moths by their antennae and wing coupling apparatus. The Butterflies have simple antennae, clubbed at apex, wing coupling are amplexiform, they are day flier and at repose they keep their wings erect, whereas moths wing coupling is by frenulum and a very small number of species, it is jugate or wing coupling is amplexiform but antennae are complex.

The present study is based on the material collected from all the districts of the Uttarakhand State made over the last 45 years by field task forces of this Regional Station. The area under investigation is with various ecological niches like herbs, shrubs, thick forests with perennial and seasonal streams suiting best for the occurrence of various species of butterflies.

The species known from Uttarakhand state not available for study has been reviewed from literature.Such not collected or observed species have become rare and endangered.

For identification, key to species, genera and sub-families of available collection belonging to families have been given. The common name, Forewing length and distribution of each species/ subspecies have been given.

SYSTEMATIC ACCOUNT

The systematic account deals with 171 species of butterflies under three families i.e. Hesperiidae, Riodinidae and Nymphalidae.

Family HESPERIIDAE

The family Hesperiidae is the third largest family of the butterflies in the world. In India, about 320 species are known to occur; of which only 83 are recorded from Western Himalaya, Arora (1995) and 72 in general from Uttarakhand in particular the members of this family are popularly known as **"Skippers"**

The bodies of these butterflies are very robust and strong. In both the sexes the prefect legs are functional for walking. The legs are coveted with very dense, long and thin scales; antennae are placed wide apart, with the club and tapering to a point at the tip or with a curved hook. The head is wider than the thorax and eyes are large and prominent. The flight is usually very rapid. They are fond of basking in sunshine and visit flowers, damp patches, some feed on bird's droppings.

The family Hesperiidae is represented in Uttarakhand by 72 species/subspecies belonging to four genera and three sub families, i.e.Hesperiinae, Coeliadinae and Pyrginae.

Key to Sub-families

1. Forewing vein M2 nearer to M1 than M3 at origin of cell; abdomen shorter than anal margin of hind wing 2

   Forewing vein M2 nearer to M1 than M3 at origin of cell; abdomen generally equal to anal margin of hind wing ..... HESPERIINAE

2. Labial palpi with second joint unturned and third joint porrect, long and owl-shaped ..... COELIADINAE

   Labial palpi with these joints showing variable orientation, third joint may be long but never owl-shaped ..... PYRGINAE

Sub-families HESPERIINAE

This subfamily Hesperiinae includes eight groups of genera from India, of which five are represented in Uttarakhand.

Key to Groups

1. Fore wing M2 straight at its origin; hind wing lower end cell usually not uprupted; vein M2 well marked 2

   - Fore wing M2 decurved at its origin; hind wing lower end cell usually uprupted; vein M2 usually untraceable 5

2. Second segment of labial palpi porrect 3

   - Second segment of labial palpi erect 4

3. Hind wing cell usually longer than half of wing ..... **Heterotopyerus** Group

   - Hind wing cell not longer than half of the wing ..... **Astictopterus** Group

4. Hind wing vein M2 decurved at origin ..... **Ancistroides** Group

   - Hind wing vein M2 not decurved at origin ..... **Plastingia** Group

5. Antennal apiculus absent ..... **Taractrocera** Group

   - Antennal apiculus present ..... **Gegenes** Group

Heterotopyerus Group

The group **Heterotopyerus** Group is not represented in Uttarakhand.

Astictopterus Group

Of the 12 genera of this group occurring in India, 8 are represented in Uttarakhand.

Key to genera

1. Fore wing vein M2 well before vein R1 and far away from vein Cu 1a 2

   - Fore wing vein M2 after or opposite vein R1 and never so far away from vein Cu la 3

2. Wings broad, costa of fore wing arched and vein R1 and Sc approximate ..... ***Astictopterus*** Felder

   - Wings narrow, costa of fore wing straight and vein R1 and Sc apart ..... ***Arnetta*** Watson

3. Wings broad and costa of fore wing always arched 4

   Wings produced at apex of fore wing, costa straight 6

4. Hind wing cell shorter than half of wing .. 5
   - Hind wing cell equal to half of wing ..... ***Aeromachus*** de Niceville
5. Fore wing vein M1 abnormal, arising well below end cell and placed mid vein M2 and R5 ..... ***Ochus*** de Niceville
   - Fore wing vein M1 normal with veins M2 and R5 at cell apex ..... ***Ampittia*** Moore
6. Fore wing upper end of cell not produced and vein M2 straight..... ***Sevastonyma*** Watson
   - Fore wing upper end of cell produced and vein M2 decurved at origin 7
7. Uncus undivided ..... ***Sovia*** Evans
   - Uncus divided 8
8. Antennal apicus not longer than twice the width of club 9
   - Antennal apicus longer than twice the width of club ..... ***Pithauria*** Moore
9. Apiculus obtuse, rather stout and blunt ..... ***Pedestes*** Hemming
   - Apiculus hooked 10
10. Labial palpi porrect, gnathos strongly developed ..... ***Thoressa*** Swinhoe
    - Labial palpi erect, gnathos absent or undeveloped ..... ***Halpe*** Moore

Genus ***Astictopterus*** Felder

1860. *Astictopterus* Felder, *Wein. Ent. Amoatsb.*, **4** : 401.

Only a single species of this genus in India is dealt with Uttarakhand.

1. ***Astictopterus jama olivasceus*** Butler
FOREST HOPPER

1860. *Astictopterus jama* Felder, *Wein. ent. Monatsb.*, **4** : 401.

1878. *Astictopterus olivasceus* Moore. *Proc. Zool. Soc. London*, : 692.

1912. *Astictopterus olivasceus* Moore. Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 604.

1949. *Astictopterus jama olivasceus :* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 234.

2006. *Astictopterus jama olivasceus* Moore : Gupta & Majumdar, *Zool. Surv. India, Fauna of Nagaland, State Fauna Series*, **12** : 306.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Jiuli (Kumaon) at 2500 feet in the month of August.

Diagnostic Characters : Apex of forewing and tornus of Hindwing more produced, under side amber brown. Male without hyaline spot but female usually with hyaline spots in cells, and on vein R4, R5 and M1.

Wingspan : 38-40 mm.

Distribution : Oriental region including India: Uttarakhand (Kumaon), Meghalaya, Assam, Manipur, Nagaland and Sikkim.

Elsewhere : Siam.

Genus ***Arnetta*** Watson

The Genus **Arnetta** Watson is not represented in Uttarakhand.

Genus ***Aeromachus*** de Niceville

1890. *Aeromachus* de Niceville, *Journ. Bombay nat. Hist. Soc. London.*, **5** : 214.

1949. *Aeromachus stigmata stigmata* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) : 26.

There are five species of genus *Aeromachus* de Niceville in India of which, one is dealt with Uttarakhand.

2. ***Aeromachus stigmata stigmata*** (Moore)
VEINED SCRUB HOPPER

1878. *Thanaos stigmata* Moore, *Proc. Zool. Soc.* London, : 694.

1949. *Aeromachus stigmata* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) : 242.

1998. *Aeromachus stigmata* Ghosh and Chaudhary, *State Fauna Series* **4** : *Fauna of Meghalaya* (Part-6) : 281.

2003. *Aeromachus stigmata stigmata* (Moore) : Majumdar, *State Fauna Series : Fauna of Sikkim* (part-4) : 117.

Status : Fairly Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No.

4498, 17.xi.2002, Coll. *Vinod Khanna* & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii.2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 3exs, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie Garhwal and F. Hannyngton (1910) from Bageshwar, Kumaon hills in the month of May.

Diagnostic Characters : Forewing under side, the veins towards termen more or less paler. Hind wing vein R5 and M1 hair pinned. Fore wing upper side with the spot faint or absent. Hind wing under side with grey or white marking, the central marking neither narrow nor broken.

Wingspan : 22-32 mm.

Distribution : India : Uttarakhand, Northwest Himalayas, Garhwal, Mussoorie; Sikkim.

Elsewhere : Bhutan, Nepal and Pakistan.

Genus *Ochus* de Niceville

1894. *Ochus* de Niceville, *J. Asiat. Soc. Bengal* (N.S.), **63**(2) : 51.

Only a single species of this genus in India is dealt with Uttarakhand.

3. *Ochus subvittatus* (Moore) TIGER HOPPER

1878. *Ochus subvittatus* (Moore), *Proc. Zool. Soc.* London, : 693.

1892. *Cyclopides suvittatus* Moore : Elwes *Proc. Zool. Soc. London*, : 653.

1949. *Ochus subvittatus* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.), : 242.

1998. *Ochus (Cyclopedes) subvittatus* (Moore) Ghosh and Chaudhary, *State Fauna Series* **4** *: Fauna of Meghalaya* (Part-6) : 282.

2003. *Ochus (Cyclopedes) subvittatus* (Moore) : Majumdar, *State Fauna Series* **9** : *Fauna of Sikkim* (part-4) : 118.

Status : Not Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gawaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species also recorded by F. Hannyngton (1910) from Sarju Valley, Kumaon.

Diagnostic Characters : Upper side of wings black forewing with a yellow spot at apex., Costa of forewing and hind wing bright yellow with numerous black markings.

Wingspan : 22 mm.

Distribution : India : Uttarakhand, Assam, Nagaland, Sikkim and Meghalaya.

Elsewhere : Bhutan, Nepal and Myanmar.

Genus *Ampittia* (Moore)

1880-81. *Ampittia* Moore, *Lep. Ceylon.*, **1** : 171.

Of the two species of this genus *Ampittia dioscorides* (Fabricius) and *Ampittia maroides* deNicevilles are known in India, the former is dealt with Uttarakhand.

14. *Ampittia dioscorides* (Fabricius) BUSH HOPPER

1932. *Ampittia dioscorides* (Fabricius) : Evans, *The Identification of Indian Butterflies*, Bombay nat. Hist. Soc. : 360.

2003. *Ampittia dioscorides* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly Diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

2003. *Ampittia dioscorides* (Fabricius): Majumdar, *State Fauna Series* **9** *: Fauna of Sikkim* (part-4) : 118.

2006. *Ampittia dioscorides* (Fabricius) : Gupta & Majumdar, *Zool. Surv. India, Fauna of Nagaland, State Fauna Series.* **12** : 308.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003), FRI, from Dehra Dun.

Diagnostic Characters : Upper side of fore wing with a large spot in area 2A, basal half of the wing and cell yellow, discal spot yellow.

Wingspan : 22-28 mm.

Distribution : India : Uttarakhand, Assam, Kangra, West Bengal, Sikkim and Nagaland.

Elsewhere : Sri Lanka, Nepal, Bangladesh, Myanmar, Siam, Tonkin, Malay Peninsular, Sumatra, Bali and Shanghai.

Genus *Sovia* Evans

1949. *Sovia* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.), : 27.

This genus *Sovia* Evans is represented by ten species in India, of which one is dealt with Uttarakhand.

Sovia lucasii (Mabille)

1876. *Hesparilla lucasii Mabille, Bull. Soc. Ent. Fr.* (5)**4** : CL iii.

1998. *Sovia lucasii* Ghosh and Chaudhary, *State fauna Series 4, Fauna of Meghalaya* (Part-6) : 284.

5. *Sovia lucasii separata* (Moore) CHEQUERED ACE

1882. *Halpe separata* Moore *Proc. zool. Soc.* London, : 407.

1949. *Sovia lucasii separata* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.), : 247.

2003. *Sovia lucasii separata* (Moore) Majumdar, *State Fauna Series : Fauna of Sikkim* (part-4) : 139.

Status : Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Gawaldam Village, 2exs., Reg. No. 4881, 2.iii.2004, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon hills.

Diagnostic Characters : Palpi clothed with long hairs. Fore wing upper side with hyaline spots in cell, in area Cu 1a, Cu 1b and apex., Hind wing under side with olive or ochreous scaling.

Wingspan : 34 mm.

Distribution : India : Uttarakhand, Garhwal; Sikkim.

Elsewhere : Bhutan.

Genus *Pedestes* Hemming

1934. *Pedestes* Hemming, *Entomologist*, **67** : 38.

Of the three species of this genus *Pedestes* are known in India, the *Pedestes masuriensis masuriensis is* dealt with Uttarakhand.

6. *Pedestes masuriensis masuriensis* (Moore) MUSSOORIE BUSH BOB

1878. *Isoteinon masuriensis* Moore, *Proc. Zool. Soc.* London : 693.

1949. *Pedestes masuriensis masuriensis* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.), : 249.

2003. *Pedestes masuriensis masuriensis* (Moore) : Majumdar, *State Fauna Series : Fauna of Sikkim* (part-4) : 119-120.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gawaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar,

Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The Species recorded by Mackinnon and de Niceville from Mussoorie, Distt. Dehra Dun in 1898 and F. Hannyngton (1910) from Cheema, 8000 feet in month of June from Kumaon.

Diagnostic Characters : Upper side of wings blush purple brown and fore wing upper side with a spot in area Cu1b overlap the spots in cell and Cu1a.

Wingspan : 28 mm.

Distribution : India : Uttarakhand, Northwest Himalaya Nagaland, Andaman Island, Bihar, Meghalaya, Sikkim and Assam.

Elsewhere : Myanmar and Indo-China.

Genus ***Thoressa*** Swinhoe

1913. *Thoressa* Swinhoe, Lep. Indica, **10** : 284.

There are ten species of this genus Thoressa Swinhoe are known in India of which two are dealt with Uttarakhand.

Key to species *Thoressa*

Hind wing cilia whitish/olive .... *Thoressa gupta* (de Niceville)

Hind wing cilia reddish ochreous and unchequred .... *Thoressa aina* (deNice ville)

7. ***Thoressa gupta*** (de Niceville) OLIVE ACE

1890. *Halpe gupta deNice ville, Journ. Asiat. Soc.*, : 255.

1998. *Thoressa gupta* Ghosh and Chaudhary, *State Fauna Series : Fauna of Sikkim* (part-4) : 285.

2003. *Thoressa gupta gupta* (deNice ville) : Majumdar, *State Fauna Series 4 : Fauna of Meghalaya* (part-6) : 120.

Status : Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Gawaldam Village, 2exs., Reg. No. 4881, 2.iii.2004, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon in the month of May & June at about 7,000 feet from Kumaon and Mackinnon and de Niceville (1898)from Tehri Garhwal.

Diagnostic Characters : Antennal club not ringed with pale yellow before apiculus, upper side of hind wing without white spot and under side of hind wing with.

Wingspan : 32 mm.

Distribution : India : Uttarakhand, Garhwal; Sikkim, Meghalaya and Uttar Pradesh.

8. ***Thoressa aina*** (deNice ville) GARHWAL ACE

1890. *Halpe aina de Niceville, J. Bombay nat. Hist. Soc.*, **5** : 176, pl. B fig. 8.

1949. *Thoressa aina* Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) : 249.

2003. *Thoressa aina* (de Niceville): Majumdar, *State Fauna Series : Fauna of Sikkim* (part-4) : 119-120.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of May and June.

Diagnostic Characters : Upper side of fore wing with two cell spots and antennal club ringed with pale yellow before apiculus.

Wingspan : 35 mm.

Distribution : India : Uttarakhand, Tehri Garhwal; Sikkim.

Genus ***Halpe*** Moore

1913. *Halpe* Moore *Proc. Zool. Soc. London*, : 689.

This genus *Halpe* Moore is represented by ten species in India, of which one is dealt with Uttarakhand.

9. ***Halpe moorei moorei*** (Watson) MOORE'S ACE

1932. *Halpe moorei* (Watson) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 394.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani Village, 1ex., Reg. No. 2, 11.ix.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in the month of May and Arun Pratap Singh & R.S.Bhandari (2003), FRI, from Dehra Dun.

Wingspan : 26 mm.

Distribution : India : Uttarakhand, Dehra Dun and South India.

Elsewhere : Sri Lanka, Malaya.

Ancistroides Group

Key to genera of Ancistroides group

1. Fore wing vein Cu 1a opposite to vein R2 at their origin ..... ***Ancistroides*** Butler
- Fore wing vein Cu 1a opposite to vein R3 2
2. Antennae greater than costa. Fore wing with hyaline white band dorsally. Hind wing cell equal to half of the wing .... ***Notocrypta de Niceville***

   Antennae shorter than half of the costa. Fore wing with large hyaline spot dorsally. Hind wing cell shorter than half of the wing .... ***Udaspes*** Moore

Genus ***Ancistroides*** Butler

1874. *Ancistroides* Butler, *Trans. Ent. Soc. London*, : 436.

1865. *Kerana diocles* Moore *Trans. Ent. Soc. London*, **14**(4) : 255.

Only one species of genus *Kerana* Moore, occurring in India, of which dealt with Uttarakhand.

10. ***Ancistroides nigrita diocles*** Moore
CHOCOLATE DEMON

1912. *Kerana diocles* Moore : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 604.

1932. *Kerana diocles* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 369.

1998. *Ancistroides nigrita diocles*, Ghosh and Chaudhary, *State fauna series 4, Fauna of Meghalaya* (Part-6) : 291.

2003. *Ancistroides nigrita diocles*, Moore Majumdar, *State fauna series* **9**, *Fauna of Sikkim* (Part-4) : 122.

Status : Common.

Material examined : India : Uttarakhand : Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party.

Remark : The species also recorded by F. Hannyngton (1910) from Nalena (Kumaon) in the month of September at 4500 feet.

Diagnostic Characters : Upper Side : Fore wing brown, unmarked. Under side: Apex of fore wing and termen of hind wing broadly paler.

Wingspan : 48-60 mm.

Distribution : India : Uttarakhand, Nalena, Nagaland and Bengal.

Elsewhere : Sri Lanka, Myanmar, Siam, Malay Peninsula and Islands, Philippines.

Genus ***Notocrypta*** deNice ville

1889. *Notocrypta* deNice ville, *J. Bombay nat. Hist. Soc.*, 188.

This genus *Notocrypta* de Niceville, is represented by three species in India, of which two are dealt with Uttarakhand.

Key to species of *Notocrypta de Niceville* genus

Fore wing under side central band not produced above the radish .... *curvifascia* (Felder)

Fore wing under side central band produced above the radish .... *feisthamelii* (Boisduval)

11. ***Notocrypta curvifascia*** (Felder)
RESTRICTED DEMON

1862. *Plesioneura curvifascia* Felder, *Wien. Ent. Mon.* **6** : 29.

1912. *Notocrypta resticta Moore* : Tytler, *J.Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Notocrypta curvifascia curvifascia* (Felder) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 286.

2006. *Notocrypta curvifascia curvifascia* (Felder) Gupta & Majumdar, *State Fauna Series* **12** : *Fauna of Nagaland* : 316-317.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Nangni Village, 2exs., 31.iii.2005, Reg.

No. 5357, Coll. Archana Bahuguna & party; Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. *Vinod Khanna* & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party Garhwal.

Remark : The species also recorded by Mackinnon and de Niceville (1898) from Aglar Valley below Mussoorie in the month of May.

Diagnostic Characters : See in key.

Wingspan : 20- 22 mm.

Distribution : India : Uttarakhand, Andaman Island, Assam, Nagaland, Sikkim, South India, Meghalaya and West Bengal.

Elsewhere : Hong Kong, Indo-China, Myanmar Nepal, Sri Lanka, Thailand, Taiwan. and Yunnan

12. *Notocrypta feisthamelii* Boisduval

1832. *Notocrypta feisthamelii* Boisduval. *Voy. Astrolabe. Lep.* : 159.

1949. *Notocrypta feisthamelii alysos* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 287.

12. *Notocrypta feisthamelii alysos* (Moore) SPOTTED DEMON

1865. *Plesioneura alysos* Moore *Proc. Zool. Soc.* London, : 789.

1912. *Notocrypta feisthamelii* Boisduval Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 604.

2006. *Notocrypta feisthamelii alysos* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 316.

Status :

Material examined : India : Uttarakhand : Almora dist., on way to Dhakuri, 1750-2750 m. 2exs., 5.viii.1990, Coll. P.C. Tak & party.; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gawaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Distt. Almora, Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Diagnostic Characters : See in key.

Wingspan : 20- 22 mm.

Distribution : India : Uttarakhand, Almora, Assam, Nagaland, Sikkim and Northwest Himalayas.

Elsewhere : Indo-China, Myanmar, Malaya and Thailand.

Remark : Only this subspecies occurs in India.

Genus *Udaspes* Moore

1881. *Udaspes* Moore *Lep. Ceylon.*, **1** : 177.

Only a single species *Udaspes folus* (Cramer) of this genus occurring in India and dealt with Uttarakhand.

13. *Udaspes folus* (Cramer) GRASS DEMON

1775. *Papilio folus* Cramer, *Pap. Exot.*, **1** : pl.74-fig. 7.

1912. *Udaspes folus* (Cramer) Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Udaspes folus* (Cramer) *Evans, A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 292.

2006. *Udaspes folus* (Cramer) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 316.

2007. *Udaspes folus* (Cramer) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 510-11.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Roorkee & around, exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002, Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt.

Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party. Distt. Nainital, Lal Kuaon, 1ex., Reg. No. 5487. 21.ix.2005, Coll. Parmod Kumar; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002; Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon hills.

Diagnostic Characters : Upper side of wings with marginal white spots. Fore wing upper side with large white marking and under side with variegated white patches, brown patches present between vein Cu1b to M3, another small and white spot present between R5 and subcostal and R1.

Wingspan : 40 – 48 mm.

Distribution : India : Uttarakhand, Nagaland, Northwest Himalayas, Orissa, Madhya Pradesh, Uttar Pradesh and West Bengal to Assam.

Elsewhere : Myanmar.

Uttarakhand : It has been recorded from Haridwar, Dehra Dun, Nainital, Rudra Prayag and Pithoragarh districts.

Plastingia Group

This group includes 18 genera from India of which six are represent in Uttarakhand.

Key to genera

1. Antennal apiculus not larger than twice width of club; palpi generally with second segment long, third pointed and more or less protruding 2
– Antennal apiculus larger than twice width of club; palpi generally with second segment short, quadratic; third very short, stout, bluntly conical, not usually protruding 3
2. Dorsum of hind wing not longer than costa; palpi with third segment long and fore wing usually with dorsum white spots ..... ***Suastus*** Moore
– Dorsum of hind wing longer than costa; palpi with third segment short; fore wing unmarked or with hyaline spots 4
3. Fore wing vein M2 decurved ..... ***Zographetus*** Watson
– Fore wing vein M2 ..... ***Hyarotis*** Moore
4. Cell of hind wing shorter than half wing; M2 of fore wing straight ..... ***Gangara*** Moore
– Cell of hind wing equal to half wing 5
5. Apex of cell of fore wing not produced; M3 opposite to R4 or R5; fore wing with large, usually separated yellow or white hyaline spots ..... ***Erionota*** Mabille
– Apex of cell of fore wing produced; M3 opposite to R3; fore wing unmarked and hind wing cilia about tornus orange to pale yellow; eyes red ..... ***Matapa*** Moore

Genus ***Suastus*** Moore

1881. *Suastus* Moore *Lep. Ceylon.* **1** : 168.

1949. *Suastus gremius* (Fabricius) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 32.

Only a single species *Suastus gremius* (Fabricius) of this genus occurring in India and dealt with Uttarakhand.

14. ***Suastus gremius*** (Fabricius)
INDIAN PALM BOB

1798. *Hesperia gremius* Fabricius, *Ent. Syst. Suppl.* : 433.

1949. *Suastus gremius* (Fabricius):: Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 296.

1999. *Suastus gremius* (Fabricius) : Ghosh and Chaudhary, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, 4 (part-6) : 295.

2007. *Suastus gremius* (Fabricius) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 511.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun,

Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gawaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from June to October in Dehra Dun and F. Hannyngton (1910) from Ranibagh and Jiuli upto 3,000 feet, Kumaon.

Diagnostic Characters : Upper side of fore wing with white spot, under side sometimes with tornus dark beyond a central white in space 2A. Hind wing with conspicuous black cell spot, which is large as any discal spot.

Wingspan : 32-42 mm.

Distribution : Oriental region including India : Uttarakhand, Northwest Himalayas (Ranibagh and Jiuli, Kumaon), Meghalaya, Assam, Manipur, Nagaland, Central India and Sikkim.

Elsewhere : Myanmar and South China.

Genus ***Hyarotis*** Moore

1881. *Hyarotis* Moore *Lep. Ceylon.* **1** : 174.

Two species of genus *Hyarotis* Moore occurring in India of which one *Hyarotis adrastus* Cramer dealt with Uttarakhand.

15. ***Hyarotis adrastus*** Cramer
TREE FLITTER

1912. *Hyarotis adrastus* Cramer : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 604.

1932. *Hyarotis adrastus* Cramer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 375.

2003. *Hyarotis adrastus* Cramer : Arun Pratap Singh & R.S. Bhandari, *Butterfly Diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Not common.

Material examined : India : Uttarakhand : Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Nalena and Takula from Kumaon in the month of May & June at 2,000-8000 feet. (610-2440m); Mackinnon and de Niceville from Mussoorie (1899) and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Fore wing upper side with a spot between 1A and Cu 1b immediately below and adjoining the cell spot. Hind wing under side with central white band in wet season form.

Wingspan : 38-48 mm.

Distribution : India : Uttarakhand, Mussoorie, Dehra Dun, Nagaland and South India.

Elsewhere : Sri Lanka.

Genus ***Zographetus*** Watson

1893. *Zographetus Watson, Proc. Zool. Soc. London.*, : 84.

Only a single species *Zographetus satwa* of this genus occurring in India and dealt with Uttarakhand.

16. ***Zographetus satwa*** de Niceville
PURPLE AND GOLD FLITTER

1883. *Isoteinon satwa* de Niceville, *J. Asiat. Soc.* Bengal : 86.

1915. *Zographetus satwa / satwa* (de Niceville) Tytler, *J. Bombay nat. Hist. Soc.*, **24** : 151.

1949. *Zographetus satwa* (de Niceville) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 299.

2006. *Zographetus satwa (de Niceville)* Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 319.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Pithoragarh, Melagad Village, 1ex., Reg. No. 5814, 16.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Jhulaghat, Kumaon.

Diagnostic Characters : Fore wing upper side with two sub apical spots and spot in space 2A, under side costa yellow upto the sub apical spots. Hind wing under side basal half yellow with a few black spots, outer half dark brown with purple washed.

Wingspan : 16 mm.

Distribution : India : Uttarakhand, Nagaland, Northwest Himalayas, Assam and Sikkim.

Elsewhere : Java, Malaya, Myanmar and Thailand.

Genus ***Gangara*** Moore

1881. *Gangara* Moore *Lep. Ceylon*, **1** : 164.

There are two species of genus *Gangara* Moore occurring in India, of which one is dealt with Uttarakhand.

17. ***Gangara thyrsis*** (Fabricius) GIANT RED EYE

1775. Papilio *thyrsis* (Fabricius) *Syst. Ent.* : 532.

1915. *Gangara thyrsis* (Fabricius) Tytler, *J. Bombay nat. Hist. Soc.* **24** : 152.

1949. *Gangara thyrsis thyrsis* (Fabricius) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (Nat. Hist.) London : 325.

2006. *Gangara thyrsis* (Fabricius) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 321.

Status : Common.

Material examined : India : Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party.

Wingspan : 36 mm.

Distribution : India : Uttarakhand, Nagaland, Andaman Island, Northwest Himalayas, South India, Assam Sikkim and West Bengal.

Elsewhere : Banka, Sumatra, Malaya, Indo-China and Thailand.

Genus ***Erionota*** Mabille

1878. *Erionota* Mabille, *Ann. Soc. Ent. Belg.*, **21** : 34.

There are three species of genus *Erionota* Mabille occurring in India, of which one is dealt with Uttarakhand.

18. ***Erionota thrax*** (Linnaeus) PALM RED EYE

1867. *Papilio thrax* Linnaeus *Syst. Nat.*, **1** : 794.

1912. *Erionota thrax* (Linnaeus) Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 604.

1949. *Erionota thrax* (Linnaeus) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 327.

2006. *Erionota thrax thrax* (Linnaeus) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 321.

Status : Very Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16, 5.vi.2002; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party; Tehri Garhwal; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Distt. Almora, Gagas Village, 2exs., Reg. No.5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 5exs, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species also recorded by Mackinnon and de Niceville (1898) from Dehra Dun in the month of April to September and F. Hannyngton (1910) from Ranibagh, Kumaon hills in the month of October.

Wingspan : 70-76 mm.

Distribution : India : Uttarakhand, Nagaland, Northwest Himalayas, Assam, West Bengal and Sikkim.

Elsewhere : Banka, Indo-China, Sumatra, Malaya, Myanmar and Thailand.

Genus ***Matapa*** Moore

1881. *Matapa* Moore *Lep.Ceylon*, **1** : 177.

There are five species of genus *Matapa* Moore occurring in India, of which one is dealt with Uttarakhand

19. ***Matapa aria*** (Moore)
COMMON REDEYE

1865. *Ismene aria* Moore, *Proc. Zool. Soc. London* : 784.

1949. *Matapa aria* : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 330.

1999. *Matapa aria* (Moore) : Ghosh and Chaudhary, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, **4**(part-6) : 297.

Status : Common.

Material examined : India : Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) in May from Dehra Dun and Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 40-45 mm.

Distribution : Oriental region including India: Uttarakhand, Meghalaya, Andaman, Assam, Sikkim and South India.

Elsewhere : Myanmar, Hainan, Siam, Tonkin, Malaya Peninsular and China.

Taractrocera group

Among five Indian genera, four are presently dealt with from Uttarakhand.

Key to genera of Taractrocera group

1. Palpi third segment long, protruding and thin as antennal shaft 2
- Palpi third segment shorter and stout, never so thin as antennal shaft 3
2. Antennal club flattened and palpi needle like ..... ***Taractrocera*** Butler
- Antennal club not flattened, labial palpi not so thin 4
3. Fore wing vein club nearer to base than to end cell, Vein M3 much nearer to Cu 1a than to M2, antennae longer than half of wing, upper side of fore wing without brand ..... ***Oriens*** Evans
- Fore wing vein club nearer to cell than to base, Vein M3 not nearer to Vein Cu 1a than to vein M2, antennae equal to half of costa, upper side of fore wing with a brand..... ***Potanthus*** Scudder
4. Fore wing vein club nearer to end cell than to base, upper side of fore wing always with an unbroken discal stigma in male and dorsally uncus deeply divided ..... ***Telicota*** Moore

Genus ***Taractrocera*** Butler

1869. *Taractrocera* Butler *Cat. Lep.* Fabr. 279.

There are three species of genus *Taractrocera* Butler occurring in India, of which two are dealt with Uttarakhand.

20. ***Taractrocera maevius*** (Fabricius)
COMMOM GRASS DART

1793. *Hesperia maevius* Fabricius, *Ent. Syst.*, **3** : 352.

1869. *Taractrocera maevius* (Fabricius), Butler, *Cat. Lep.* Fabr. p. 279, pl. 3, fig. 13.

1932. *Taractrocera maevius* (Fabricius). : Evans, *The Identification of Indian Butterflies*, Bombay nat. Hist. Soc. : 397.

1997. *Taractrocera maevius* (Fabricius) Ghosh and Chaudhary, *State Fauna Series* **3** *: Fauna of West Bengal* (part-7); 303.

2003. *Taractrocera maevius* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811,

27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii.2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Distt. Almora Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 2exs, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Nainital and Binsar from Kumaon in the month of May & June at 7,800 feet & Mackinnon and de Niceville (1898) from Aglar valley and on Nag Tiba near Mussoorie, Distts. Dehra Dun in the month of May and June and Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Character : Hind wing : under side ochreau browan, veins white and spoting.

Wingspan : 25 mm.

Distribution : India : Uttarakhand, Dehra Dun, Nainital, Binsar, Northwest Himalayas, Sikkim Assam, West Bengal, Madhya Pradesh and South India.

Elsewhere : Sri Lanka, Nepal, Bhutan & Pakistan.

21. ***Taractrocera danna*** Moore
HIMALAYAN GRASS-DART

1932. *Taractrocera danna Moore.* : Evans, The Identification of Indian Butterflies, *Bombay nat. Hist. Soc.* : 397.

2003. *Taractrocera maevius* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Fairly Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon in the month of May & June at about 7,000 feet & Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Hindwing overland greening scales, veins ground colour. No spoting.

Wingspan : 27 mm.

Distribution : India : Uttarakhand, Dehra Dun, Northwest Himalayas, Kashmir to Bhutan.

Genus ***Oriens*** Evans

1932. *Oriens* Evans A *cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 40.

There are 16 species of genus *Oriens* Evans occurring in India, of which one is dealt with Uttarakhand.

22. ***Oriens gola*** (Moore)
COMMON DARTLET

1877. *Padraona gola* Moore, *Proc. Zool. Soc.* London, : 58, fig. ix.

1949. *Oriens gola* (Moore) Evans *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 40.

Status : Common.

Material examined : India : Uttarakhand, Haridwar dist.; Beribara, 2exs., 9.xi.1990, Coll. P.C. Tak & party and recorded by Arora (1995) from Nainital.

Wingspan : 24 mm.

Distribution : India : Uttarakhand : Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs, Reg. No. 6, 10.vii.2002, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party *Distt.* Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1, 5.vi.2002, Coll. Vinod Khanna & party.

Diagnostic Characters : Fore wing with an oblique discal irregular sinuous broader golden yellow band which is bent before apex and indented at the end of cell; hind wing with an median discal golden yellow band and with some hairs at base, cilia edged with golden yellow; under side of both wings with a blackish streak at the end of cell.

Distribution : Nainital (Kumaon) Northwest Himalaya, Sikkim to Assam and Meghalaya

Elsewhere : Myanmar.

Genus *Potanthus* Scudder

1872. *Potanthus* Scudder, 4th Ann. Peabody Acad. Sci., : 75.

There are 16 species of genus *Potanthus* Scudder occurring in India, of which three are dealt with Uttarakhand.

23. *Potanthus dara* (Kollar) HIMALAYAN DART

1848. *Hesperia dara* Kollar, *In Hugel's Kaschmir,* **4** : 455.

1892. *Padraona dara* (Kollar) Elwes, *Proc. Zool. Soc.* London : 651.

1949. *Potanthus dara* (Kollar) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 379.

2006. *Potanthus dara* (Kollar) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 323.

Status : Not Rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 1ex., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party Chamoli dist., Reni, 2000 m. 1ex., 5.i.1989; Loha jung, 2150 m. 1ex., 1.ix.1991, Coll. P.C. Tak & party.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 30 mm.

Distribution : India : Uttarakhand, Kashmir to Kumaon, Northwest Himalayas and Nagaland.

Elsewhere : Nepal, Pakistan and Bhutan.

24. *Potanthus pseudomaesa* (Moore) COMMON INDIAN DART

1881. *Padraona pseudomaesa* Moore, Lep. Ceylon, **1** : 170.

1949. *Potanthus pseudomaesa* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 377.

1999. *Potanthus pseudomaesa* (Moore) : Ghosh and Chaudhary, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series,* **4** (part-6) : 311.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun

Wingspan : 32 mm.

Distribution : India : Uttarakhand, Dehra Dun, Meghalaya and South India.

Elsewhere : Sri Lanka.

25. *Potanthus maesoides* (Butler) LESSER DART

1932. *Potanthus. maesoides* (Butler) : Evans, *The Identification of Indian Butterflies,* Bombay nat. Hist. Soc. : 401.

2003. *Potanthus. maesoides* (Butler) : Arun Pratap Singh & R.S. Bhandari, *Butterfly diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville from Mussoorie and Dehra Dun in 1899, Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun

Wingspan : 26 mm.

Distribution : India : Uttarakhand, Dehra Dun and South India.

Elsewhere : Sri Lanka, Malaya.

Genus *Telicota* Moore

1881. *Telicota* Moore, *Lep. Ceylon,* **1** : 169.

There are five species of genus *Telicota* Moore, occurring in India, of which two are dealt with Uttarakhand.

Key to species of genus Telicota Moore

1. Under side of HW more or mess tawny, band broad but inconspicuous .... *colon* (Fabricius)

- Under side of HW not tawny and without band ..... *ancilla* (Moore)

26. ***Telicota colon*** (Fabricius)
PALE PALM DART

1932. *Astycus colon* (Fabricius) : Evans : The Identification of Indian Butterflies, *Bombay nat. Hist.* Soc. : 405.

2003. *Telicota colon* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Diagnostic Characters : See in key.

Wingspan : 35mm.

Distribution : India : Uttarakhand, Dehra Dun, Northwest Himalayas.

Elsewhere : Malayan, Philippines, Sri Lanka, Pakisthan, Nepal and Bhutan.

27. ***Telicota ancilla bambusae*** (Moore)
DARK PLAM DART

1878. *Pamphila bambusae* (Moore) *Proc. Zool. Soc.* London : 691.

1912. *Telicota bambusae* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Telicota ancilla bambusae* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 397.

2006. *Telicota ancilla bambusae* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* 324.

2007. *Telicota ancilla bambusae* (Moore) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 512.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in April and May and August to October in Dehra Dun and Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Diagnostic Characters : Fore wing with black spotting at apex less developed ventrally. Genitalia cuiller protrudes as a blunt triangle; valva short and broad.

Wingspan : 15 mm.

Distribution : India : Uttarakhand, North-west Himalayas, South India, Madhya Pradesh, Orissa, Assam, Manipur, West Bengal and Sikkim.

Genus ***Actinor*** Moore

1881. *Actinor* Moore, *Lep. Ceylon.*, **1** : 180.

Only one species of genus *Actinor* Moore, occurring in India, of which dealt with Uttarakhand.

28. ***Actinor radians*** (Moore)
VEINED DART

1932. *Actinor radians* (Moore) : Evans, The Identification of Indian Butterflies, *Bombay nat. Hist. Soc. (Second edition)* : 396.

2003. *Actinor radians* (Moore) : Arun Pratap Singh & R.S. Bhandari, *Butterfly diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Not rare.

Wingspan : 34 – 42 mm.

Material examined : India : Uttarakhand : Dehra Dun, Jharipani, 1ex., Reg. No. 4, 1ex., 18.vi.2003; Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002, Coll. J.P. Sati & party.

Remark : The species Recorded by Mackinnon and de Niceville (1898) from Mussoorie from Mussoorie and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Upper side of Male. Luteous-brown, basal hairy scales yellow. Cilia cinereous-white : forewing with a pale-yellow constricted spot at end of the cell, and an irregular transverse continuous discal band of spots with their lower angles continued outward along the veins; hindwing with a yellow streak at end of the cell and a short discal band with outer rays. Underside paler, minutely speckled with yellowish-white; forewing as above, the hind margin being also broadly yellow; hindwing with a sub basal spot, all the veins, and two (a median and a discal) transverse sinuous bands pale yellow. Palpi, body beneath and legs yellowish-white.

Distribution : India : Uttarakhand, Mussoorie, Dehra Dun and Chitral to Kumaon in the Himalayas upto 4,000 feet.

Genus ***Pamphila*** Moore

1881. *Pamphila* Moore, *Lep. Ceylon.* **1** : 180.

There are two species of genus *Pamphila* occurring in India, of which one is dealt with Uttarakhand.

29. ***Pamphila comma dimila*** Moore
CHEQUERED DARTER

1894. *Erynnis dimila* Moore : Mackinnon and deNice ville *Joun. A.S.B.*, Vol. **63** (part II) : 52, plate 1, fig. 7.

1932. *Pamphila comma dimila* Moore Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 316.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon & de Niceville (1898) from Upper Ganges Valley near thee Nilung Pass at 16,000 feet in July and August in 1894.

Diagnostic Characters : Upper side of wings border broad dusky/dark tawny. Under side of HW dark green, discal spots dark bordered, conjoined or nearly so.

Wingspan : 23 mm. (Male).

Distribution : India : Uttarakhand, Kangra to Kumaon (North West Himalaya), Sikkim, Nagaland and West Bengal.

Elsewhere : China, Hainan, Myanmar, Thailand and Tonkin.

Group Gegenes
Key to genera of group Gegenes

1. Antennae with more segments on the nudum on the club than on the apiculus ..... ***Parnara*** Moore

   Antennae with at least as many segments on the apiculus as on the club 2

2. Antennae not reaching mid costa. Forewing vein Cu 1a opposite to R1 3

   Antennae longer, nearly equal to half of the costa. Forewing vein Cu 1a before origin of vein R1 to R1 4

3. Underside of hindwing without cell spot. Mid tibia unspined ..... ***Borbo*** Evans

   - Underside of hindwing with a cell spot. Mid tibia heavily spined ..... ***Pelopidas*** Walker

4. Antennal apiculus more obtuse and palpi less flattened ..... ***Polytremes*** Mabille

   Antennal apiculus right angled, palpi much stouter 5

5. Mid tibiae unspined ..... ***Caltoris*** Swinhoe

   - Mid tibiae heavily spined ..... ***Baoris*** Moore

Genus ***Gegenes*** Moore

1881. *Gegenes* Moore *Lep. Ceylon.*, **1** : 180.

Only one species of genus *Gegenes* occurring in India, of which one is dealt with Uttarakhand.

30. ***Gegenes nostrodamus*** (Fabricius)
DINGY SWIFT

1932. *Gegenes nostrodamus* (Fabricius) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 418.

1932. *Gegenes nostrodamus karsana* Moore : Evans : *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 418.

2003. *Gegenes nostrodamus* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly* Diversity *in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002;. Dehra Dun, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded Mackinnon and de Niceville (1898) from Mussoorie in the month of September and in Dehra Dun in August and Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Antennae : Shaft plain white ventrally. Wings : Pale brown. Genitalia: Curved ventral edge of cuiller evenly and finely serrate throughout.

Wingspan : 28-35 mm.

Distribution : India : Uttarakhand : Tehri Garhwal.

Elsewhere : South Europe, North Africa Asia Minor to Central Asia.

Genus ***Parnara*** Moore

1881. *Parnara* Moore, *Lep. Ceylon,* **1** : 166.

There are five species of genus *Parnara* Moore, occurring in India, of which one is dealt with Uttarakhand.

31. ***Parnara guttatus*** (Bremer & Grey) STRAIGHT SWIFT

1853. *Eudomus guttatus* Bremer & Grey, Schmett. N. China : 10.

1949. *Parnara guttatus* (Bremer & Grey) : Evans *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (Nat. Hist.) London : 433.

2003. *Parnara guttatus* (Moore) Majumdar, Zool. surv. India, Fauna of Sikkim, State Fauna Series, 9 (part-4) : 146.

2006. *Parnara guttatus* (Bremer & Grey) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 325-326.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal, 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie from July to September and in Dehra Dun in September.

Diagnostic Characters : Antennae very short; not equal to half costa. Upper side of FW decreasing spots in 2-4, apical 6-8, very rarely faint spot in cell. Upper side of HW and under side of HW a straight decreasing row of spots in 2-5.costa. Cuiller projection ventrally beyond the valva, then ventral edge of the latter straight.

Wingspan : 17 mm.

Distribution : India : Uttarakhand, Kashmir to Kumaon, Nagaland, Assam and Sikkim.

Elsewhere : Bokhara, Hainan, North Myanmar, South and West-China and Thailand.

Genus ***Borbo*** Evans

1949. *Borbo* Evans *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 44.

There are two species of genus *Borbo* Evans, occurring in India, of which one is dealt with Uttarakhand.

32. ***Borbo bevani*** (Moore) BEVAN'S SWIFT

1878. *Hesperia bevani* Moore, *Proc. Zool. Soc.* London : 688.

1892. *Paranara bevani* (Moore) : Elwes, *Proc. Zool. Soc.* London : 650.

1912. *Paranara bevani* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.,* **21** : 605.

1949. *Borbo bevani* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 437.

2006. *Paranara bevani* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 326.

2007. Borbo bevani (Moore) : Majumdar, State Fauna Series 5 : Fauna of Andhra Pradesh : 513.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 1ex., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party Distt. Nainital, Dhulwa soat, 6 kms. from Sultan on way to Dhikala, 1ex., 25.vi.2002, Reg. No. 4407, Coll. J.P. Sati & party; Garjia & around, 1ex., 5.iv.2003, Reg. No. 4639, Coll. Vinod Khanna & party.

Diagnostic Characters : Wing broad. Antennal club obtuse. Palpi semi-errect, hairy, third segment longer, pointed and conspicuous. Fore wing upper side with two spots in space 2A. Hind wing upper side with dots in space M1 to M3.

Wingspan : 20- 22 mm.

Distribution : India : Uttarakhand, Nainital (Kashmir to Kumaon), South India to Madhya Pradesh, Bombay, Lucknow. Kolkata, Pakistan to Assam.

Elsewhere : Sri Lanka, Thailand, Indo-China, Java and Myanmar.

Genus *Pelopidas* Walker

1870. *Pelopidas* Walker, Ent., **5** : 56.

There are seven species of genus *Pelopidas* Walker, occurring in India, of which four are dealt with Uttarakhand.

Key to species of the *Pelopides* Walker

1. Upper side of FW with discal stigma 2

   Upper side of FW without discal stigma ... 3

2. Lower end of stigma not nearer to base, more or less under origin of Vein Cu 1a .... *sinensis* (Mabille)

   Lower end of stigma nearer to base and well before origin of Vein Cu 1a .... *mathias* (Fabricius)

3. Upper side of FW spots white, cell spots usually conjoined; uncus arms divergent .... *assamensis* (Wood-Mason & de Niceville)

   Upper side of FW spots pale yellow, cell spots separate; uncus arms connivent .... *conjucta* Herrich-Schaffer

33. *Pelopidas sinensis* (Mabille) LARGE BANDED SWIFT

1877. *Gegenes sinensis* (Mabille) *Bull. Soc. Zool. Fr.* : 232.

1892. *Chapra priomines* Moore : *Proc. Zool. Soc.* London : 649.

1912. *Parnara sinensis* (Mabille) Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Pelopidas sinensis* (Mabille) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 438.

2006. *Pelopidas sinensis* (Mabille) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 326-327.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; .Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898)from Mussoorie, Dehra Dun and Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Wingspan : 17 mm. (Male).

Distribution : India : Uttarakhand, Nagaland, Assam, Meghalaya and Northwest Himalaya and Sikkim.

Elsewhere : Myanmar and Southwest China.

34. *Pelopidas mathias* (Fabricius) SMALL BANDED SWIFT

1798. *Hesperia mathias* Fabricius, *Ent. Syst. Supple.* : 433.

1997. *Pelopidas mathias*, Ghosh and Chaudhary, *State Fauna Series 3, Fauna of West Bengal* (7) : 313-314.

2003. *Pelopidas mathias* (Fabricius) Majumdar *State Fauna Series 9, Fauna of Sikkim* (part-4) : 131.

2007. *Pelopidas mathias* (Fabricius) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 512-13.

Status : Very Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16.5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the summer, rains and autumn, and in the Dehra Dun from March to November. The species recorded by Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Diagnostic Characters : Fore wing dorsally with discal stigma in male, lower end of stigma nearer to base than termen and situated well before origin of Vein Cu 1b, a line joining the cell spot centres.

Wingspan : 36 mm.

Distribution : India : Uttarakhand, Himachal Pradesh, South Sikkim, West Bengal, South India, Central India, Rajasthan, Punjab, Jammu & Kashmir, Assam.

Elsewhere : Australian region.

35. ***Pelopidas assamensis*** (Wood-Mason & de Niceville) GREAT SWIFT

1882. *Pelopidas assamensis* Wood-Mason & de Niceville *j. Asiat. Soc. Bengal* : 65.

1912. *Parnara assamensis* Wood-Mason & de Niceville *Tytler, J. Bombay nat. Hist. Soc.*, 21 : 605.

1949. *Pelopidas assamensis* (Wood-Mason & de Niceville) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Bri. Mus.* (nat. Hist.) London : 443.

2006. *Pelopidas assamensis* (Wood-Mason & de Niceville) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 327.

Status : Very Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville from Mussoorie, Dehra Dun in 1899, Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Wingspan : 17 mm. (Male).

Distribution : India : Uttarakhand, Nagaland, Assam, Meghalaya, Kausali and Sikkim.

Elsewhere : Myanmar, Malaya, Thailand and Indo-China.

Remarks : The species is protected under Schedule Wildlife Protection Act, 1972 and subsequent amendments.

36. ***Pelopides conjucta*** Herrich-Schaffer CONJOINED SWIFT

1869. *Goniloba conjuncta* Herrich-Schafer, *Corr. Blatt. Zool. Min. Ver. Regensb.*, : 195.

1949. *Pelopides conjuncta* Herrich-Schaffer : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 443.

1999. *Pelopides conjuncta* Herrich-Schaffer : Ghosh and Chaudhary, Zool. Surv. India, Fauna of Meghalaya, State Fauna Series, 4 (part-6) : 315.

Status : Not Rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in April and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 50-55 mm.

Distribution : India : Uttarakhand, Dehra Dun, Meghalaya, Andaman, Nicobar Assam and. Sikkim.

Elsewhere : China, Myanmar, Malayan, Siam and Taiwan.

Genus ***Polytremis*** Mabille

1904. *Polytremis* Mabille In *Wytsman, Genera Insectorum* 17(B) : 136.

There are four species of genus *Polytremis* Mabille, occurring in India, of which two are dealt with Uttarakhand.

Key to species of the genus *Polytremis* Mabille

1. Palpi third segment slender, protruding, semi-erect, antennal club obtuse, upper side of HW with inconspicuous hyaline spots .... ***lubricans*** *(Herrich-Schaffer)*

   Palpi third segment short, stout and erect, antennal club angled, upper side of HW with conspicuous spots 2

2. Hind wing tornal cilia white, uncus and gnathos convergent .... *discreta* (Elwes & Edwards)

   Hind wing tornal cilia white, uncus and gnathos convergent ..... *eltola* (Hewitson)

37. ***Polytremis lubricans lubricans*** (Herrich-Schaffer) SWIFT

1869. *Goniloba lubricans* Herrich-Schaffer, *Corr. Blatt. Zool. Mir. Yer. Regensb.* : 196.

1892. *Parnara toona* (Moore) Elwes, *Proc. Zool. Soc.* London : 446.

1912. *Parnara contigue Mabile :* Tytler, *J.Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Polytremis lubricans lubricans* (Herrich-Schaffer) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Bri Mus.* (nat. Hist.) London : 447.

2006. *Polytremis lubricans lubricans* Herrich-Schaffer Gupta & Majumdar, *State Fauna Series* **12** *: Fauna of Nagaland* : 327.

Status : Not Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Prayag, 3exs, Reg. No. 4864, 1.iii.2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex.., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Lower Gori Valley, 2500 feet in month of August from Kumaon.

Wingspan : 18-19 mm. (Male).

Distribution : India : Uttarakhand, Northwest Himalaya Nagaland, Andaman Island, Bihar, Meghalaya, Sikkim and Assam.

Elsewhere : Myanmar and Indo-China.

38. ***Polytremis eltola*** (Hewitson) YELLOW SPOT SWIFT

1869. *Hesperia eltola* Hewitson, *Exot Bult.* 4 : pl. 4 fig. 40.

1892. *Parnara eltola* (Hewitson) *Elwes, Proc. Zool. Soc.* London : 649.

1912. *Parnara eltola* (Hewitson) Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Polytremis eltola eltola* (Hewitson) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Bri Mus.* (nat. Hist.) London : 447.

2006. *Polytremis eltola eltola* (Hewitson) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* 328.

Status : Common.

Material examined : India : Uttarakhand, Almora dist., Maliadoh, 2500 m., 1ex., 4.ix.1990; Chamoli dist., Loha jung to Wan, 2150-2300 m. 1ex., 2.ix.1991, Coll. P.C. Tak & party.

Remark : Mackinnon and de Niceville (1898) from Mussoorie from April to June., August to September, and in Dehra Din in September.

Wingspan : 18-19 mm. (Male).

Distribution : India : Uttarakhand, Northwest Himalayas, Nagaland, Assam, Meghalaya, West Bengal and Sikkim.

Elsewhere : Myanmar, Nepal, Bhutan and Pakisthan.

Genus ***Caltoris*** Swinhoe

1893. *Caltoris* Swinhoe *Trans. Ent, Soc. London.*, : 323.

There are 12 species of genus *Caltoris* Swinhoe, occurring in India, of which one is dealt with Uttarakhand.

39. ***Caltoris plebia*** (de Niceville) TUFTED SWIFT

1887. *Parnara plebia* de Niceville *Proc. Zool. Soc.* London : 466, pl. 60. figs. ii.

1949. *Caltoris plebia* (de Niceville) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Bri Mus.* (nat. Hist.) London : 456.

1998. *Caltoris plebia, Ghosh & Chaudhary, State Fauna Series 4, Fauna of Meghalaya* (6) : 306.

2003. *Caltoris plebia Majumdar* State Fauna Series 9, *Fauna of Sikkim* (part-4) : 131.

Status : Not rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 1ex., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party.

Remark : The species Recorded by Mackinnon and de Niceville (1898) from Dehra Dun in April and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Upper side of FW with out cell spot and under side of FW with an unturned tuft of dark hair from dorsum near base.

Wingspan : 38 mm.

Distribution : India : Uttarakhand, Sikkim and Meghalaya.

Elsewhere : Myanmar and Malayan sub-region.

Genus ***Baoris*** Moore

1881. *Baoris* Moore : *Lep. Ceylon*, **1** : 165.

There are three species of genus *Baoris* Moore, occurring in India, of which one is dealt with Uttarakhand.

40. ***Baoris farri farri*** (Moore)
PAINT BRUSH SWIFT

1878. *Hesperia farri* Moore, *Proc. Zool. Soc.* London : 688.

1912. *Paranara oceia* Hewitson) : *Tytler, J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Borbo farri farri* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 448.

2006. *Baoris farri farri* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 329.

Status : Not rare.

Material examined : India : Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; .Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Male with secondary sexual character. Upper side of FW with hyaline white spots, cell spot more than one. Under side with polished grey dorsal area in the centre of which lying an oval brand in male and with pale super scaling; upper side of HW of male with a black recumbent paint brush overlying a scent pouch in cell.

Wingspan : 40mm. (Male).

Distribution : India : Uttarakhand, Sikkim, South India, Central India, Meghalaya. Assam, Nagaland, Uttar Pradesh and West Bengal.

Elsewhere : Bhutan, Nepal and Mynmar.

Remarks : The species is protected under Schedule-IV of Indian Wildlife Protection Act, 1972 and subsequent amendments.

Group Hesparia
Genus *Ochlodes* Moore

1881. *Ochlodes* Moore *Lep. Ceylon.*, **1** : 180.

There are three species of genus *Ochlodes* occurring in India, of which one is dealt with Uttarakhand.

41. ***Ochlodes brahma*** Moore
HIMALYAN DARTER

1932. *Ochlodes brahma brahma* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 408.

Status : Fairly common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party; 1ex., Reg. No. 11, 24. 9.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005;, Coll. J.P. Sati & party.

Remarks : The species also recorded by F.Hannyngton (1910) from Kumaon, Mackinnon and de Niceville (1898) from Mussoorie and Dehra Dun fairly common in month of May and June and again in September at 5,000 feet and The species originally described from Mussoorie and common in the ravines from May and June, 7,000 feet by Mackinnon and de Niceville.

Diagnostic Characters : Upper side of HW spots larger, yellowish, suffused. Under side of HW spots rather obscure, yellowish.

Wingspan : 36-38 mm.

Distribution : India : Uttarakhand, Mussoorie to Kumaon.

Subfamily COELIADINAE

The Subfamily Coeliadinae is known in India by 21 species and five genera of which eight species and 4 Genera are reported from Uttarakhand.

Keys to genera

1. Fore wing cell shorter than dorsum 2
- Fore wing cell shorter than dorsum 3
2. Fore wing vein 1A slightly bisinuate, without hyaline spot dorsally ..... ***Bibasis*** Moore

   Fore wing vein 1A acutely bisinuate, often with a hyaline spot dorsally ..... ***Hasora*** Moore
3. Fore wing cell longer than dorsum. Upper side of the fore wing brown with hyaline white spots ..... ***Badamia*** Moore
- Fore wing cell equal to dorsum. Upper side of the fore wing more or less blue or green without and hyaline white spots ..... ***Choaspes*** Moore

Genus *Bibasis* Moore

1881. *Bibasis* Moore : *Lep. Ceylon*, **1** : 160.

There are seven species of genus *Bibasis* Moore, occurring in India, of which five are dealt with Uttarakhand.

Key to species of the genus *Bibasis Moore*

1. Under side of Hindwing not striped, and with out black spot ..... *sena* (Moore)
- Under side of Hindwing more or less striped, and with black spot at space 8 2
2. Underside of Forewing with discal striping reaching termen at apex ..... *Vasutana* (Moore)
- Underside of Forewing with discal striping not reaching termen at apex 3
3. Underside of Hindwing without orange striping ..... *Jaina* (Moore)

   Underside of Hindwing with orange striping 4
4. Upper side of Forewing normal, above rather pale brown, faintly purple; wing span 50-55mm ..... *anadi* (de Niceville)
- Upper side of Forewing with orange brand; wingspan 40-50 ..... *aedipodea* (Swainson)

42. ***Bibasis sena*** (Moore)
ORANGE TAIL AWL

1865. *Goniloba sena* Moore, *Proc. Zool. Soc. London* : 778.

1892. *Bibasis sena* (Moore) : Elwes, Proc. *Zool. Soc.* London : 648.

1912. *Bibasis sena* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 606.

1949. *Bibasis sena* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 52.

2006. *Bibasis sena* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 330.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1,. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party. Mussoorie, Distts. Dehra Dun.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in April Arun Pratap Singh & R.S.Bhandari, (2003) FRI, from Dehra Dun.

Wingspan : 20mm. (Male) : (45-50) mm.

Distribution : India : Uttarakhand, North West Himalayas (Mussoorie, Distts. Dehra Dun), Sikkim, South India, Nagaland, Meghalaya and Andaman's.

Remarks : The species is protected under Schedule-II (part-2) of Indian Wildlife Protection Act,1972 and subsequent amendments.

43. ***Bibasis vasutana*** Moore
GREEN AWL

1865. *Ismene vasutana* Moore, *Proc. Zool. Soc. London* : 783.

1892. Choaspes vasutana (Moore) : Elwes, *Proc. Zool. Soc.* London : 646.

1912. *Ismene vasutana* Moore : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Bibasis vasutana* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 49.

2006. *Bibasis vasutana* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 331.

Status : Common.

Material examined : India : Uttarakhand. Nil

Remarks : The species recorded by Evans from Kumaon Hills.

Wingspan : 28mm. (Male).

Distribution : India : Uttarakhand, North West Himalayas, Sikkim, Nagaland and.

44. ***Bibasis jaina*** Moore
ORANGE OWL

1865. *Ismene jaina* Moore, *Proc. Zool. Soc. London* : 782.

1912. *Ismene jaina* Moore : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 605.

1949. *Bibasis jaina* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 47.

2006. *Bibasis jaina* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 331.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Evans in Mussoorie, Mackinnon and de Niceville (1898) from Mussoorie from February to August from Mussoorie, dist. Dehra Dun and Arun Pratap Singh & R.S. Bhandari,(2003) FRI, from Dehra Dun.

Wingspan : 20mm. (Male).

Distribution : India : Uttarakhand, North West Himalayas (Mussoorie), Sikkim, Nagaland and Meghalaya.

Elsewhere : Myanmar.

45. ***Bibasis anadi*** (de Niceville)
PLAIN ORANGE AWLET

1883. *Choaspes anadi* de Niceville, *Journ. Asiat. Soc. Bengal*, **52**(2) 83, pl. 10, Fig.vi.

1949. *Bibasis anadi* : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 48.

1999. *Bibasis anadi* (de Niceville) : Ghosh and Chaudhary, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series*, 4 (part-6) : 315.

Status : Rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) in the month of February to August from Mussoorie, dist. Dehra Dun.

Wingspan : 50-55 mm.

Distribution : India : Uttarakhand, (Mussoorie, dist. Dehra Dun,), Meghalaya, Assam and. Sikkim.

Elsewhere : Myanmar, Siam, Thailand and Meghalaya. Myanmar and Nepal.

46. ***Bibasis aedipodea*** (Swanson)
BRANDED ORANGE AWLET

1876. *Ismene belesis* Mabille, *Bull. Ann. Soc. Ent. Fr.* (5)4 : ix & 260.

1915. *Ismene ataphus* Watson : Tytler, *J. Bombay nat. Hist. Soc.*, **24** : 155.

1949. *Bibasis aedipodea* (Mabille) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 45.

2006. *Bibasis aedipodea* (Mabille) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 331.

Status : Not rare.

Material examined : India : Uttarakhand. Nil.

Remark : The species recorded by Mackinnon and de Niceville(1898) from Dehra Dun in 1899 and Arun Pratap Singh & R.S. Bhandari (2003), FRI, from Dehra Dun.

Wingspan : 23 mm. (Male).

Distribution : India : Uttarakhand, Kangra to Kumaon (North West Himalaya), Sikkim, Nagaland and West Bengal.

Elsewhere : China, Hainan, Myanmar, Thailand and Tonkin.

Genus ***Hasora*** Moore

1881. *Hasora* Moore : *Lep. Ceylon,* **1** : 159.

There are eight species of genus *Hasora* Moore, occurring in India, of which one is dealt with Uttarakhand.

47. ***Hasora chromus*** (Cramer) COMMON BABDED OWL

1782. *Papilio chromus* Cramer, *Pap. Exot.,* 3, pl. 284, fig. E.

1912. *Hasora chromus* (Cramer) : Tytler, *J. Bombay nat. Hist. Soc.,* **21** : 606.

1932. *Hasora chromus* (Cramer) : Evans, The Identification of Indian Butterflies, *Bombay nat. Hist. Soc.* : 316.

1997. *Hasora chromus* (Cramer) : Ghosh and Chaudhary, State Fauna Series **3**, *Fauna of West Bengal* (7) : 279.

2003. *Hasora chromus* (Cramer) : Majumdar, *State Fauna Series : Fauna of Sikkim* (part-4) : 137.

2007. *Hasora chromus* (Cramer) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 514.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party; Kumaon, Ranibagh, 2000 feet in August Coll. Dr. P.C. Tak & party.

Diagnostic Characters : *Remarks* : Upper side of base paler. Fore wing dorsum equal to termen, upper side with white spots in space Cu 1a and Cu 1b. Undersides of hind wing with more or less dark tornal lobe and style of claspers undivided.

Elsewhere : Nepal, Bhutan and Myanmar.

Wingspan : 45-50 mm.

Distribution : India : Uttarakhand : Kumaon, Ranibagh, Nagaland, West Bengal and Sikkim.

Genus ***Badamia*** Moore

1881. *Badamia* Moore : *Lep. Ceylon,* **1** : 157.

Only one species of genus *Badamia* Moore, occurring in India, of which dealt with Uttarakhand.

48. ***Badamia exclamationis*** (Fabricius) BROWN AWL

1775. *Papilio exclamationis* Fabricius *Syst. Ent.* : 530.

1912. *Badamia exclamationis* (Fabricius) : Tytler, *J. Bombay nat. Hist. Soc.,* **21** : 606.

1949. *Badamia exclamationis* (Fabricius) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 72.

2006. *Badamia exclamationis* (Fabricius) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* 334.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Kalsi, 1ex., Reg. No. 8, 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party species recorded by Mackinnon and de Niceville from Mussoorie, Dehra Dun in 1899 Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. N. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Remark : Arun Pratap Singh & R.S. Bhandari, (2003), recorded from FRI Dehra Dun.

Diagnostic Characters : Upper side of wings dark brown with pale base. Fore wing upper side with large whitish hyaline spot in spaces M3 and Cu1a, Cu1b and also in cell. Hind wing under side pale brown with a dark brown tornus surmounted by a whitish subtornal spot.

Wingspan : 29mm. (Male).

Distribution : India : Throughout, Uttarakhand, Sikkim, Nagaland, Andaman, West Bengal and Meghalaya.

Elsewhere : Sri Lanka, Nepal, Bhutan, Myanmar and Pakistan.

Genus ***Choaspes*** Moore

1881. *Choaspes* Moore : *Lep. Ceylon,* **1** : 158.

There are four species of genus *Choaspes* Moore, occurring in India, of which one is dealt with Uttarakhand.

49. ***Choaspes benjaminii*** (Guerin)
INDIAN AWLKING

1843. *Thymele benjaminii* (Guerin), *Delesserts. Souv. Voy. Ind.* **2** : 79, pl. 22, fig. 2, 2a.

1892. *Choaspes benjaminii* (Guerin) : Elwes, *Proc. Zool. Soc. London* : 646.

1912. *Rhopalocampa benjaminii* (Guerin) : Tytler, *J. Bombay nat. Hist. Soc.,* **21** : 606.

1949. *Choaspes benjaminii* (Guerin) : Evans, *A cat. of Hesperiidae from Europe, Asia) and Australia in Brit. Mus.* (nat. Hist.) London : 74.

2006. *Choaspes benjaminii* (Guerin) Gupta & Majumdar, *State Fauna Series* **12** *: Fauna of Nagaland* : 334.

Status : Common.

Material examined : India : Dehra Dun, Mussoorie, Jharipani Village 1ex., Reg. No. 11, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Evans, Mackinnon and de Niceville (1898) from Mussoorie and Dehra Dun in the month of February to August, dist. Dehra Dun and Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Diagnostic Characters : Upper side of fore wing of male without brand and cuiller of claspers with rounded tip and a beak.

Wingspan : 25 mm. (Male).

Distribution : India : Uttarakhand, Sikkim, H.P, A.P. Nagaland, South India and Meghalaya.

Elsewhere : Sri Lanka, Nepal, Bhutan and North Myanmar.

Sub-family PYRGINAE

The Sub-family Pyrginae includes three groups of genera from India of which two are present in Uttrakhand.

Key to the groups of the Sub-family *Pyrginae*

Fore wing cell generally long, 2nd segment of palpi erect ..... *Celaenorrhinus* Group

Fore wing cell generally short, 2nd segment of palpi porrect ..... *Tagiades* Group

Group Celaenorrhinus

Of the four genera of this group represented in India, one is dealt here.

Key to the genera of Celaenorrhinus Group

Hind wing vein M2 tubular. Hind tibiae with hair pencil ..... ***Capila*** Moore

Hind wing vein M2 not tubular. Hind tibiae without hair pencil ..... ***Celaenorrhinus Huebner***

Genus ***Capila*** Moore

This genus not represented in Uttarakhand.

Genus ***Celaenorrhinus*** Huebner

1819. *Celaenorrhinus* Huebner *Verz. Bek. Schmett* : 106.

There are twenty one species of genus *Celaenorrhinus* Huebner occurring in India, of which seven are dealt with Uttarakhand.

Key to species of the genus *Celaenorrhinus* Huebner

1. Upper side of fore wing with white central spot or band 2
– Upper side of fore wing with yellowish orange Central spot or band ..... *dhanada* (Moore)
2. Antennal shaft chequered 3
– Antennal shaft white ..... *pero* de Niceville
3. Fore wing apex rounded, termen shorter than Dorsum 4
– Fore wing apex produced, termen equal to dorsum ..... *pulomaya* Moore
4. Upper side of hind wing with conspicuous and cell spot 5
– Upper side of hind wing without cell spot .. .. *sumitra* (Moore)
5. Abdomen striped. Upper side of fore wing cell spot not continued above radius. Hind wing cilia yellow ..... *patula* de Niceville

– Abdomen unstriped. Upper side of fore wing cell spot continued above radius. Hind wing cilia out wardly wardly white, basally yellow ..... *leucocera* (Kollar)

6. Hind wing cilia normally white between end of the veins 7

– Hind wing cilia white or pale yellow between the darkened end of the veins .... *munda* de Niceville

50. *Celaenorrhinus Pero de* Niceville
MUSSOORIE PIED FLAT

1912. *Celaenorrhinus. pero de* Niceville Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 603.

1915. *Celaenorrhinus pero de* Niceville Tytler, *J. Bombay nat. Hist. Soc.*, **24** : 145.

1949. *Celaenorrhinus pero de* Niceville Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 96.

2006. *Celaenorrhinus pero de* Niceville Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 337.

Status : Not Rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie distt. Dehra Dun, in the month of August.

Wingspan : 28 mm.

Distribution : India : Uttarakhand, Nagaland and Sikkim.

Elsewhere : Maupin.

51. *Celaenorrhinus pulomaya* (Moore)
MULTI SPOTTED FLAT

1865. *Plesioneura. pulomaya* Moore *Proc. Zool. Soc.* London, : 787.

1892. *Celaenorrhinus. pulomaya* (Moore) : Elwes *Proc. Zool. Soc. London*, : 659.

1912. *Celaenorrhinus. pulomaya* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 603.

1949. *Celaenorrhinus. pulomaya* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 95.

2006. *Celaenorrhinus. pulomaya* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 338.

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) in August in the Upper Ganges Valley at about 8,000 feet.

Wingspan : 24mm.

Distribution : India : Uttarakhand, Assam, Nagaland, Sikkim, Manipur and Northwest Himalayas.

Elsewhere : Nepal, Bhutan and Yunnan.

52. *Celaenorrhinus sumitra* Moore
MOORE'S SPOTTED FLAT

1865. *Plesioneura. sumitra* Moore *Proc. Zool. Soc. London*, : 787.

1912. *Celaenorrhinus. sumitra* (Moore) : *Tytler, J. Bombay nat. Hist. Soc.*, **21** : 603.

1949. *Celaenorrhinus. sumitra* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 97.

2006. *Celaenorrhinus. sumitra* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 339.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Pindari Valley from 7000 to 9000 feet.

Wingspan : 28 mm.

Distribution : India : Uttarakhand, Nagaland, Sikkim and Manipur.

Elsewhere : North Shan states, Myanmar.

53. *Celaenorrhinus patula* (de Niceville)
LARGE SPOTTED FLAT

1889. *Celaenorrhinus patula* de Niceville, *J. Bombay nat. Hist. Soc.*, **4** : 182, pl. B, fig. 4.

1915. *Celaenorrhinus patula de* Niceville Tytler, *J.Bombay nat. Hist. Soc.*, **24** : 145.

1949. *Celaenorrhinus. patula de* Niceville Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 98.

2006. *Celaenorrhinus patula de* Niceville Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 338.

Status : Not Common.

Material examined : India : Uttarakhand : Almora dist., on way to Dhakuri, 1750-2750 m., 2exs., 5.viii.1990, Coll. P.C. Tak & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Wingspan : 22-27 mm.

Distribution : India : Uttarakhand, Almora, Kumaon to Sikkim, Nagaland, Manipur, Assam, Nagaland and Sikkim.

Elsewhere : Nepal and Myanmar.

54. ***Celaenorrhinus leucocera*** (Kollar) COMMON SPOTTED FLAT

1848. *Hesperia leucocera* (Kollar) *In : Hugel's Kaschmir und der Reich der seik*, **4**(1) : 454, pl. 18, fig. 3, 4.,

1844. *Celaenorrhinus leucocera* Kollar, *In* : Hugel's *Kaschmir und das Reich der seik*, **4**(2) : 336-496.

1912. *Celaenorrhinus leucocera* (Kollar) : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 603.

1949. *Celaenorrhinus leucocera* (Kollar) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Museum.* (nat. Hist.) London : 98.

2006. *Celaenorrhinus leucocera* (Kollar) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* 339.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 2exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Almora dist., on way to Jatoli, 2210-2150 m., 1ex., 28.viii.1990, Coll. P.C. Tak & party.

Wingspan : 22mm.

Distribution : India : Uttarakhand, Almora, Kashmir to Assam, Sikkim, Nagaland, Maharashtra, South India, West Bengal, Meghalaya and Sikkim.

Elsewhere : Bhutan, Nepal, Myanmar, West Thailand, Pakistan and Bangladesh.

55. ***Celaenorrhinus munda*** (Moore) HIMALAYAN SPOTTED FLAT

1884. *Plesioneura munda* Moore, *Journ. Asiat. Bengal*, : 48.

1949. *Celaenorrhinus munda* Moore : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 100.

1999. *Celaenorrhinus munda* Moore, Ghosh & Chaudhary *State Fauna Series 4 : Fauna of Meghalaya (Part-6)* : 326.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of April to September.

Wingspan : 45-50 mm.

Distribution : India : Uttarakhand, Meghalaya, Assam and Sikkim.

Elsewhere : Myanmar.

56. ***Celaenorrhinus dhanada*** (Moore) HIMALAYAN YELLOW SPOT

1865. Plesioneura *dhanada* Moore *Proc. Zool. Soc. London*, : 789.

1949. *Celaenorrhinus dhanada* : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 104.

2003 *Celaenorrhinus dhanada* (Moore) Majumdar, *State Fauna Series 9 : Fauna of Sikkim (Part-4)* : 139.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of April to June and August-September.

Wingspan : 42 mm.

Distribution : India : Uttarakhand, Northwest Himalaya, Meghalaya, Assam and Sikkim.

Elsewhere : Bhutan and Myanmar.

Tagiades Group

This group represented 15 genera in India, of which 9 are represented in Uttarakhand.

Genus *Darpa* Moore

1865. *Darpa* Moore, *Proc. Zool. Soc. London,* : 781.

There are three species of genus *Darpa* Huebner occurring in India, of which one is dealt with Uttarakhand.

57. *Darpa hanria* Moore
HAIRY ANGLE

1865. *Darpa hanria* Moore *Proc. Zool. Soc. London,* : 781.

1915. *Darpa hanria* Moore : *Tytler, J. Bombay nat. Hist. Soc.*, **24** : 149.

1949. *Darpa hanria* Moore : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 110.

2006. *Darpa hanria* Moore Gupta & Majumdar, *State Fauna Series* **12** *: Fauna of Nagaland* : 341-342.

Status : Rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani Village 1ex., Reg. No. 11, 18.x.2002; Kalsi, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of May.

Wingspan : 17 mm.

Distribution : India : Uttarakhand, Assam, Meghalaya, Nagaland, Sikkim and Manipur.

Genus *Coladenia* Moore

1881. *Coladenia* Moore, *Lep. Ceylon.*, **1** : 180.

There are five species of genus *Coladenia* Moore occurring in India, of which two are dealt with Uttarakhand.

Key to species of *Coladenia* Moore

1. Upper side of hind wing dark brown, more or less suffused with tawny spots, hind tibiae fringed. Uncus widely divided .... *dan* (Fabricius)

- Upper side of hind wing not dark brown but with tawny spots, hindtibiae with recumbent hair pencil. Uncus undivided 2

2. Wings upper side with more or less developed ochreous shading or spotting. Fore wing under side always with an ochreous discal spot in space 2A, a similar spot beyond termen and cilia white .....*indrani* (Moore)

58. *Coladenia dan* (Fabricius)
FULUOUS PIED FLAT

1787. *Papilio dan* Fabricius, *Mant. Ins.*, **2** : 88.

1949. *Coladenia dan* (Fabricius) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 112-114.

1998. *Coladenia dan* Ghosh and Chaudhary, *State fauna Series 4, Fauna of Meghalaya* (6) : 334.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Katta Pattar Village, 2ex., Reg. No. 7, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 40 mm.

Distribution : India : Uttarakhand, Northwest Himalaya, Meghalaya, Manipur, Naga hills and Sikkim.

Elsewhere : Bhutan, North Myanmar, Yunnan, S. Shan State, Korea.

59. ***Coladenia indrani*** (Moore)
TRICOLOURED PIED FLAT

1865. *Plesioneura indrani* Moore *Proc. Zool. Soc. London,* : 789.

1997. *Coladenia indrani* (Moore).Ghosh and Chaudhary *State Fauna Series 3 : Fauna of West Bengal* (Part-7) : 285.

2003. *Coladenia indrani* (Moore) Majumdar, *State Fauna Series 9 : Fauna of Sikkim* (Part-4) : 144.

2007. *Hasora chromus* (Cramer) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 514.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party.

Remarks : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie from April, June, August, September and June and August in Dehra Dun and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Diagnostic Characters : Upper side of forewing cell spot slightly narrowed at upper end, rectangular. Upper side of Hind wing uniform dark brown in WSF., bur paler and more ochraceous in DSF.

Wingspan : 40 mm.

Distribution : India : Uttarakhand, Northwest Himalaya Assam, West Bengal, Uttar Pradesh, Himachal Pradesh and Sikkim.

Elsewhere : Nepal, Bhutan, Bangladesh and Sri Lanka.

Genus ***Sarangesa*** Moore

1881. *Sarangesa* Moore, *Lep. Ceylon.*, **1** : 180.

There are two species of genus *Sarangesa* occurring in India, both are dealt with Uttarakhand.

60. ***Sarangesa dasahara*** (Moore)
SMALL COMMON FLAT

1865. Nisionides *dasahara* Moore, *Proc. Zool. Soc.* London, : 787.

1892. *Sarangesa dasahara* (Moore) *Proc. Zool. Soc.* London, : 652.

1912. *Sarangesa dasahara* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 603.

1949. *Sarangesa dasahara dasahara* (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 120.

2006. *Sarangesa dasahara dasahara* (Moore) Gupta & Majumdar, *State Fauna Series* **12** *: Fauna of Nagaland* : 343.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1, 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 2exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded Mackinnon and de Niceville (1898) from Mussoorie in August and September and in Dehra Dun in June and September, F. Hannyngton (1910) from Kumaon and Arun Pratap Singh & R.S. Bhandari, FRI, from Dehra Dun, in 2003.

Wingspan : 26-32 mm.

Distribution : India : Uttarakhand, Northwest Himalaya, Assam, Bihar, Nagaland and Sikkim.

Elsewhere : Indo-China and Myanmar.

61. ***Sarangesa purendra*** (Moore)
SPOTTED SMALL FLAT

1882. *Sarangesa purendra* Moore, *Proc. Zool. Soc.* London, : 262.

1949. *Sarangesa purendra* Moore : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 119.

1999. *Sarangesa purendra* Moore : Ghosh & Chaudhary *State Fauna Series 4 : Fauna of Meghalaya* (Part-6) : 335.

Status : Not rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani Village 1ex., Reg. No. 11, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Kalsi Village 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded Mackinnon and de Niceville (1898) from Dehra Dun in March to June and December, F. Hannyngton (1910) from Kumaon, Arora (1995) from Nainital and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 30-35 mm.

Distribution : India : Uttarakhand (Dehra Dun to Garhwal Kumaon), Meghalaya, Uttar Pradesh, Himachal Pradesh (Kangra, Kulu and Shimla) Assam and Sikkim.

Genus *Caprona* Wallengren

1857. *Caprona* Wallemgren, *K. svenska vetensk Akad handl.*, 2(4) : 51.

There are three species of genus *Caprona* Wallemgren, occurring in India, all are dealt with Uttarakhand.

62. *Caprona agama pelias* (Moore) SPOTTED ANGLE

1857. *Pyrgus agama* Moore, *Cat. Lep. Mus. E.I.C.*, 1 : 249, pl. 7, fig. 1.

1932. *Caprona agama pelias* (Moore) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 346.

1949. *Caprona agama* (Moore) : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 161.

1999. *Caprona agama* (Moore) : Ghosh & Chaudhary *State Fauna Series 4 : Fauna of Meghalaya* (Part-6) : 336.

Status : Not rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 8, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 30-50 mm.

Distribution : India : Uttarakhand (Mussoorie dist Dehra Dun), Meghalaya, West Punjab, Himachal Pradesh (Kangra, Kulu and Shimla), Assam and Sikkim.

Elsewhere : Myanmar, Hong Kong, Tonkin and Siam.

63. *Caprona ransonnetti* (Felder) GOLDEN ANGLE

1868. *Pterygaspidea ransonnetti* Felder, *Verh. Zool. Bot. Ges. Wein* : 284.

1987. *Caprona ransonnetti* (Felder) Elwes & Edwards, *Trans. R. ent. Soc. Lond.*, 14, pt. 4(No.1) : 150-151.

1994. *Caprona ransonnetti* (Felder) G.S. Arora, Fauna of Conservation Area, Raja Ji National Park, : 292.

1997. *Caprona ransonnetti* (Felder) : Ghosh and Chaudhary, State Fauna Series 3, Fauna of West Bengal (7) : 284.

Status : Common.

Material examined : India : Uttarakhand : Haridwar dist., Beribara, 1ex., 9.xi.1990; Pauri dist. Chilla, 1ex., 2.viii.1991, Coll. P.C. Tak & party; 2exs., 23.viii.1991; Kunnao, 2exs., 23.viii.1991 Coll. Arun Kumar & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Wingspan : 35 – 45 mm.

Distribution : India : Uttarakhand, Haridwar, Pauri, Punjab to Kumaon, West Bengal, Madhya Pradesh, South India and Sikkim.

Elsewhere : Bangladesh, Myanmar, and Sri Lanka.

64. *Caprona ransonnetti surya Doherty* GOLDENANGLE

1868. *Pterygaspidea ransonnetti* Felder, *Verh. Zool. Bot. Ges. Wein* : 284.

1932. *Caprona ransonnetti surya Doherty* : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 345.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Bageshwar, 3,500 feet in month of August from Kumaon.

Wingspan : 35-40 mm.

Distribution : India : Uttarakhand, Bageshwar and Kumaon.

Elsewhere : Nepal.

65. *Caprona tailored* de Niceville GOLDENANGLE

1868. *Pterygaspidea ransonnetti* Felder, *Verh. Zool. Bot. Ges. Wein* : 284.

1932. *Caprona ransonnetti tailored* de Niceville : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 345.

Status : Not rare.

Material examined : India : Uttarakhand Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) in the Aglar Valley near Mussoorie in the month of August and in DehraDun in the month of March.

Wingspan : 35-40 mm.

Distribution : India : Uttarakhand, Mussoorie, Dehra Dun, South India and Bengal.

Genus *Tagiades* Huebner

1816. *Tagiades* Huebner *Verz. Bek.* Schmett : 108.

There are seven species of genus *Tagiades* Huebner occurring in India, of which two are dealt with Uttarakhand.

66. *Tagiades litigiosa* Moschler WATER SNOW FLAT

1878. *Tagiades litigiosa* Moschler Verh. *Zool. Bot. Ges. Wein*, **68** : 230.

1915. *Tagiades litigiosa* Moschler : Tytler, *J. Bombay nat. Hist. Soc.*, **24** : 147.

1949. *Tagiades litigiosa* Moschler : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 146.

2006. *Tagiades litigiosa* Moschler Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 346.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 18-19 mm.

Distribution : India : Uttarakhand, Assam, Meghalaya, Nagaland, Sikkim and South India.

Elsewhere : Indo-China, Thailand, Myanmar, Nepal and Bhutan.

67. *Tagiades atticus* (Fabricius) COMMON SNOW FLAT

1865. *Pterygospidia ravi* Moore, *Proc. Zool. Soc.* London, : 779.

1892. *Tagiades* ravi Moore, *Proc. Zool. Soc.* London, : 654.

1892. *Tagiades atticus* Fabricius Elwes. *Proc. Zool. Soc.* London, : 665.

1912. *Tagiades khasiana Moore* Tytler, *J. Bombay nat. Hist. Soc.*, **21** : 603.

1949. *Tagiades japetus* ravi (Moore) Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 135.

2003. *Tagiades japetus* ravi (Moore) Majumdar, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, 9(part-4) : 145.

2006. *Tagiades japetus ravi* (Moore) Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 345.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll.

J.P. Sati & party; Distt. Nainital, Garjia Village, 3exs, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 1ex., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded Mackinnon and de Niceville (1898) from April to August in Mussoorie and from Dehra Dun in September, F. Hannyngton (1910) from April to October from Kumaon, Arora (1995) and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 20-23 mm.

Distribution : India : Uttarakhand, Assam, Orissa, Nagaland, West Bengal and Sikkim.

Genus ***Sesaria*** Matsumara

1920. *Sesaria Matsumara, Thous. Ins. Japan. Addit.*, **3** : 683.

There are two species of genus *Sesaria Matsumara* occurring in India, of which two are dealt with Uttarakhand.

Key to species of Genus *Sesaria*

Upper side of Hind wing with white area sullied ..... *sambara* (Moore)

Upper side of Hind wing with white area unsullied ..... *dohertyi* (Watson)

68. ***Sesaria sambara*** (Moore) SIKKIM WHITE FLAT

1857. *Goniloba sambara* Moore, *Cat. Lep. Mus. E.I.C.*, **1** : 246.

1949. *Sesaria sambara Evans, A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 124.

1999. *Sesaria sambara* Ghosh and Chaudhary, *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series,* **4**(part-6) : 329.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from April to October from Nainital, (Kumaon).

Wingspan : 40-45mm.

Distribution : Oriental region including India: Uttarakhand, Assam, Manipur, Nagaland, Meghalaya and Sikkim.

69. ***Sesaria dohertyi*** (Watson) HILALAYAN WHITE FLAT

1893. *Satarupa dohertyi* (Watson), *Proc. Zool. Soc.* London, : 46.

1949. *Sesaria dohertyi dohertyi* (Watson) *Evans, A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London : 123.

2003. *Sesaria dohertyi dohertyi* (Watson) : Majumdar, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9**(part-4) : 145.

2006. *Sesaria dohertyi dohertyi* (Watson) (Watson) : Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 348.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from May to June at 5,000 feet from Mussoorie (Garhwal) Distt. Dehra Dun.

Wingspan : 45-50mm.

Distribution : India : Uttarakhand, Northwest Himalaya (Mussoorie to Kumaon), Manipur, Nagaland and Sikkim.

Genus ***Odentoptilum*** de Niceville

1775. *Odentoptilum* de Niceville, *J. Bombay nat. Hist. Soc.*, **5** : 217.

There are two species of genus *Odentoptilum* deNice ville occurring in India, of which one is dealt with Uttarakhand.

70. ***Odentoptilum angulata*** Felder CHEST NUT ANGLE

1862. *Odentoptilum angulata* Felder *Tagiades litigiosa* Moschler Verh. *Zool. Bot. Ges. Wein*, **12** : 488.

1912. *Odentoptilum sura Moore* : Tytler, *J.Bombay nat. Hist. Soc.*, **21** : 603-604.

1949. *Odentoptilum angulata angulata* Felder : Evans, *A cat. of Hesperiidae from Europe, Asia and Australia in Brit. Mus.* (nat. Hist.) London: 157.

2006. *Odentoptilum angulata angulata* Felder : Gupta & Majumdar, *State Fauna Series 12 : Fauna of Nagaland* : 348.

Status : Not Rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No.

4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 2exs., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 2exs., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from April, and July to September, in Mussoorie and from Dehra Dun in July and August and Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun and F. Hannyngton (1910) in the month of August from Jiuli (Kumaon) at 2,500 feet.

Wingspan : 40-45mm.

Distribution : India : Uttarakhand, Northwest Himalaya, Assam, Meghalaya, Nagaland, Sikkim and South India.

Elsewhere : Bhutan, Indo-China, Nepal, Sri Lanka Thailand and Myanmar.

Genus *Spialia* Swinhoe

1881. *Spialia* Swinhoe.

1913. *Spialia* Swinhoe, Lep. Indica :

There are three species of genus *Spialia* occurring in India, of which single species is treated here.

71. *Spialia Galba* (Fabricius) INDIAN SKIPPER

1793. *Hesperia galba* Fabricius, *Syst. Ent.*, 3(1) : 352.

1932. *Syrichtus galba* Fabricius Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 347.

1935. *Syrichtus galba* Fabricius, Home, J. Bombay *nat. Hist. Soc.*, 37(4) : 894.

2003. *Spialia galba* (Fabricius) : Arun Pratap Singh & R.S. Bhandari, *Butterfly Diversity in Tropical Moist Deciduous Sal Forest* of Dehra Dun : 1267.

2007. *Spialia galba* (Fabricius) : Majumdar, *State Fauna Series 5 : Fauna of Andhra Pradesh* : 515.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1, 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party.

Remark : The species recorded by F. Hannyngton (1910) from Sarju and Pindari Valley, 3,000-9000 feet in month of April, May, October from Kumaon and Mackinnon and de Niceville (1898) from Mussoorie, on Lal tiba from May to August; Giri Valley in November and Dehra Dun from March to May & Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Diagnostic Characters : Upper side of fore wing with three cell spots. Under side of Hind wing with discal band ending to mid dorsum.

Wingspan : 26 mm.

Distribution : India : Uttarakhand, Dehra Dun, North West Himalayas (Kashmir to Kumaon), Sikkim, South India, West Bengal, Assam and Andhra Pradesh.

Elsewhere : Cutch, Myanmar to South Shan States, Sind and Sri Lanka.

Genus *Achalarus* Moore

1881. *Achalarus* Moore *Lep. Ceylon.* 1 : 180.

There are two species of genus *Achalarus* occurring in India, of which one is dealt with Uttarakhand.

72. *Achalarus casypa* Moore MARBLED FLAT

1932. *Achalarus bifuasciatus casypa* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 329.

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910), from Dwali, 8000 feet in month of May and in Nainital from Kumaon in the month of June at the same elevation and Mackinnon and de Niceville (1898) from Mussoorie Distt. Dehra Dun from April to September.

Wingspan : 45-55 mm.

Distribution : India : Uttarakhand, Dwali, Nainital, Kashmir to Kumaon, Western Himalaya.

Family RIODINIDAE

These are brown butterflies, with yellowish or tawny markings. They are found in thick forests. Punches are found along streams while judies in thicker jungles. They are weak fliers, flying very short distances and settling down immediately. Judies sit with their wings partly closed, while punches sit with their wings closed over the back. They are visit damp patches and suck moisures from the leaves and ground Of the 21 species and subspecies known from India, eight are found in Uttarakhand.

Key to the Genera

1. Hindwing with a precostal. spur/vein arising from origin of vein Sc 2
- Hindwing with a precostal. spur/vein arising from after origin of vein Sc 3
2. Eyes smooth. Forewing with lower end of disco cellular vein at origin of vein Cu 1b. Hindwing with vein Rs and M3 arising from upper end of cell, M1 and Cu 1b from lower end of cell; hindwing lobed .... ***Zemeros*** Boisduval

   Eyes hairy. Forewing with lower end of disco cellular vein after origin of vein Cu 1b. Hindwing with vein Rs and M3 forked after end of cell, Vein Cu 1b before end cell; hindwing produced and lobed ..... ***Dodona***
- Eyes hairy. Hindwing with the cell long and narrow at base ..... ***Abisarsa*** Felder & Felder

Genus ***Zemeros*** Boisduval

1836. *Zemeros* Boisduval, (Roret's Suite a Buffon), *Hist., nat. Ins. Spec. gen. Lepid.*, **1** : pl. 21 fig. v.

Only a single species *Zemeros flegyas* Cramer occurring in India is dealt from Uttarakhand.

73. ***Zemeros flegyas*** Cramer PUNCHINELLO

1780. *Papilio flegyas* Cramer *Pap. Exot.*, **3** : 280.

1851. *Zemeros flegyas* Cramer *Gen. Diurn. Lep.*, **2** : 419 pl. 69 fig. 5.

1932. *Dodona durga* (Kollar) Evans, *Identification of Indian Butterflies* : 194.

Status : Very common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1, 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24. 9.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party.

Remark : The species recorded by Arora (Western Himalayas,1995) from Tehri Garhwal, Pauri and Pithoragarh distts. and Arun Pratap Singh & R.S. Bhandari, (2003) FRI, from Dehra Dun.

Wingspan : 35-40 mm.

Distribution : India : Uttarakhand, Mussoorie to Myanmar.

Elsewhere : Myanmar, Java and China.

Genus ***Dodona*** Hewitson

1861. *Dodona* Hewitson, *Ill. Exot. Butts.*, **2** : 91.

Of the seven species of this genus are found in India, five are recorded from Uttarakhand.

Key to species

1. Hindwing with a tornal without a filamentous short tail ..... *dipoea* Hewitson

   Hindwing with a tornal with a filamentous short tail 2
2. Upper side of forewing with discal transverse markings macular 3

   Upper side of forewing with discal transverse markings not macular, continuous and forming a band 4
3. Ground colour brown.Discal transverse macular markings small, not or very obscurely continued on the hindwing .... *eugenes* Bates

   Ground colour black, suffused with ochraceous at base. Discal non macular markings large, continued as an unbroken broad band on the hindwing .... *egeon* Doubleday

4. Underside of wings with ground colour ochraceous red, hind wing without distinct transverse bands; female with a broad white discal band on forewing ..... *ouida* Moore

74. ***Dodona dipoea*** Hewitson
LESSER PUNCH

1932. *Dodona dipoea* Hewitson Evans, *Identification of Indian Butterflies* : 195.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1,. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party;, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Mussoorie, Bhatta phal Village, 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) August and September and Arora (Western Himalayas, 1995) from Almora distts.

Wingspan : 35-40 mm.

Distribution : India : Uttarakhand, (Kumaon), Almora and Arunachal Pradesh.

Elsewhere : Murree to Kumaon.

Remarks : The species has been included in schedule-II (part-2) of the Indian Wildlife (Protection) Act.

75. ***Dodona eugenes*** Bates
TAILED PUNCH

1867. *Dodona eugenes* Bates, *J. Linn. Soc. Zool.*, **9** : 371.

1932. *Dodona durga* (Kollar) Evans, *Identification of Indian Butterflies* : 195.

Status : Common.

Material examined : India : Uttarakhand : Pithoragarh distts, Lilam, 1800 m., 1ex., 18.ix.1993, Coll. J.P. Sati & party. Tehri Garhwal, Dev Prayag, 3exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 3exs., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 2exs., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 2exs., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002 : Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Sahiya, 2exs., Reg. No. 7, 5.ii.2003; Korva Village, 3ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species also recorded by Arora (1995) from western Himalayas.

Wingspan : 35-45 mm.

Distribution : India : Uttarakhand : The species is common in outer Himalayas from Murree (Pakistan) to Assam, ascending to about 4,500 feet in Himalayas. Also occurs in Bhutan. Pithoragarh district.

76. ***Dodona egeon*** Doubleday
ORANGE PUNCH

1932. *Dodona egeon* Doubleday Evans, *Identification of Indian Butterflies* : 195.

Status : Rare.

Material examined : India : Uttarakhand, The species recorded by Evans (1932).

Wingspan : 45-50 mm.

Distribution : India : Uttarakhand to Arunachal Pradesh.

Elsewhere : Nepal, Bhutan and Myanmar.

Remarks : The species has been included in schedule-II (part-2) of the Indian Wildlife (Protection) Act.

77. ***Dodona ouida*** Moore
MIXED PUNCH

1932. *Dodona ouida* Moore, Evans, *Identification of Indian Butterflies* : 195.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar,

Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in March to June and F. Hannyngton (1910) from Binsar and Cheena (Kumaon) upto 7,000 feet in May and October.

Wingspan : 40-55 mm.

Distribution : India : Uttarakhand, Mussoorie.

Elsewhere : Mussoorie to Nepal.

78. ***Dodona durga*** (Kollar)
COMMON PUNCH

1844. *Melitaea durga* Kollar, *In* : Hugel's *Kaschmir und das Reich der* Siek, 4(2) : 441, pl. 13 – figs. 3, 4.

1932. *Dodona durga* (Kollar) Evans, *Identification of Indian Butterflies* : 194.

Status : Common.

Material examined : India : Uttarakhand, Chamoli Distt. Loha Jung to Wan, 2150-2300 m., 1ex., Male, 2 female, 2.ix.1991, Coll. P.C. Tak & party; Distt. Dehra Dun, Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; .Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2exs., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party.

Remark : The species also recorded by Arora (1995) from western Himalayas.

Wingspan : 30-40mm.

Distribution : India : Uttarakhand : Almora, Chamoli, Dehra Dun, Haridwar, Nainital and Tehri Garhwal districts. The species is very common all over the outer range of western Himalayas and ascends to about 9,000 feet in Himalayas.

Genus ***Abisara*** Felder & Felder (C & R)

1860. *Abisara* Felder & Felder, *Wein. Ent. Monats.* 4 : 397.

Of the six species of this genus are found in India, two are recorded from Uttarakhand.

Key to species of genus Abisara

1. Hindwing with terminal margin not concave or emarginated above vein M3 ..... *fylla*
   Hindwing with terminal margin concave or emarginated above vein M3 2
2. Upper side of forewing and hindwing having ground colour purplish or maroon-brown .... *echerius* (Stoll)

79. ***Abisara fylla*** Doubleday and Hewitson
DARK JUDY

1932. *Abisara fylla* Doubleday and Hewitson Evans, *Identification of Indian Butterflies* : 196.

1948. *Abisara fylla* Doubleday: Parsons & Cantle, J. Bombay *nat. Hist. Soc.*, 47(3) :

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) in April, May, August and September in Mussoorie and F. Hannyngton (1910) from Nalena, Binsar, Nainital upto 4,000 to 8,000 feet in April and September.

Wingspan : 50-60 mm.

Distribution : India : Uttarakhand, Mussoorie.

Elsewhere : Mussoorie to Myanmar.

80. ***Abisara echerius*** (Stoll)
PLUM JUDY

1865. *Sospita echerius* Moore, *Proc. zool. Soc.* Lond. P. 771.

1932. *Abisara echerius* (Stoll) Evans, *The Identification of Indian Butterflies* : 197.

Status : Common.

Material examined : India : Uttarakhand, Distt. Nanital Dhulwa soat, 6 kms. from Sultan on way to Dhikala, 25.vi.2002, 1ex., Reg. No. 4407, Coll. J.P. Sati & party. and Arun Pratap Singh & R.S. Bhandari, FRI, from Dehra Dun during the year 2000-2003.

Distribution : India : Chamba (Himachal Pradesh) to Assam, Bihar, Bengal and Peninsular India.

Elsewhere : Sri Lanka and Myanmar.

Family NYMPHALIDAE

The members of this family are the most beautiful amongst butterflies. Always bright and brilliantly, coloured, most of them have tawny

background with black markings, may be banded, spotted, blotched, striped, or variegated with very different pattern. The wings are of varied shape, the hind wings may be tailed, toothed, scalloped, sharply angled and indented, or evenly rounded. The bodies are robust, the thorax stoutly built and abdomen comparatively short.The fore legs are imperfect in both the sexes and the cell open in both the wings.

The family comprises more than a hundred genera from the world, of which around fifty are found in India.The size varies from the very large Kaisers, the Great Eggfly, Oak-leaf (135 mm.wingspan) to a minute Baby Lascar (25 mm.).

They are fast fliers, difficult to catch. All the species of this family visit flowers, fond of sunshine and basking. Some species are attracted to over-ripped fruits, fruits dipped in beer, or freshly dropped dung.

Subfamily NYMPHALINAE
Genus *Ariadne* Horsfield

1829. *Ariadne* Horsfield, Descr. *Cat. Lep. Ins. Mus. East India Coy.*, (2) : 33.

This genus known in India by two species viz., Ariadne *ariadne* (Linnaeus) and *A. merione* (Cramer) and both are found in Uttarakhand.

Keys to species

Upper side of wings with a single discal line just beyond cell, being regular. Outer margin of forewing concave between vein Cu 1a and M2 ..... *Ariadne*

- Upper side of wings with a double discal line just beyond cell, being highly irregular. Outer margin of forewing faintly concave between vein Cu 1a and M2 ..... *merione*

82. *Ariadne ariadne palliditor* (Fruhstofer)
ANGLED CASTOR

1911. *Ergolis palliditor* Fruhstofer, Berl. Ent. Zschr., **44** : 90.

1932. *Ergolis ariadne palliditor* (Fruhstofer) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 191.

1990. *Ariadne ariadne* (Linnaeus) : Varshney, Revised *Nomenclature for Butterfly* taxa : *Jour. Bom. Nat. Hist. Soc.* **87** : 60.

2006. *Ariadne ariadne palliditor* (Fruhstofer) Gupta, *State Fauna Series-* **12**, *Fauna of Nagaland* : 219.

Status : common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1, 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party.

Remark : The species recorded by Evans from Mussoorie and F. Hannyngton (1910) in Kumaon at 2000 to 5000 feet in the month of September and October.

Wingspan : 45-55 mm.

Distribution : India : Uttarakhand : Mussoorie to Myanmar. Uttar Pradesh, Sikkim, Arunachal Pradesh and Nagaland.

Elsewhere : Myanmar, Sri Lanka, Nepal, Bhutan and Bangladesh.

82. *Ariadne merione tapestrina* (Cramer)
COMMON CASTOR

1777. *Papilio merione* Cramer, *Pap. Exot.*, **2** : pl. 144 – Figs. G, H.

1911. *Ergolis merione* Cramer : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 64.

1932. *Ariadne merione tapestrina* (Cramer). Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 191.

Status : Very common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002; Distt. Dehra Dun, Karuva Pani, Asharori, 3exs., 8.vi.2001; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; 3exs., 28.vi.2001, Coll. A. Husain & party; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770,

25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Wingspan : 45 - 55 mm.

Distribution : India : Kashmir to Kumaon, Uttar Pradesh, Orissa and Madhya Pradesh.

Elsewhere : Nepal, Bhutan, Pakistan, Sri Lanka and Myanmar.

Subfamily NYMPHALINAE

Key to Genera

1. Tarsal Claws very long and without appendages ..... ***Cethosia*** Fabricius
- Tarsal Claws normal and with appendages 2
2. Fore wing with lower disco cellular vein, if present, ending beyond origin of vein Ca.... 3
- Fore wing with lower disco cellular vein ending before/at or only .just beyond origin of vein Cu 1a 4
3. Cell open in hind wing .... ***Melitaea*** Fabricius

   Cell closed in hind wing ....***Argynnis*** Fabricius
4. Fore wing vein R2 arising from cell, R3 ending on apex behind a line joining ends of veins R4, R3 and M1 5
- Fore wing vein R2 arising from R5, R3 ending on costa and R2 behind a line joining ends of veins R5 and M1 6
5. Antennae longer than half the length of costa, club gradual. Fore wing with lower disco cellular vein ending at or just beyond origin of vein Cu 1a ..... ***Vindula*** Hemming

   Antennae equal to half the length of costa, slender and club less. Fore wing with lower disco cellular vein ending before origin of vein Cu 1a .....***Cirrochroa*** Doubleday
6. Antennal club absent. Fore wing vein R2 arising well beyond origin of R5, R4 very short; hind wing cell open ....***Cupha*** Billberg

   Antennal club moderate. Fore wing vein R2 arising just beyond origin of R5, hind wing cell closed 7
7. Hind wing with a spur from the angle of vein M3 towards M2..... ***Vagrans*** Hemming
- Hind wing without any spur from the angle of vein M3..... ***Phalanta*** Horsfield

Genus ***Cethosia*** Fabricius

1806. *Cethosia* Fabricius, *Mag. F. Insektenk* (Illiger), **6** : 280.

This genus is represented in India by three species of which one is known from Uttarakhand.

83. *Cethosia cyane* (Drury)
LEOPARD LACCEWING

1770. *Papilio cyane* Drury, Ill. Exot. Ent., **1** : Pl. iv. fig. i.

1882. *Cethosia cyane* (Drury) : De Niceville, *J. Asiat Soc. Beng.*, **51**(2-3) : 57.

1932. *Cethosia cyane* Drury Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 190.

2006. *Cethosia cyane Drury* Gupta, *State Fauna Series-* **12**, *Fauna of Nagaland* 221.

Status : Not Rare.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party. Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and F. Hannyngton (1910) from Kumaon.

Diagnostic Characters : Upper side of fore wing, in both the sexes, marked with a brad oblique discal white or yellowish band.

Wingspan : 85-95 mm.

Distribution : India : Uttarakhand : Mussoorie (Garhwal), Kumaon, Uttar Pradesh, Orissa, Assam, Sikkim, Arunachal Pradesh and West Bengal.

Elsewhere : Myanmar, Nepal, Bhutan and Bangladesh.

Genus ***Melitaea*** Fabricius

1807. *Melitaea* Fabricius, *Mag. F. Insektenk (Illiger)*, **6** : 284.

This genus is represented in India by a single species, *Melitaea arcesia Bremer* is dealt with from Uttarakhand.

84. ***Melitaea arcesia sindura*** Moore BLACKVEIN FRITILLARY

1865. *Melitaea sindura* Moore *Proc. Zool. Soc. Lond.* : 496, n. 64 pl. 30, fig. 2.

1886. *Melitaea sindura* Moore : De Niceville, *The Butterflies of India, Burmah and Ceylon* **2** : 25.

1932. *Melitaea arcesia sindura* Moore Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 186.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Nilang Pass, Tehri Garhwal at 18,000 feet in July and F. Hannyngton (1910) from Kumaon at 12,000 feet in the month of June to August.

Wingspan : 85-95 mm.

Distribution : India : Uttarakhand : Tehri Garhwal, Kumaon (North-west Himalaya), Kongma Pass, Native Sikkim, Ladhak to Kumaon at high elevations.

Genus ***Argynnis*** Fabricius

1807. *Argynnis* Fabricius *Mag. F. Insektenk (Illiger)*, **6** : 283.

This genus is represented in India by 14 species, only six species, viz., *Argynnis hyperbius hyperbius* Linnaeus, *Argynnis gammata* Butler, *Argynnis pales sipora* Moore, *Childrena childreni* (Gray) *Issoria lathonia* Linnaeus and *Fabriciana kamala* (Moore) are dealt with from Uttarakhand.

Keys to species

1. Fore wing with vein R2 arising from cell, upper apex opposite well beyond origin of Cu 1a 2

- Fore wing with vein R2 arising from R5, (except in *gammata*) 6

2. Hind wing precostal vein well curved forward 3

- Hind wing precostal vein straight and rather obscure 5

3. Under side of hind wing ochraceous and olive brown with silver stripes .... *hyperbius* (Linnaeus)

   Under side of hind wing dark green with silver stripes 4

1. Under side with basal silver stripes continued to costa; discal silver band Straight .... *childreni* (Gray)

- Under side with no silver stripes continued in space, discal band very sinuate .... *kamala* Moore

2. Under side of hind wing ochraceous bearing very large silver spots, postdiscal series of small, brown ringed silver spots bowed in the middle present ..... *lathonia* (Linnaeus)

   Under side of hind wing dark green bearing a series of long silver streaks Complete but post discal series absent..... *clara* Blanchard

3. Hind wing costa straight and apex pointed; under side markings not prominently silver and spot at end cell not elongated..... ..... *pales* (Dennis Schiff.)

   Hind wing apex rounded, under side markings brilliant silvery, spot at end cell very long, nearly or quite reaching postdiscal row of small spots 7

4. Under side of hind wing with marginal silver markings short, not of even width and also not reaching postdiscal spots .... *gammata* Butler

85. ***Argyreus hyperbius hyperbius*** (Linnaeus) INDIAN FRITILLAR&Y

1764. *Papilio hyperbius* Linnaeus, *Amoen Acad.*, **6** : 408, no. 75, female.

1911. *Argynnis hyperbius* (Linnaeus,) : Tytler, *J.Bombay nat. Hist. Soc.* **21**(1) : 64.

1932. *Argynnis hyperbius hyperbius* (Linnaeus,) : Evans, *Identification of Indian Butterflies*, : 182.

2006. *Argynnis hyperbius hyperbius* (Linnaeus,) : *Gupta*, Fauna *Nagaland State, Fauna Series*, **12** : 221.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002

Coll. Vinod Khanna & party; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) Kumaon May and July to October at 5000–10000 feet and Arora (1995) recorded from Dehra Dun, Tehri, Chamoli in Garhwal feet and Arun Pratap Singh & R.S.Bhandari (2003), FRI, from Dehra Dun.

Wingspan : 65 – 85 mm.

Distribution : India : Chitral (Pakistan) to Assam, Madhya Pradesh and Mt.Abu, in Rajasthan Uttarakhand: Almora, Chamoli, Dehra Dun, Haridwar, Pauri, Rudra Prayag, Tehri Garhwal, Pithoragarh and Uttarkashi districts.

Elsewhere : Myanmar and Nepal.

86. ***Childrena childreni*** (Gray)
LARGE SILVER STRIPE

1831. *Argynnis childreni* Gray, *Zool. Misc.*, **1** : 33.

1932. *Argynnis childreni childreni* Gray, Evans, *Identification of Indian Butterflies* Ed. **2** : 182.

1994. *Childrena childreni* (Gray) Varshney, Revised *Nomenclature Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

2003. *Childrena childreni* (Gray) State Fauna Series 9, Fauna of Sikkim (Part-4) : 37-38.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal, 1ex., Reg. No. 16. 5.vi.2002; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K.Gupta & party; 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in May to September and F. Hannyngton (1910) from Nainital, Kumaon May to September at 8000–10000 feet and Arora (1995) recorded from Tehri Garhwal, Uttarkashi and Nainital in Kumaon.

Wingspan : 75 –100 mm.

Distribution : India : Chitral (Pakistan) to Kumaon and Nagaland, Arunachal Pradesh, East, North and West Sikkim, West Bengal, Uttar Pradesh. Uttarakhand: Almora, Chamoli, Nainital, Tehri Garhwal, Rudra Prayag, Bageshwar, Udhamsingh Nagar, and Uttarkashi districts.

Elsewhere : Myanmar, Nepal, Bhutan and Pakistan.

87. ***Fabriciana kamala*** (Moore)
The Common Silver-stripe

1857. *Argynnis kamala* Moore, *In* : Horsfield and Moore's *Cat Lep* Mus. *E.I.C.* **1** : 156, no. 324.

1990. *Fabriciana kamala* (Moore) : Varshney, Revised Nomenclature for Butterfly taxa : *Jour. Bom. Nat. Hist. Soc.* **87** : 59.

1932. *Argynnis kamala* Moore Evans, *Identification of Indian Butterflies* Ed. **2** : 182.

2003. *Childrena childreni* (Gray) State Fauna Series 9, Fauna of Sikkim (Part-4) : 37-38.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs,

Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Diagnostic Characters : Male and female: Upper side : Wings golden-yellow. Forewing dusky ochraceous at the base, all the veins deeply marked with black, sub-marginal row of spots are less defined and continuous, marginal row is connected between the vein-lets by a narrow line. Hindwing with an irregular zigzag inner black band, than a row of five round black spots, and a sub-marginal row of seven linear-shaped spots, also a marginal black line.

Under side : Forewing with the markings as on upper side, apex Dusted with dark green scales bearing two lines of silvery spots. Hindwing beautiful metallic green with five silvery sub-marginal and inner bands and a series of marks about the basal half silvery white; between the sub-marginal and inner band some small spaces of yellow, and an indistinct row of reddish spots.

Wingspan : 65 – 75 mm.

Distribution : The species is common from Chitral (Pakistan) to Kumaon from above 6,000 feet, and ascends to about 10, 000 feet in Himalayas Uttarakhand : Almora, Chamoli and Rudra Prayag districts.

Elsewhere : Nepal, Pakistan and Afghanistan.

88. ***Issoria lathonia*** Linnaeus
QUEEN OF SPAIN

1767. *Papilio lathonia* Linnaeus, *Syst. Nat.* (12th ed.), **1**(2) : *786* no. 213.

1932. *Argynnis lathonia Issoria* Linnaeus Gray, Evans, *Identification of Indian Butterflies* Ed. **2** : 183,

1990. *Issoria lathonia* Linnaeus Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 60.

2003. *Issoria lathonia* Linnaeus State Fauna Series 9, Fauna of Sikkim (Part-4) : 38.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Tehri Garhwal Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and adjoining hills in the month of May to September and F. Hannyngton (1910) Kumaon April to October at 5000 –10000 feet and Arora (1995) recorded from Tehri Garhwal, Uttarkashi, Chamoli in Garhwal and Almora in Kumaon.

Wingspan : 50-60 mm.

Distribution : India: Commonest Himalayan species of Argyreus and ascending to about 5,000 to 8,000 feet in Himalayas.

Uttarakhand : Almora, Chamoli, Dehra Dun, Pauri.

Elsewhere : Myanmar and Nepal.

89. ***Argynnis clara clara*** (Blanchard)
SILVERSTREAK

1844. *Argynnis clara*, Blanchard, *Jacque Mont's Voy. Dans l Inde*, **4** : 20 n. 14. pl. II, Figs. 2-3.

1889. *Argynnis clara*, Blanchard de, Niceville. *Journ. Bomb. Nat. hist. Soc.* **4** : 165.

1932. *Argynnis clara clara*, Blanchard : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 183.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Nila Valley.

Wingspan : 50-65 mm.

Distribution : India : Uttarakhand : The species ranges from Tehri Garhwal Garhwal to Kumaon at 12,000 feet in middle of August.

90. ***Argyreus pales sipora*** Moore
STRAIGHTWING SILVERSPOT

1874. *Argyreus sipora* Moore, *Proc. Zool. Soc. Lond.* : 568, pl. 66, fig. 2.

1932. *Argyreus pales sipora* Moore : Evans, *Identification Indian Butterflies*, : 182.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Bingham (1907) from Kumaon.

Wingspan : 35-40 mm.

Distribution : India : Chitral (Pakistan) to Kumaon, Kashmir. Tehri Garhwal, Pithoragarh and Uttarkashi districts.

91. ***Argynnis gammata*** Butler
GEM SILVERSPOT

1881. *Argynnis gammata* Butler, *Ann. Mag. nat. Hist.* (5)7 : 32, pl. 4 fig. 1.

1882. *Argynnis gammata* Butler : Elwes, *Proc. Zool. Soc. Lond.*, : 399-417.

1932. *Argynnis gammata gammata* Butler : Evans, *Identification of Indian Butterflies* Ed. 2 : 184.

2003. *Argynnis gammata gammata* Butler State Fauna Series 9, Fauna of Sikkim (Part-4) : 39.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Bingham (1907) from Kumaon.

Wingspan : 45-50 mm.

Distribution : India : Kumaon to Chummbi Valley, East of Sikkim, Uttar Pradesh.

Elsewhere : Tibet.

Genus ***Cupha*** Billberg

1820. *Cupha* Billberg, Enum. *Ins. Mus. Billb.* : 79.

Only one species *Cupha erymanthis* (Drury) occurring in India, is dealt with from Uttarakhand.

92. ***Cupha erymanthis*** (Drury)
RUSTIC

1770. *Papilio erymanthis* Drury, *Exot. Ent.*, 1; pl. 15 – Figs. 3-4.

1883. *Cupha erymanthis* (Drury) *J. Asiat. Soc. Beng.*, **51**(2-3) : 58.

1911. *Cupha erymanthis* (Drury) Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 64.

1932. *Cupha erymanthis lotis* Sulzer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 177.

2006. *Cupha erymanthis* (Drury) Gupta & Majumdar, Fauna *of Nagaland, State Fauna Series* **12** : 223.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Dehra Dun, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. A. Husian & party.

Wingspan : 50 - 60 mm.

Distribution : India : Mussoorie to Assam, South India.

Elsewhere : Sri Lanka, Nepal, Bhutan, Bangladesh and Mynmar.

Genus ***Vagrans*** Hemming

1934. *Vagrans* Hemming, *Entomologist*, **67** : 77.

This monotypic genus is represented in India by a single species *Vagrans egista* (Cramer).

93. ***Vagrans egista sinha*** (Kollar) VAGRANT

1844. *Terinas sinha* Kollar, Kollar, Hugel's Kaschmir, **4**(2) : 438.

1883. *Atella sinha* (Kollar) : De Niceville, *J. Asiat. Soc. Beng.*, **53**(2-4) : 94.

1994. *Vagrans egista sinha* (Kollar) : Varshney, *Oriental Insect*, **28** : 172.

2003. *Vagrans egista sinha* (Kollar) : Gupta, Fauna *Sikkim, State Fauna Series* **9** (part-4) : 41.

2006. *Vagrans egista sinha* (Kollar) Gupta, Fauna *Nagaland, State Fauna Series* **12** : 223.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 2exs., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex, Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in August to December and in Mussoorie in April to August and Hannyngton (1910) from Nalena at 4,500 feet in May and September from Kumaon.

Wingspan : 55-65 mm.

Distribution : India : Uttarakhand : Dehra Dun and Mussoorie (Tehri Garhwal) and Nalena (Kumaon), Nagaland and Sikkim.

Elsewhere : Nepal.

Genus ***Phalanta*** Horsfield

1829. *Phalanta* Horsfield, Descr., *Cat. Lep. Ins. Mus. East India Coy.*, (2) : Pl. 17.

This genus known in India by two species viz., *Phalanta phalantha* (Drury) and *Phalantha alcippe* (Cramer) and only one species *Phalanta phalantha* (Drury) is found in Uttarakhand.

94. ***Phalanta phalantha phalantha*** (Drury) COMMON LEOPARD

1773. *Papilio phalantha* Drury, *Illus. nat. Hist.*, **1** : pl. 21-figs. 1, 2.

1911. *Atella phalantha* (Drury) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 63.

1932. *Atella phalantha* (Drury) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 187.

2006. *Phalanta phalantha phalantha* (Drury) *Gupta* & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 224.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Karuva Pani, Asharori, 2exs., 28.vi.2001, Coll. A. Husian & party; 4exs., 22.xi.2001, Coll. J.P. Sati & party; Mohand Rao, 1ex., 29.v.2001; 1ex., 8.viii.2001, Coll. A. Husian & party; Sabhawala, 1ex., 20.xii.2001, Coll. J.P. Sati & party; Sankra Nala, Badshahibag road, 1ex., 18.vii.2000; 1ex., 18.xii.2001, Coll. N.K. Sinha & party; Timli forest, 1ex., 20.xi.2000, Coll. N.K. Sinha & party; 1ex., 6.vii.2001, Coll. Arun Kumar & party; 5exs., 27.xi.2001,Coll. J.P. Sati & party; Jharipani, 1ex., Reg. No. 4, 1ex., 18.vi.2003; Mussoorie, Bhatta phal Village 1ex., Reg. No. 8, 18.x.2002; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party; Distt. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005 Coll. J.P. Sati & party.

Wingspan : 50 – 60 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka, Pakistan and Myanmar.

Tribe **Nymphalini**

The tribe Nymphalini is represented in India by 11 genera.

Key to Genera

1. Eyes smooth 2
- Eyes hairy 5
2. Labial palpi black above, white beneath. Head and thorax black, each with a pair of white dots. Forewing only slightly falcate ..... ***Hypolimnas*** Huebner
- Labial palpi not as above, Head and thorax not white spotted. Forewing markedly falcate 3
3. Hind wing not tailed ..... ***Junonia*** Huebner
- Hind wing tailed or prominently toothed... 4
4. Upper side orange brown with a black apical border on forewing. Cell open in fore and hind wing ..... ***Doleschallia*** Felder

   Upper side purple blue with a broad orange or pale blue subapical band on fore wing. Cells slenderly closed in fore and hind wing ..... ***Kallima*** Doubleday
5. Antennae equal to half the length of costa of forewing. Cell open in hindwing ..... ***Symbrenthia*** Huebner
- Antennae longer than half the length of costa of forewing. Cell closed in hindwing 6
6. Hindwing not produced and angled at vein M3 7
- Hindwing termen produced at vein M3 8
7. Upper side pinkish red, base golden brown, forewing with three central black spots on the red area ..... ***Cynthia*** Fabricius
- Upper side dark brown with a red central band on the forewing and a black spotted red marginal band on underside of hind wing ... . ***Vanessa*** Fabricius
8. Fore wing dorsum excavated in the distal half. Hind wing termen excavated above vein Rs 9

   Fore wing dorsum straight. Hind wing termen not excavated above vein Rs 10
9. Upper side very dark indigo blue with a broad postdiscal blue band on the forewing and hindwing ..... ***Kaniska*** Moore
- Upper side tawny with black spots .... ***Polygonia*** Huebner
10. Palpi, costa of fore wing and dorsum of hindwing with long, black, coarse and erect hairs ..... ***Nymphalis*** Kluk
- Palpi, costa of fore wing and dorsum of hindwing without long, black, coarse and erect hairs ..... ***Aglais*** Dalman

Genus ***Hypolimnas*** Huebner

1819. *Hypolimnas* Huebner, *Verz. Bekannt. Schmett.*, (3) : 45.

This genus known in India by two species viz., *Hypolimnas bolina* (Linnaeus) and *Hypolimnas misippus* (Linnaeus) and both the species are found in Uttarakhand.

Key to species

Under side of hindwing with a prominent middle black costal spot in space Rs .... *misippus* (Linnaeus)

- Under side of hindwing without any prominent middle black costal spot in space Rs ..... *bolina* (Linnaeus)

95. ***Hypolimnas misippus*** (Linnaeus) DANAID EGGFLY

1764. *Papilio misippus* Linnaeus, *Mus. Ludov. Ulr.* : 264, pl. 20 – fig. 85.

1932. *Hypolimnas misippus* (Linnaeus) Evans, *Identification of Indian Butterflies* ed. 2 : 175, pl. 23, fig. 30. 1.

2003. *Hypolimnas misippus* (Linnaeus) State Fauna Series 9, Fauna of Sikkim (part-4) : 48.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party; Sahiya, 1ex., Reg. No. 7, 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No.

5832, 17.xi.2005, Coll. J.P. Sati & party., Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16, 5.vi.2002 Coll. Vinod Khanna & party.

Wingspan : 70–85 mm.

Distribution : The species is common throughout India, ascending to about 7,500 to 9,500 feet in Himalayas.

Uttarakhand : Dehra Dun, Haridwar Pauri and Tehri Garhwal districts.

Elsewhere : Pakistan, Bangladesh, Sri Lanka, Malaysia, Myanmar, China, Africa and Australia.

96. ***Hypolimnas bolina*** (Linnaeus) GREAT EGG-FLY

1758. *Papilio bolina* Linnaeus, *Syst. Nat.*, (10th ed) : 479, no. 124.

1911. *Hypolimnias bolina* (Linnaeus) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 54.

1932. *Hypolimnias bolina* (Linnaeus) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 149.

2006. *Hypolimnias bolina* (Linnaeus) Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 225.

Status: Common.

Material examined : India : Uttarakhand : Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 2129.v.2002, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Mohand, Lalo Nala, Shakumbri road, 1ex., 22.ix.2000, Coll. A. Husian & party; Mohan Rao, 2exs., 8.viii.2001; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 1ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Wingspan : 70-110 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka, Pakistan and Myanmar.

Genus *Junonia* Huebner

1816. *Junonia Huebner Verz. Bekannt. Schmett.*, : 34.

Six species of this genus is representing in India and all are dealt with from Uttarakhand.

Key to species

1. Under side of forewing with a black variegated ocellus in space Cu 1b 2
- Under side of forewing without any ocellus in space Cu 1b ..... *iphita* (Cramer)
2. Upper side of hindwing with a black spot in space Cu 1b ..... *hierta* (Fabricius)

   Upper side of hindwing with a variegated ocellus in space Cu 1b 3
3. Upper side of forewing and hindwing with a sub-marginal ocelli in all space .... *atlites* (Linnaeus)

   Upper side of forewing and hindwing without sub-marginal ocelli in space Cu 1a and M1 4
4. Upper side of forewing with a whitish sub-apical band ..... *orithya* (Linnaeus)

   Upper side of forewing without a whitish any sub-apical band 5
5. Upper side of forewing brown with pale yellow spots ..... *lemonias* (Linnaeus)

   Upper side of forewing fulvous orange and without pale yellow spots .... *almana* (Linnaeus)

97. ***Junonia iphita siccaitica*** (Cramer) CHOCOLATE PANSY

1779. *Papilio iphita* Cramer, *Pap. Exot.*, **3** : pl. 209 figs. C, D.

1881. *Junonia iphita* (Cramer) De Niceville. *Asiat. Soc. Beng.* **50**(1) : 50.

1882. *Precis iphita* (Cramer) De Niceville. *Asiat. Soc. Beng.* **51**(2-3) : 57.

1911. *Junonia. iphita* (Cramer) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 61.

1932. *Precis iphita siccaitica* (Cramer). Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 177.

1994. *Junonia iphita* Cramer : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia iphita* Cramer Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 226-227.

Status : Common.

Material examined : India Uttarakhand : Distt. Dehra Dun, Mohand Rao, 3exs., 9.xi.2001, Coll. A. Husian & party; Karuva Pani, Asharori, 3exs., 22.xi.2001; 1ex., 27.xi.2001, Maldevta, 1ex., Reg. No. 2129.v.2002 Coll. J.P. Sati & party; Khajnawar Nala, Shakumbri road, 1ex., 12.iv.2002, Coll. S.K. Gupta & party; Punjna nadi, 4exs., 28.xi.2001, Coll. N.K. Sinha & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Dhulwa soat, 6 kms. from Sultan on way to Dhikala, 2exs., 25.vi.2002, Reg. No. 4407, Coll. J.P. Sati & party. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Wingspan : 55-65 mm.

Distribution : India : Kashmir to Kumaon.

Elsewhere : Sri Lanka and Myanmar.

Remarks : The species is very fond of visiting damp places and moist areas, and never found in dry and open area.

98. ***Junonia heirta*** (Fabricius)
YELLOW PANSY

1758. *Papilio hierta* Fabricius, *Ent. Syst.* (Suppl.) : 424, no. 281.

1932. *Precis heirta* (Fabricius) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 176.

1994. *Junonia heirta* (Fabricius) : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia heirta* (Fabricius) *Gupta* & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 226.

Status : Very common.

Material examined : India : Uttarakhand : Distt. Nainital, Jhirna, Kothirio, 1ex., 27.vi.2002, Reg. No. 4454, Coll. J.P. Sati & party; Dehra Dun dist., Sankra Nala, Badshahibag road, 1ex., 28.vi.2000, Coll. J.P. Sati & party.

Wingspan : 45 - 55 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka, Nepal, Bhutan, Baluchistan and Myanmar.

99. ***Junonia atlites*** (Linnaeus)
GREY PANSY

1763. *Papilio atlites* Linnaeus, *Cent. Ins.* : 24, no. 72.

1911. *Junonia atlites* Linnaeus (Linnaeus) : *Tytler, J. Bombay nat. Hist. Soc.*, **21**(1) : 61.

1932. *Precis atlites* (Linnaeus) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 176.

1994. *Junonia atlites* (Linnaeus) : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia atlites* (Linnaeus) *Gupta* & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 227.

Status : Locally common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party; Sankra Nala, Badshahibag road, 1ex., 13.x.2000, Coll. N.K. Sinha & party; Timli forest, 1ex., 6.vii.2001, Coll. Arun Kumar & party; Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2exs., Reg. No. 16, 10.vii.2002, Coll. J.P. Sati & party; Roorkee &

around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Wingspan : 55-65 mm.

Distribution : India : Common throughout plains of India, Andaman and Central Nicobar.

Elsewhere : Nepal, Bhutan, Bangladesh, Sri Lanka and Myanmar.

100. ***Junonia orithya*** (Linnaeus) BLUE PANSY

1764. *Papilio orithya* Linnaeus, *Mus. Ludov. Ulr.* : 278, no. 96.

1932. *Precis orithya swinhoei* (Linnaeus) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 176.

1994. *Junonia orithya* (Linnaeus) : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia orithya* (Linnaeus) *Gupta* & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 227.

Status : Very Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Dhikala and around, 1ex., 22.ii.2005, Reg. No. 5136, Coll. A.N. Rizivi & party; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Wingspan : 40 55 mm.

Distribution : The species ranges from Pakistan eastwards through Himalayas to Sikkim. The species is common in India during March to October in North-west Himalayas and ascends to about 9,000 feet.

Elsewhere : Sri Lanka, Nepal, Bhutan, Bangladesh, Afghanistan, Pakistan and Myanmar.

101. ***Junonia lemonias persicaria*** (Linnaeus) LEMON PANSY

1758. *Papilio lemonias* Linnaeus, *Syst. Nat.*, (10th ed.) : 473, no. 93.

1911. *Junonia lemonias* (Linnaeus) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 61.

1932. *Precis lemonias persicaria* Fruhstorfer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 176.

1994. *Junonia lemonias* (Linnaeus) : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia lemonias* (Linnaeus) : Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 228.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Bado wala, Asan River, 1ex., 27.vi.2000, Coll. J.P. Sati & party; Mohand Rao, 1ex., 3.xi.2000; 1ex., 20.iv.2001; 1ex., 2.ii.2001, 1ex., 8.viii.2001, Coll. A. Husian & party; 3exs., Karuva Pani, Asharori, 1ex., 1.vii.2000; 5exs., 8.vi.2001, Coll. J.P. Sati & party; 3exs., 6.vii.2001, Coll. Arun Kumar & party; Sankra Nala, Badshahibag road, 2exs., 28.vi.2000, Coll. J.P. Sati & party; Timli forest, 1ex., 22.ix.2000, Coll. A. Husian & party; 3exs., 6.vii.2001, Coll. Arun Kumar & party; Tiparpur, Mohand, 1ex., 19.ix.2001, Coll. J.P. Sati & party; a Nala near Dat Mandir, Mohand, 2exs., 24.viii.2001, Coll. A. Husian & party; Timli, Darrari Village 1ex., 28.vi.2000, Coll. J.P. Sati & party; Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004; Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party;

Sahiya, 1ex., Reg. No. 7 5.ii.2003; Korva Village, 2ex., Reg. No. 6, 10.vii.2002, Coll. J.P. Sati & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Champawat, Ramganga Ghat, 1ex., Reg. No. 5832, 17.xi.2005, Coll. J.P. Sati & party. Distt. Nainital, On way Kalagarh to Jhirna, 1ex., 8.vi.2002; Lal Dhang, 1ex., 28.vi.2002, Coll. Romesh Sharma & party; Dhikala, Leed Khali Chaur, 2exs., 22.vi.2002, Reg. No. 4376; Dhikala, Thandi sarak, 2exs., 23.vi.2002, Reg. No. 4384; Sanguri soat near Gairel, 2exs., 23.vi.2002, Reg. No. 4393; Dhulwa soat, 6 kms. from Sultan on way to Dhikala, 2exs., 25.vi.2002, Reg. No. 4407; Dhumanda road, 3 kms. from Gairel, 10exs., 25.vi.2002, Reg. No. 4417; Dhela forest, 1ex., 28.vi.2002, Reg. No. 4469, Coll. J.P. Sati & party.; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004 Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 1. 5.vi.2002 Coll. Vinod Khanna & party.

Wingspan : 50-60 mm.

Distribution : India : Kashmir to Kumaon, Assam, West-Bengal, Nagaland and Sikkim.

Elsewhere : Sri Lanka and Myanmar.

Remarks : The species is quite common in the area closer to jungle and visits flowers. The seasonal variation is quite well marked, in WSF, ocelli on wings prominent and reduced in DSF.

102. ***Junonia almana almana*** (Linnaeus) PEACOCK PANSY

1758. *Papilio almana* Linnaeus, *Syst. Nat.* (10th ed.) : 472, no. 89.

1911. *Junonia almana* (Linnaeus) Doubleday Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 62.

1932. *Precis almana almana* (Linnaeus). Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 176.

1994. *Junonia almana* (Linnaeus) : Varshney, Oriental Insect, **28** : 176.

2006. *Junonia almana almana* (Linnaeus) : Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 228.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No. No 11, 19.viii.2003, Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004, Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Distt. Dehra Dun, Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Distt Distt. Nainital, Sandyal Dam, Paterpani, 2exs., 24.i.2003, Reg. No. 4756, Coll. Vinod Khanna & party. Dehra Dun dist., Bhure Shah, 1ex., 28.vi.2001, Coll. A. Husian & party; Badowala, Asan River, 1ex., 12.ix.2000, Coll. A. Husian & party; Mohand Rao, 1ex., 2.ii.2001; Sodi nagar Nala, Shakumbri road, 1ex., 24.vii.2001, Coll. A. Husian & party; Sankra Nala, Badshahibag road, 6exs., 6.ix.2001, Coll. N.K. Sinha & party; 2exs., 4.x.2001, Coll. J.P. Sati & party; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005, Coll. J.P. Sati & party.

Wingspan : 60 - 65 mm.

Distribution : Throughout continental and peninsular India.

Elsewhere : Sri Lanka and Myanmar.

Remarks : The species is common in the area and found in both the moist as well as dry jungle areas.

Genus ***Kallima*** Doubleday

1849. *Kallima* Doubleday, In Doubleday, Westwood & Hewitson, Gen. Diurn. Lep., : 324, pl. 52, fig. 2, 3.

This genus known in India by four species of which one species is found in Uttarakhand.

103. ***Kallima inachus*** (Boisduval)
ORANGE OAKLEAF

1836. *Papilio inachus* Boisduval, In : Cuvier's *Reg. No. Anim. Ins.*, **2** : pl. 139 – fig. 3.

1882. *Kallima inachus* (Sic) (Boisduval) : De Niceville, *J. Asiat. Soc. Beng.*, **51**(2-3) : 58.

1992. *Kallima inachus inachus* (Boisduval) : Haribal, *Butterflies of Sikkim Himalayas* : 169.

2003. *Kallima inachus inachus* (Boisduval) *Gupta &* Majumdar, Fauna *of Sikkim, State Fauna Series* **9** : 46.

Status : Not rare.

Material examined : India : Uttarakhand : Dehra Dun, Bhure Shah, 1ex., 20.vii.2001, Coll. P.C. Tak & party; Sankra Nala, Badshahi bagh road, 1ex., 18.vii.2000, Coll. N.K. Sinha & party; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004; Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16, 5.vi.2002, Coll. Vinod Khanna & party.

Diagnostic Characters : Upper side of forewing with dark basal area extending beyond end cell and discal band orange.

Wingspan : 85–110 mm.

Distribution : India : Northwest Himalaya from Mussoorie to Sikkim and Assam; Orissa and Maharashtra; Southern India (Eastern ghat) and Bihar.

Elsewhere : Nepal, Bhutan, Bangladesh and Myanmar.

Genus ***Symbrenthia*** Huebner

1819. *Symbrenthia Huebner Verz. Bekannt. Schmett.* (3) : 43.

This genus known in India by four species and three species are found in Uttarakhand.

Key to species

1. Under side of forewing and hindwing marked with a black tessellations 2

   Under side of forewing and hindwing marked with ferruginous markings black tessellations absent ..... *hippoclus* Cramer

2. Upper side of forewing with preapical oblique fulvous or yellow irregular short band extended to costal margin .... *niphanda* Moore

   Upper side of forewing with preapical oblique fulvous or yellow irregular short Band not extended to costal margin .... *hypselis* Godart

104. ***Symbrenthia hippoclus*** (Cramer)
COMMON JUESTER

1779. *Papilio hippoclus*, Cramer, *Pap. Exot*, Vol. **III** : 46 pl. 220 figs. C-D.

1780. *Papilio lucina* Cramer *Pap. Exot*, Vol. **IV** : 46 pl. 230 figs. E-F.

1886. *Symbrenthia hippoclus* Cramer : De Niceville, *J. Asiat Soc. Beng.*, **51**(2) : 57.

1932. *Symbrenthia hippoclus* Cramer : Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 180.

1995. *Symbrenthia hippoclus* (Cramer) : Arora et al. Lepidoptera, Fauna of Western Himalaya, (Part-1) *zool. Surv. India*, : 69.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004, Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party.

Remark : The species recorded by Arora (1995) from Dehra Dun, Tehri Garhwal and Pauri and found at elevation 3,000 to 6,000 feet.

Wingspan : 45-55 mm.

Distribution : India : Uttarakhand : Dehra Dun, Tehri Garhwal, Pauri, Kumaon, Himachal Pradesh. Its ranges from Kullu to Myanmar.

Elsewhere : Myanmar and China.

105. *Symbrenthia niphanda* Moore
BLUETAIL JESTER

1872. *Symbrenthia niphanda* Moore *Proc. zool. Soc. Lond.*, : 559.

1886. *Symbrenthia niphanda* Moore : De Niceville, *The Butterflies of India, Burma and Ceylon,* **2** : 243.

1911. *Symbrenthia niphanda* Moore : Tytler, J. *Bombay nat. Hist. Soc.,* **21**(1) : 62

1932. *Symbrenthia niphanda* Moore : Evans, *The Identification of Indian Butterflies Bombay nat. Hist. Soc.* : 181.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Evans (1932) in Kumaon.

Wingspan : 50-60 mm.

Distribution : India : Uttarakhand : Kumaon, Sikkim, Assam, Naga land. The Species ranges from Kashmir to Kumaon.

Elsewhere : Nepal and Bhutan.

Remarks : The species has been included in Schedule (part-4) of the Indian Wildlife Protection Act.

106. *Symbrenthia hypselis* Godart
HIMALAYAN JUESTER

1823. *Venessa hypselis*, Godart, *Enc. Meth.*, Vol. Ix, Suppl. : 818.

1836. *Laogona hypselis*, Boisduval, *Sp. Gen.*, Vol. 1, pl.x, fig. 3.

1886. *Symbrenthia hypselis* Godart De Niceville, *The Butterflies of India, Burma and Ceylon,* **2** : 241.

1911. *Symbrenthia hypselis* Godart : Tytler, J. Bombay *nat. Hist. Soc.,* **21**(1) : 62

1932. *Symbrenthia hypselis brabira* Moore : Evans, *The Identification of Indian Butterflies Bombay nat. Hist. Soc.* : 181.

Status : Fairly common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie from April to September and also occurs in Tehri Garhwal and Upper Ganges Valley.

Wingspan : 40-55 mm.

Distribution : India : Uttarakhand : Mussoorie, Kumaon Kashmir, Shimla. The Species ranges from Kashmir to Kumaon.

Elsewhere : Nepal and Bhutan.

Genus *Cynthia* Fabricius

1819. *Cynthia* Fabricius, *Mag. F. Insektenk (Illiger),* **6** : 281.

Only single species of this genus is represent in India and is found in Uttarakhand.

107. *Cynthia cardui* (Linnaeus)
PAINTED LADY

1758. *Papilio cardui* Linnaeus, *Syst. Nat.*, (10th ed.) : 475, no. 107.

1971. *Cynthia cardui* (Linnaeus) Field, *Smithson Contr. Zool.*, **84** : 37.

2003. *Cynthia cardui* (Linnaeus) State Fauna Series 9, Fauna of Sikkim (part-4) : 48.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002; Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Kalsi,

2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004, Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002, Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party.

Wingspan : 55 – 70 mm.

Distribution : India : Throughout. Uttarakhand : Recorded from Chamoli, Dehra Dun, Haridwar, Almora, Rudra Prayag, Bageshwar, Champawat, Udhamsingh Nagar, Nainital, Pauri, Pithoragarh, Tehri Garhwal and Uttarkashi districts.

Elsewhere : Nepal, Bhutan, Sri Lanka, Bangladesh, Myanmar, and Pakistan.

Remarks : The species is migratory in habit. It was treated earlier under the genus Vanessa Fabricius but Field (1971) resurrected the genus Cynthia Fabricius and held Cynthia cardui (Linnaeus) a valid species and followed by Varshney (1977), Gupta (1988), and Haribal (1982).

Genus ***Vanessa*** Fabricius

1807. *Vanessa* Fabricius *Mag. F. Insektenk (Illiger)*, **6** : 281.

Two species of this genus is represent in India and are found in Uttarakhand.

108. ***Vanessa indica*** (Herbst) INDIAN RED ADMIRAL

1794. *Papilio atlanta indica* Herbst, *Nat. Schmett.*, **7** : 171, no. 64, pl. 180 figs. 1, 2.

1911. *Vanessa indica* (Herbst) Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 62.

1932. *Vanessa indica indica* (Herbst) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 177.

2006. *Vanessa indica indica* (Herbst) Gupta & Majumdar, Fauna *of Nagaland, State, Fauna Series* **12** : 229.

Status : Common.

Material examined : India : Uttarakhand, Distt. Dehra Dun, Timli forest, 1ex., 27.xi.2001, Coll. J.P. Sati & party; Arun Pratap Singh & R.S. Bhandari, FRI, from Dehra Dun : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Wingspan : 55 – 65 mm.

Distribution : India : Himalaya (Kashmir to Eastward).

Elsewhere : Nepal; Myanmar; China; Pakistan, Afganistan Thailand and North-Myanmar.

109. ***Vanessa (Grapta) c-album*** Linnaeus

1758. *Papillio c-album*, Linnaeus, *Syst, Nat., ed. 10th.* : 477.

Status : Not Uncommon.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Tehri Garhwal Garhwal at 7,000 feet in March and from Upper Ganga Valley in July and August and F. Hannyngton (1910) from Pindari Valley, Kumaon from May and August at 10,000 to 12000 feet.

Wingspan : 45-55 mm.

Distribution : India : Uttarakhand : Tehri Garhwal, Pindari Valley, and Kumaon. The species ranges from Ladhak to Sikkim and Jammu and Kashmir.

Genus ***Kaniska*** Moore

1899. *Kaniska* Moore, *Lep. Ind.*, **2**(14) : 42.

This genus is represented in India by a single species *Kaniska canace* (Linnaeus) and found in Uttarakhand.

110. ***Kaniska canace*** (Linnaeus) BLUE ADMIRAL

1767. *Papilio canace* Linnaeus, *Syst. Nat.* (12th ed.), **1**(2) : 779, no. 173.

1983. *Kaniska canace* (Linnaeus), Varshney, *Rec. zool. Surv. India*, Occ. Paper No. **47** : 8.

2003. *Kaniska canace* (Linnaeus) Gupta, *State Fauna Series 9, Fauna of Sikkim* (part-4) : 48.

Status : Common.

Material examined : India : Uttarakhand, Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21-29.v.2002, Coll. J.P. Sati & party; Arun Pratap Singh & R.S. Bhandari, FRI, from Dehra Dun (2003); Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Wingspan : 60 – 75 mm.

Distribution : The species ranges from Chitral (Pakistan) eastwards through Kumaon to Sikkim and Assam, ascending to about 9,000 feet in Himalayas. Also occurs in Myanmar.

Uttarakhand : Recorded from Almora, Chamoli, Dehra Dun, Nainital, Rudra Prayag, Bageshwar, Champawat, Udhamsingh Nagar, Pithoragarh, Tehri Garhwal and Uttarkashi districts.

Elsewhere : Nepal, Bhutan, Sri Lanka, Myanmar and Pakistan.

Genus ***Polygonia*** Huebner

1819. *Polygonia* Huebner *Verz. Bekannt. Schmett.*, (3) : 36.

This genus known in India by a single species and is found in Uttarakhand.

111. ***Polygonia egea cognata*** (Moore) EASTERN COMMA

1872. *Grapta agnicula* Moore, *Pro. Zool. Soc. Lon.* : 559.

1932. *Vanessa (Grapta) egea cognata* (Moore) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 178.

1992. *Polygonia egea cognata* (Moore) Haribal, Butterflies of Sikkim Himalaya : 166.

2003. *Polygonia egea cognata* (Moore) Gupta, *State Fauna Series 9, Fauna of Sikkim* (Part-4) : 49.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 21, 29.v.2002, Coll. J.P. Sati & party. Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and Kumar and Gupta from Govind Pashu Vihar distts. Uttarkashi and Tehri Garhwal Distts.

Wingspan : 50-65 mm.

Distribution : India : Uttarakhand : Mussoorie, Sikkim, West Bengal.

Elsewhere : Nepal to Bhutan.

Remarks : Its status is not rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

Genus ***Nymphalis*** Kluk

1780. *Nymphalis* Kluk, *Zweiz. Hist. Nat. Natur. Poez. Gospod.*, **4** : 86.

This genus is represented in India by three species of which *Nymphalis xanthomeleana* is dealt with from Uttarakhand.

112. ***Nymphalis xanthomeleana*** (Denies & Schiffermuller) LARGE TORTOISESHELL

1776. *Papilio xanthomelas* Wiener *Verzeichniss* : 176, no. 6

1823. *Vanessa xanthomelas*, Godart, *Enc. Meth.* **9** : 820, no. 24.

1932. *Vanessa xanthomelas* Wiener *Verzeichniss* : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 179.

1990. *Nymphalis xanthomeleana* (Denies & Schiffermuller) : Varshney, *Revised Nomenclature for butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remarks : The species recorded by Mackinnon and de Niceville (1898) from Nag Tiba, Mussoorie

and F. Hannyngton (1910) from Cheena, Binsar and Dhakuri (Kumaon) from March to May and again in October at 8,000 to 10,000 feet.

Wingspan : 60-70 mm.

Distribution : The species ranges from Baluchistan (Pakistan), North Waziristan, Chitral to Kumaon.

Elsewhere : Pakistan and Nepal.

Genus *Aglias* Dalman

1816. *Aglias* Dalman, *Kongl. Vet. Akad. Handl.* **37** : 54, 64.

Three species of this genus known from India are dealt with from Uttarakhand.

Key to species

1. Forewing and hindwing narrow and produced. Upper side of hindwing with sub-marginal row of blue centered black spots inwardly fuscous bordered .... *cashmirensis* Fruhstorfer
   - Forewing and hindwing broad and squared. Upper side of hindwing with sub-marginal row of blue centered black spots not inwardly fuscous bordered 2
2. Forewing termen rounded at apex and only slightly produced at vein M1 .... *adakensis* Moore
   - Forewing termen concave below apex .... *urticae* (Moore)

113. *Aglais cashmirensis aesis* Fruhstorfer
INDIAN TORTOISESHELL

1844. *Vanessa cashmirensis* Kollar, *In* : Hugel's *Kaschmir und das Reich der Siek*, **4**(2) : 442, no.1, pl. 11 figs. 3-4.

1909. *Vanessa aesis* Fruhstorfer, *In* : Seitz., *Macrolepidoptera of the world*, **9** : 527.

1983. *Aglais cashmirensis* aesis Fruhstorfer Varshney, *Rec. zool. Surv. India*, Occ. Paper No. **47** : 8.

2003. *Aglais cashmirensis* aesis Fruhstorfer State Fauna Series 9, Fauna of Sikkim (Part-4) : 50.

Status : Very Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072,23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and F. Hannyngton (1910) from Almora, Kumaon May and July to October at 5000–10000 feet and Arora (1995) recorded from Dehra Dun, Tehri Garhwal, Chamoli in Garhwal feet and Arun Pratap Singh & R.S.Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 55 – 65 mm.

Distribution : Waziristan (Pakistan) to Sikkim, and Himachal Pradesh, West Bengal and Uttarakhand: Almora, Chamoli, Tehri Garhwal, Pauri, Rudra Prayag, Bageshwar, Pithoragarh and Uttarkashi districts.

114. *Aglias ladakensis* Moore
LADAK TORTOISESHELL

1878. *Vanessa. ladakensis* Moore, *Ann. Mag. Nat. Hist.*, **5**(1) : 227.

1842. *Aglias ladakensis* (Moore) : Haribal, *Butterflies of Sikkim Himalaya*, : 167.

2003. *Aglias ladakensis* (Moore) Gupta, *State Fauna Series* 9, *Fauna of Sikkim* (Part- 4) : 50.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon in July and August at 10,000 feet.

Wingspan : 45-55 mm.

Distribution : The species ranges from Ladhak to Sikkim and Jammu and Kashmir.

115. *Aglias urticae rizana* (Moore) MOUNTAIN TORTOISESHELL

1872. *Vanessa rizana* Moore *Proc. Zool. Soc. Lond.* : 559.

1932. *Vanessa rizana* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 179.

1992. *Aglias urticae rizana* (Moore) : Haribal, *Butterflies of Sikkim Himalaya*, : 166.

2003. *Aglias urticae rizana* (Moore) Gupta, State Fauna Series 9, Fauna of Sikkim (Part-4) : 50.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon in the month of July to August at 10,000 feet.

Wingspan : 50-60 mm.

Distribution : The species ranges from Chitral to Sikkim.

Elsewhere : Safed Koh, Afghanistan and Pakistan.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

Tribe **Cyrestini**

This tribe is known in India by two genera, viz. *Cyrestis* Boisduval and *Chersonesia* Distant.

Key to genera

Forewing with vein R2 arising directly from cell ..... ***Cyrestis*** Boisduval

- Forewing with vein R2 arising directly from vein R5 ..... ***Chersonesia*** Distant

Genus ***Cyrestis*** Boisduval

1832. *Cyrestis* Boisduval, *Voy. Astrolabe*, : 117.

This genus is represented in India by three species of which *Cyrestis thyodamas* Boisduval dealt with from Uttarakhand.

116. *Cyrestis thyodamas* Boisduval COMMON MAP BUTTERFLY

1836. *Cyrestis thyodamas* Boisduval, In : *Cuvier's Reg. No. Animal, Ins.*, 2, pl. 138-fig. 4.

2003. *Cyrestis thyodamas* Boisduval, Gupta. *State Fauna Series 9, Fauna of Sikkim* (part-4) : 51.

Status : Common.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around, 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004, Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party; Maldevta, 1ex., Reg. No. 2129.v.2002 Coll. J.P. Sati & party., Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002, Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Diagnostic Characters : Fore wing tornus and hind wing apex truncated.

Wingspan : 50 –60 mm.

Distribution : This hilly species ranges from Kashmir to Kumaon, and ascends to about 8,000 feet in Himalayas.

Uttarakhand : Recorded from Almora, Chamoli, Dehra Dun, Tehri Garhwal, Rudra Prayag, Bageshwar, Pithoragarh and Uttarkashi districts.

Elsewhere : Pakistan, Nepal, Bhutan, Bangladesh and Afghanistan.

Genus ***Chersonsia*** Distant

1883. *Chersonsia Distant, Rhop. Malay*, : 142.

The Genus is known in India by two species, viz. *Chersonsia rahria* Moore and *Chersonsia risa* Doubleday & Hewitson of which *Chersonsia risa* Doubleday & Hewitson is dealt with from Uttarakhand.

117. *Chersonsia risa* Doubleday & Hewitson COMMON MAPLET

1850. *Cyrestis risa*, Doubleday, Hewitson, *Gen. Diurn. Lep.*, 2 : 262, no. x. pl. 32 fig. 4.

1886. *Chersonsia risa* Doubleday, *Journ. A.S.B.*, **55**(2) : 122 no. 71.

1932. *Chersonsia risa* Doubleday : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 170.

1994. *Chersonsia risa* Doubleday & Hewitson : Varshney, Oriental Insect, **28** : 178.

2003. *Chersonsia risa* Doubleday & Hewitson Gupta, State Fauna Series 9, Fauna of Sikkim (part-4) : 51.

Status : Uncommon.

Material examined : India : Uttarakhand. : Nil.

Remark : The species recorded by F. Hannyngton (1910) at Kapkot, Sarju Valley and Kali Valley in Kumaon at 2000 to 3000 feet.

Diagnostic Characters : Fore wing with vein R2 arising from vein R5.

Wingspan : 60-75 mm.

Distribution : India : Uttarakhand : Kumaon, Kapkot, Sarju Valley and Kali Valley; Sikkim, Assam, Arunachal Pradesh and Uttar Pradesh.

Elsewhere : Bhutan, Bangladesh, Myanmar and Nepal.

Tribe **Limenitidini**

This tribe is represented in India by 21 genera, of which 11 are dealt with Uttarakhand.

Key to genera

1. Hindwing precostal vein arising at or before the origin of vein Sc 2
   - Hindwing precostal vein arising beyond the origin of vein Sc 10
2. Hindwing with vein Sc ending on costa or, if ending on termen (*Phaedyma* only), vein M1, Rs and Sc ending close together, and M1 remote from M2 3
   - Hindwing with vein Sc reaching termen in both sexes, vein M1, ending of veins M2, Rs and Sc more or less equidistant..... 6
3. Forewing with vein R2 arising from vein R5 ..... ***Pantoporia*** Huebner
   - Forewing with vein R2 arising from the cell 4
4. Hindwing with vein Sc ending on termen in male; precostal vein with a spur directed based ..... ***Phaedyma*** Felder

   Hindwing with vein Sc ending on costa in male; precostal vein with a long spur directed distad 5
5. Mostly small orange species with two sub-marginal lines on forewing or fuliginous species with small sub-costal spot above the end of cell streak..... ***Lasippa*** Moore
   - Mostly black & white species; if orange, with only a single sub-marginal line on forewing; if fuliginous, than without sub-costal spot above the end of cell streak .... ***Neptis*** Fabricius.
6. Hindwing cell open 7
   - Hindwing cell closed 9
7. Forewing lower disco-cellular vein ending well beyond origin of Cu 1a .... ***Moduza*** Moore
   - Forewing cell open or, if closed, with lower disco-cellular vein ending close to vein Cu 1a 8
8. Proximal end of abdomen with pale band(except in Selenophora male), the latter with a longitudinal whitish cell streak on underside of forewing..... ..... ***Athyma*** Westwood

   abdomen not pale banded. Underside of forewing without any whitish cell streak... ..... ***Parasarpa*** Moore
9. Eyes hairy. Upper side of wings with a pale green transverse band ..... ***Sumalia*** Moore
   - Eyes smooth. Upper side of wings without any pale green transverse band .... ***Auzakia*** Moore
10. Forewing with vein R4 arising before end of R2 11

    Forewing with vein R4 arising beyond end of R2..... 14
11. Antennae almost equal to half of the length of costa of forewing..... 12

    Antennae more than half of the length of costa of forewing 17

12. Forewing with vein 1A+2A highly sinuous ..... ***Neurosigma*** Butler

    Forewing with vein 1A+2A straight .... ***Abrota*** Moore

13. Labial palpi with thin long hairs. Forewing with vein R3 distorted, hindwing with precostal vein forked at end .... ***Parthenos*** Huebner

    Labial palpi smooth. Forewing with vein R3,R2, R1distorted but R3 arising well before R4; hindwing with precostal vein not forked ..... ***Lebadea*** Felder

14. Cell open in forewing 15

    - Cell closed in forewing 16

15. Upper side of forewing and hindwing tawny orange with black markings .... ***Symphaedra*** Huebner

    Upper side of Forewing and Hindwing brown with white markings 16

16. Thorax relatively slender. Forewing with veins R1 and Sc anastomosed in both sexes in female R3 arising approximately mid-way between apex of cell and origin of R4 .... ***Tanaecia*** Butler

    Thorax robust. Forewing with veins R1 and Sc free in male; free or anastomosed in female and with R3 arising close to cell apex and remote from R4..... ***Euthalia*** Huebner

Genus ***Pantoporia*** Huebner

1819. *Pantoporia Huebner Verz. Bekannt. Schmett.*, (3) : 44.

This genus known in India by a single species viz. *Pantoporia hordonia* (Stoll) and found in Uttarakhand.

118. ***Pantoporia hordonia hordonia*** Stoll
COMMON LASCAR

1932. *Neptis hordonia hordonia* Stoll : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 172.

1882. *Rahinda hordonia* (Stoll) : De Nieceville. *J. Asiat. Soc. Beng.*, **51**(2-3) : 58.

1990. *Pantoporia hordonia* : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

2003. *Pantoporia hordonia hordonia* Stoll, Gupta, *State Fauna Series- 9, Fauna of Sikkim* (part-4) : 53.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain Bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun and F. Hannyngton (1910) at 3000 to 5000 feet Common in the month of April and May from Kumaon.

Wingspan : 45-50 mm.

Distribution : India : Uttarakhand The species ranges from Dehra Dun to Myanmar.

Genus ***Phaedyma*** Felder (C.)

1819. *Phaedyma* Felder, *Nova Actad. Caesar, Lemp. Carol.*, **28** : 1-50.

This genus known in India by two species viz. *Phaedyma columella* Cramer and *Phaedyma aspasia* (Leech) of which former is dealt with from Uttarakhand.

119. ***Phaedyma columella*** Cramer
SHORT -BANDED SAILER

1882. *Neptis columella* Cramer De Niceville, *J. Asiat Soc. Beng.*, **51**(2-3) : 59

1932. *Neptis columella* Cramer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 164.

1990. *Phaedyma columella* Cramer : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in March to May and F. Hannyngton (1910) from Haldwani and Ranibagh (Kumaon) in December and January.

Wingspan : 65-70 mm.

Distribution : The species is recorded from Dehra Dun to Myanmar.

Genus ***Lasippa*** Moore

1898. *Lasippa* Moore, Lep. Indica, **3** : 146.

This genus known in India by two species viz. *Lasippa viraja* Moore and *Lasippa tiga* (Moore) and the former species is dealt with from Uttarakhand.

120. ***Lasippa viraja viraja*** Moore
YELLOW JACK SAILER

1872. *Neptis viraja* Moore. *Proc. Zool. Soc. London* : 563, pl. 32, fig. 6.

1932. *Neptis viarja viraja* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 171.

1990. *Lasippa viraja* Moore : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

2003. *Lasippa viraja viraja* Moore Gupta, State Fauna Series 9, Fauna of Sikkim (part-4) : 54.

Status : Not Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) at Nalena in Kumaon at 4500 feet in the month of June.

Wingspan : 55-75mm.

Distribution : India : Uttarakhand The species ranges from Kumaon to Myanmar.

Elsewhere : Myanmar.

Genus ***Neptis*** Fabricius

1807. *Neptis* Fabricius, *Mag. F. Insektenk (Illiger)* **6** : 282.

Of the 30 species occurring in India ten are found in Uttarakhand.

Key to species

1. Fore wing with subcostal spots internal to the upper post discal band 2

   Fore wing without subcostal spots internal to the upper post discal band 5

2. Forewing post discal spot in space Cu 1a, if present, placed above the spot in Cu 1a or, at most, only slightly shifted in .....

   - Forewing post discal spot in space Cu 1a, much sifted in, often touching the streak beyond cell, so that cell streak, streak beyond cell and lower post discal band form a continuous hockey stick 5

3. Forewing post discal spot in space Cu 1a, absent or, at most; a mere extension of the spot in space Cu 1a across vein Cu al; streak beyond cell not entering baser of space Cu 1a ..... *armandia* oberthuer

   - Forewing post discal spot in space Cu 1a, well developed; streak beyond cell extending into the base of space Cu 1a, at least on the underside larger 4

4. Forewing with subcostal spot in space. Under side hindwing variegated with mauve markings; no basal or sub-basal streaks..... ..... *radha* Moore

   Forewing without subcostal spot in space. Under side hindwing with basal or sub-basal streaks; no mauve markings..... ..... *narayana* Moore

5. Forewing with streak beyond cell not extending into the base of space Cu 1a 6

   Forewing with streak beyond cell extending narrowly into the base of space Cu 1a On upper or under side or on both..... ..... *zaida* Westwood

6. Under side hind wing with a sub basal streak, basal streak not reaching vein Sc+R1 10

Under side hind wing without sub basal streak, basal streak not reaching vein Sc+R1 near its origin 7

7. Fore wing with prominent post discal spot in space Cu 1a ..... *cartica* Moore

Fore wing with post discal spot in space Cu 1a absent or, at most, forming merely a narrow continuation of the spot in Cu 1b across vein Cu 1a 8

8. Under side fore wing with post discal fascia and sub marginal series reaching v3ein R3, as usual, and not bluish .... *nashona* Swinhoe

Under side fore wing with post discal fascia and sub marginal series fading out before vein R3 and nearly always tinged bluish 9

9. Upper side marking broader and paler, cilia very obscurely chequered. Female with fore wing upper and lower post discal bands well separated ..... *ananta* Moore

- Upper side marking narrower and richer orange, cilia narrowly but clearly chequered with white.. Female with fore wing upper and lower post discal bands narrowly united by an orange line ..... *namba* Tytler

10. Under side hind wing discal fasia obsolete or much closer to the discal than to the post discal band and outwardly edged, or partly obscured, by a dark band or series of blochy spots 11

Under side hind wing with discal fascia placed centrally between the discal and post discal bands, usually whitish and prominent 15

11. Fore wing upper post discal band entirely above vein M2 xii

Fore wing upper post discal band extending into space M3 on upper side or under side or both 13

12. Upper side marking orange. Under side hind wing with v or u shaped mark nearly always present ..... *miah* Moore

Upper side marking white or pale yellow. Under side hind wing without a v or u shaped mark under vein M2 near edge or discal band ..... *sankara* Kollar

13. Forewing cilia fuscous or fore wing and at most very obscurely chequered on hind wing with lighter and dark brown .... *harita* Moore

Forewing cilia with prominent apical white patch in space R5 and R4 and hind wing cilia chequered white and brown .... *pseudovikasi* Moore

14. Forewing cilia usually fuscous in spacesM1 and R5 but occasionally with few white hair scales ..... *clinia* Moore

Forewing cilia with white patches in spaces M1 and R5 15

15. Upper side fore wing cell streak without indications of a transverse line. Hind wing cilia narrowly chequered, the white patches smaller than the dark ones, post discal band inwardly almost even-edged .... *yerburii* Butler

- Upper side fore wing cell usually with indications of a dark line across the cell close to the disco cellular bar. Hind wing cilia chequered with white patches at least as wide as the dark patches; spots of post discal band, particularly those in spaces M2 and M3, with their inner edges more or less rounded 16

16. Under side with some shade of yellow to reddish ochraceous, with the hind wing discal band and usually most of the other white markings outlined by the black lines ..... *hylas* Linnaeus

- Under side always more reddish, with the white markings more weakly or not outlined in black 17

17. Under side of hindwing with the discal band usually weakly outlined black .... *sappho* Pallas

Under side of hindwing with the discal band not outlined by black 18

18. Upper side white markings with a creamy tinge ..... *soma* Moore

Upper side white markings without a creamy tinge 19

19. Antennal club with tip of nudum dark brown, barely contrasting with the rest of the club ..... *mahendra* Moore

- Antennal club with tip of nudum yellow-brown to light brown contrasting well with the rest of the club ..... *nata* Moore

121. *Neptis radha* Moore
GREAT YELLOW SAILOR

1857. *Neptis radha* Moore, *Cat. Lep. Ins. Mus. East India Com.* : 165, pl. 4a, fig. ii.

1911. *Neptis radha* Moore : Tytler, *J. Bombay nat, Hist. Soc.*, **21**(1) : 61.

1932. *Neptis radha radha Moore* : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 170.

2006. *Neptis radha radha* Moore, Gupta, *State Fauna Series* **12** *: Fauna of Nagaland* : 235.

Status : Not Common.

Material examined : India : Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002, Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party Uttarakhand.

Remark : The species recorded by F. Hannyngton (1910) at 3,000 feet in May and June in Bageshwar (Kumaon).

Wingspan : 70-80 mm.

Distribution : The species is recorded from Mussoorie, Nagaland, Sikkim, Assam and Uttar Pradesh.

Elsewhere : Myanmar, Nepal and Bhutan.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

122. *Neptis columella ophiana* Cramer Moore
SHORT-BANDED SAILOR

1932. *Neptis columella* Cramer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 164.

Status : Not rare.

Material examined : India : Uttarakhand The species recorded by F. Hannyngton (1910) at 3,000 feet in May and June in Bageshwar (Kumaon). Nil.

Wingspan : 65-70 mm.

Distribution : India : Uttarakhand The species is recorded from Dehra Dun.

Elsewhere : Myanmar.

123. *Neptis narayana narayana* Moore
BROADFSTICK SAILER

1932. *Neptis narayana narayana* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 170.

1990. *Neptis narayana* Moore : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

Status : Very Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Nag Tibba, Mussoorie in the month of May and June and F. Hannyngton (1910) at 5000-6500 feet in May in Kumaon.

Wingspan : 60-70mm.

Distribution : India : Uttarakhand The species is recorded from, Nagaland, Sikkim, Assam and Manipur.

Elsewhere : Bhutan.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

124. *Neptis hylas* Moore
COMMON SAILER

1872. *Neptis astola* Moore, *Proc. zool. Soc. Lond.* : 560

1932. *Neptis hylas* astola Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 166

1994. *Neptis hylas* Linnaeus Varshney, Oriental Insect, **28** : 176.

2004. *Neptis hylas* Moore *Gupta*, Fauna *of Manipur, State Fauna Series* **10** : 555.

Status : Very variable.

Material examined : India : Uttarakhand : Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party Dehra Dun dist., Bhure Shah, 1ex., 4.ix.2001; Sankra Nala, Badshahibag road, 1ex., 11.x.2001, Coll. N.K. Sinha & party; Distt. Dehra Dun, Pasulok, Rishikesh, 4exs, Reg. No., 19.viii.2003, Kalsi, 2exs., Reg. No. 4, 10.ix.2003, Bhure Shah, Kulhal, 2exs., Reg. No. 5, 8.23.2004, Timli forest, 2exs., Reg. No. 3, 10.viii.2004, Coll. Vinod Khanna & party.

Wingspan : 45 – 60 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka and Myanmar.

125. ***Neptis leucothoe*** Cramer
COMMON SAILER

1932. *Neptis leucothoe* Cramer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 166.

Status : Very Common.

Material examined : India : Uttarakhand, Dehra Dun dist., *Bhure* Shah, 1ex., 4.ix.2001; Sankra Nala, Badshahibag road, 1ex., 11.x.2001, Coll. *N.K. Sinha* & party.

Wingspan : 50 – 60 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka and Myanmar.

126. ***Neptis eurynome*** Westwood
COMMON SAILER

1932. *Neptis eurynome* Westwood : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 166.

Status : Very Common.

Material examined : India : Uttarakhand, Dehra Dun dist., *Bhure* Shah, 1ex., 4.ix.2001; Sankra Nala, Badshahibag road, 1ex., 11.x.2001, Coll. *N.K. Sinha* & party.

Wingspan : 50 – 60 mm.

Distribution : India : Throughout.

Elsewhere : Sri Lanka and Myanmar.

127. ***Neptis yerburyi*** (Butler)
YERBUR'S SAILAR

1886. *Neptis yerburyi* Butler, *Proc. zool. Soc. Lond.* : 360.

1932. *Neptis yerburyi yerburyi* (Butler) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 167.

1994. *Neptis yerburyi* (Butler) Varshney, Oriental Insect, **28** : 178.

Status : Not rare.

Material examined : India : Uttarakhand, Dehra Dun, Sankra Nala, Badshahibag road, 1ex., 3.xi.2000, Coll. A. Husian & party; Timli forest, 1ex., 20.xi.2000, Coll. N.K. Sinha & party; 1ex., 6.vii.2001, Coll. Arun Kumar & party.

Wingspan : 60 – 70 mm.

Distribution : India : Kashmir to Kumaon.

Elsewhere : Myanmar, Nepal and Bhutan.

128. ***Neptis mahendra*** Moore
THE HIMALAYAN SAILOR

1872. *Neptis mahendra* Moore *Proc. zoo. Soc. Lond.* : 560, pl. 32, fig. ii.

1969. *Neptis mahendra mahendra* Moore : *Eliot, Bull Brit. Mus. (nat. Hist.) ent. Suppl.* **15** : 79.

2003. *Neptis mahendra mahendra* Moore, Gupta, *State Fauna Series 9, Fauna of Sikkim* (part-4) : 61.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Kaddu khal, 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Distt. Dehra Dun Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party, Maldevta, 1ex., Reg. No. 11, 24.ix.2002 Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party

Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie, Dehra Dun dist., Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 55 – 60 mm.

Distribution : The species is common from Chitral (Pakistan) to Kumaon and ascends to about 8,000 feet in North-West Himalayas.

Uttarakhand : Recorded from Dehra Dun, Haridwar, Pauri Almora, Chamoli, Bageshwar, Pithoragarh and Tehri Garhwal districts.

129. ***Neptis soma soma*** Moore
SULLIED SAILER

1858. *Neptis soma* Moore, *Proc. zool. Soc. Lond.* : 9, pl. 49, fig. 6.

1911. *Neptis soma* Moore : Tytler, *J. Bombay nat, Hist. Soc.*, **21** : 61.

1932. *Neptis soma soma* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 166.

2006. *Neptis soma soma* Moore, Gupta, *State Fauna Series* **12** *: Fauna of Nagaland* : 238.

Status : Rare.

Material examined : India : Uttarakhand, distts. Almora On way to Jatoli, 2210-2150 m. 1ex., 28.viii.19990, Coll. P.C. Tak & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of June and F. Hannyngton (1910) at 25000 to 5000 feet in Kumaon.

Wingspan : 50-60 mm.

Distribution : India : Uttarakhand The species is recorded from Mussoorie, Nagaland, Sikkim, Assam and Eastern Himalayas.

Elsewhere : Myanmar, Nepal and W. China.

130. ***Neptis sankra sankra*** Kollar
BROAD-BANDED SAILER

1858. *Neptis amba* Moore, *Proc. zool. Soc. Lond.* : 7, pl. 49, fig. iv.

1932. *Neptis sankra sankra* Kollar : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 167.

1990. *Neptis sankra* Kollar : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of April and July and F. Hannyngton (1910) at 4000 to 9000 feet in April to July from Kumaon.

Wingspan : 65-75mm.

Distribution : India : Uttarakhand The species ranges from Kashmir to Kumaon.

Elsewhere : Myanmar.

131. ***Neptis ananta ananta*** Moore
YELLOW SAILER

1911. *Neptis annata* Moore : Tytler, *J. Bombay nat, Hist. Soc.*, **21**(1) : 61.

1932. *Neptis ananta ananta* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 168.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in May and June and F. Hannyngton (1910) at 4000 to 9000 feet in August and September in Kumaon.

Wingspan : 55-70mm.

Distribution : India : Uttarakhand The species ranges from Chamba (Himachal Pradesh) to Kumaon.

Elsewhere : Myanmar.

132. ***Neptis pseudovikasi*** Moore
DINGY SAILER

1886. *Bimbisara pseudovikasi* Moore, *Lep. Ind.*, **2** : 7, pl. 291, fig. 1, 1a-1c.

1932. *Neptis vikasi pseudovikasi* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist Soc. (Second edition)* : 168.

1990. *Neptis pseudovikasi* Moore : Varshney, *Revised Nomenclature for Butterfly taxa : Jour. Bom. Nat. Hist. Soc.* **87** : 59.

2003. *Neptis pseudovikasi* Moore Gupta, State Fauna Series 9, Fauna of Sikkim (part-4) : 59.

Status : Not Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kapkot (Kumaon) at 4000 feet in the month of August and September.

Wingspan : 60-70mm.

Distribution : India : Uttarakhand The species ranges from Kumaon to Assam.

133. ***Neptis clinia susruta*** Moore
CLEAR SAILER

1872. *Neptis susruta* Moore, *Proc. Zool. Soc. Lond.*; 563, pl. 32. fig. 4.

1932. *Neptis nandina susruta* Moore Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 167.

1992. *Neptis clinia susruta* Moore Haribal, Butterflies of Sikkim Himalaya : 172.

2003. *Neptis clinia susruta* Moore State Fauna Series 9, Fauna of Sikkim (part-4) : 59.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie May and June and F. Hannyngton (1910) at Nalena 4500 feet Common in June and July from Kumaon.

Wingspan : 45-60 mm.

Distribution : India : Uttarakhand The species ranges from Sikkim to Myanmar, Assam.

Elsewhere : Myanmar, North and South-east China and Siam.

134. ***Neptis viraja viraja*** Moore
YELLOWJACK SAILER

1932. *Neptis viraja viraja* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* (Second edition) : 170-171.

Status : Not Rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani, 2exs., Reg. No. 7, 16.vii.2004, Coll. Vinod Khanna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie May and June and F. Hannyngton (1910) at Nalena 4500 feet Common in June and July in Kumaon.

Wingspan : 55-75 mm.

Distribution : India : Uttarakhand The species ranges from Kumaon to Myanmar.

135. ***Neptis hordonia hordonia*** Stoll
COMMON LASCAR

1932. *Neptis hordonia hordonia* Stoll : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* (Second edition) : 171-172.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani, 1ex., Reg. No. 7, 16.vii.2004, Coll. Vinod Khanna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie May and June and F. Hannyngton (1910) at Nalena 4500 feet Common in June and July from Kumaon.

Diagnostic characters : Upper side of forewing marginal lines much zigzagged, but often in wet season form prominently so in the middle.

Wingspan : 55-75 mm.

Distribution : India : Uttarakhand The species ranges from Dehra Dun to Myanmar and recorded from South India.

136. ***Neptis zaida zaida*** Doubleday
PALE GREEN SAILER

1932. *Neptis zaida zaida* Doubleday : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 170.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie May and June and F. Hannyngton (1910) at Nalena 4500 feet Common in June and July in Kumaon.

Wingspan : 65-75 mm.

Distribution : India : Uttarakhand The species ranges from Murree to Kumaon.

Genus ***Moduza*** Moore

1881. *Moduza* Moore, Lep. Ceylon, **1**(2) : 47.

A single species *Moduza procris* (Cramer) represents this genus in India and is found in Uttarakhand.

137. ***Moduza procris procris*** (Cramer) COMMANDER

1777. *Papilio procris* Cramer, *Pap. Exot.*, **2** : pl.106, fig. E.F.

1882. *Limenitis procris* (Cramer) : De Nieceville. *J. Asiat. Soc. Beng.*, **51**(2-3) : 58.

1932. *Limenitis procri sprocris* (Cramer) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 172.

1992. *Moduza procris procris* (Cramer) : Haribal, *Butterflies of Sikkim Himalayas* : 178.

2006. *Moduza procris procris* (Cramer), Gupta, *State Fauna Series* **12** *: Fauna of Nagaland* : 239.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in May and September and F. Hannyngton (1910) at Haldwani from Kumaon.

Wingspan : 60-75 mm.

Distribution : India : Uttarakhand The species ranges from Dehra Dun to Myanmar. Sikkim, Uttar Pradesh to Arunachal Pradesh.

Elsewhere : Myanmar.

Genus ***Athyma*** Westwood

1850. *Athyma* Westwood, In Doubleday's Gen. Diurn. Lep. : (2) : 272.

Of the 13 species of this genus occurring in India, six are dealt with from Uttarakhand.

Keys to species

1. Cell closed in fore wing 2

   Cell open in fore wing 7

2. Sexes dissimilar. In male, upper side of fore wing with discal spots from dorsal to spaces Cu 1 b or Cu 1a conjoined and directed to apex or costa 3

   - Sexes similar. On upper side of fore wing with discal spots in space Cu 1b well separated from spot in interspace 1A+2A, no discal spot in interspace Cu 1a, lower part of discal band directed to mid termen 6

2. Upper side of fore wing with prominent discal spot in interspace Cu 1a. In female, Upper side of wings with white or sullied brownish bands 4

   Upper side of fore wing without a prominent discal spot in space Cu 1a. In female, Upper side of wings with broad orange markings normally arranged 5

3. Under side of fore wing with the discal streak twice divided by a brown line across cell, a triangular spot, at the base of space M2 beyond cell well separated .... *selenophora* (Kollar)

   Under side of fore wing with the discal streak entire or hardly separated from the spot at the end of cell in interspace M2 .... *Zeroca* (Moore)

4. In male, under side of fore wing with discal streak much broken. In female, discal spots in spaces M1, M2 forming a continuous and even edged apical band .... *nefta* (Cramer)

- In male, under side of fore wing with discal streak continuous but upper edge irregular. In female, a small discal spots in interspace M3 and against outer edged spot in space Cu 1 b ..... *cama* (Moore)

5. Upper side of fore wing with a large triangular white spot just beyond apex of cell .... *opalina* (Kollar)

- Upper side of fore wing without a triangular white spot just beyond apex of cell .... *ranga* (Moore)

6. Eyes smooth 8

- Eyes hairy ..... *jina* Moore

7. Upper side of fore wing with discoidal streak divided ..... *perseus* (Linnaeus)

Upper side of fore wing with discoidal streak not divided 9

8. A spot present beyond apex of discal streak ..... *asura* Moore

- No spot beyond apex of discal streak .... *pravara* Moore

138. ***Athyma selenophora*** Kollar
STAFF SERGEANT

1848. *Limenitis selenophora* Kollar, *Hugel's Kaschmir*, 4(2) : 426, pl. 7, fig. 1, 2, male.

1911. *Pantoporia selenophora* Kollar Tytler, *J. Bombay nat. Hist. Soc.* **21**(1) : 60.

1932. *Pantoporia selenophora* Kollar Evans, *Identification of Indian Butterflies* Ed. **2** : 162.

2006. *Athyma selenophora* Kollar *Gupta*, Fauna *Nagaland, State Fauna Series*, **12** : 240.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072,23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie May and September and F. Hannyngton (1910) from Kumaon in April and May. Arun Pratap Singh & R.S.Bhandari, FRI, from Dehra Dun (2003) from Kumaon.

Wingspan : 55-75 mm.

Distribution : India : Nagaland, Sikkim, Uttar Pradesh to Arunachal Pradesh.

Uttarakhand : Mussoorie.

Elsewhere : Myanmar, Nepal, Bhutan and Bangladesh.

139. ***Atshyma zeroca*** Moore
SMALL STAFF SERGEANT

1872. *Athyma zeroca* Moore *Proc. Zool. Soc. Lond.* : 564.

1911. *Pantoporia zerca* (Moore) Tytler, *J. Bombay nat. Hist. Soc.* **21**(1) : 60.

1932. *Athyma zeroca* Moore Evans, *Identification of Indian Butterflies* Ed. **2** : 162, pl. 23, fig. 30. 1.

2006. *Athyma zeroca* Moore Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 225.

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Nalena at 4500 feet and Binsar at 8000 feet from Kumaon at in May and June.

Wingspan : 55-70 mm.

Distribution : The species is distributed from Kumaon to Myanmar.

Elsewhere : Myanmar, Nepal and Bhutan.

140. ***Athyma cama*** Moore
ORANGE STAFF SERGEANT

1857. *Athyma cama* Moore *Cat. Lep. Mus. E.I.C.*, **1** : 174, pl. 5, fig. 5. Male, female.

1911. *Pantoporia cama* (Moore) Tytler, *J. Bombay nat. Hist. Soc.* **21**(1) : 60.

1932. *Pantoporia cama* Moore Evans, *Identification of Indian Butterflies* Ed. **2** : 162.

2006. *Athyma cama* Moore Gupta, Fauna *Nagaland, State Fauna Series,* **12** : 240-241.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and Bhilung Distt. Tehri Garhwal in September and F. Hannyngton (1910) from Kumaon in the month of April to October at 2000 to 5000 feet and Arun Pratap Singh & R.S. Bhandari (2003) FRI, from Dehra Dun.

Wingspan : 60-75 mm.

Distribution : India : Nagaland, Sikkim, Uttar Pradesh to Arunachal Pradesh, West Bengal, Uttarakhand : Mussoorie.

Elsewhere : Myanmar.

141. ***Athyma opalina opalina*** (Kollar) HIMALYAN SERGEANT

1844. *Limenitis opalina* Kollar, In : *Hugel's Kaschmir und. das Reich der Siek,* **4**(2) : 427.

1857. *Athyma opalina* Kollar : Horsfield and Moore, *Cat. Lep. Mus. E.I.C.,* **1** : 171, no. 351, fig. 2.

1932. *Athyma opalina opalina* Kollar Evans, *Identification of Indian Butterflies* ed. **2** : 163, pl. 23, fig. 30. 1.

1994. *Athyma opalina opalina* Kollar Varshney, Oriental Insect, **28** : 180.

Status : Common.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani, 2exs., Reg. No. 7, 16.vii.2004, Coll. Vinod Khanna & party; Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg.No. 4566, 16.x.2003, Coll. D.P. Uniyal & party; Uttarakhand : Distt. Tehri Garhwal Kaddu khal. 1 ex., Reg.No. 1. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Wingspan : 55-70 mm.

Distribution : India : Kashmir to Sikkim and Assam, Uttarakhand : Almora, Chamoli, Dehra Dun, Haridwar, Pauri, Pithoragarh and Tehri Garhwal districts) ascending to about 10,000 feet in Himalayas. Also occurs in Myanmar.

142. ***Athyma perius*** (Linnaeus) COMMON SERGEANT

1758. *Papilio perius* Linnaeus, Syst. Nat. **10** : 471.

1911. *Athyma perius* (Linnaeus) Tytler, *J. Bombay nat. Hist. Soc.* **21**(1) : 60.

1932. *Athyma perius* (Linnaeus) Evans, *Identification of Indian Butterflies* Ed. **2** : 164,

2006. *Athyma perius* (Linnaeus) Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 241.

Status : Common.

Material examined : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1 ex., Reg.No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P.Sati & party : Dehra Dun, Mussoorie, Jharipani, 2exs., Reg. No. 7, 16.vii.2004, Coll. Vinod Khanna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and Dehra Dun in the month of March to October and F. Hannyngton (1910) from Kumaon and. Arun Pratap Singh & R.S.Bhandari, FRI, from Dehra Dun (2003) from Kumaon.

Wingspan : 60-70 mm.

Distribution : The species is distributed from. Himachal Pradesh to Arunachal Pradesh.

Elsewhere : Myanmar.

143. ***Athyma asura*** Moore STUDDED SERGEANT

1857. *Athyma asura* Moore *Cat. Lep. Mus. E.I.C.,* **1** : 171, pl. 5a, 1.

1911. *Athyma asura* Moore Tytler, *J. Bombay nat. Hist. Soc.* **21**(1) : 61.

1932. *Pantoporia asura* Moore Evans, *Identification of Indian Butterflies* Ed. **2** : 164.

1994. *Athyma asura* Moore Varshney, Oriental Insect, **28** : 180.

2006. *Athyma asura* Moore Gupta, Fauna *Nagaland, State Fauna Series,* **12** : 241-242.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in April, May, August and September and F. Hannyngton (1910) from Binsar (Kumaon) in August at 8000 feet.

Wingspan : 60-75 mm.

Distribution : India : Nagaland, Sikkim, Himachal Pradesh, Uttarakhand.

Elsewhere : Myanmar, Nepal and Bhutan.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

Genus ***Sumalia*** Moore

1898. *Sumalia* Moore. *Lep. Ind.*, 3(32) : 146, 150.

This genus known in India by two species viz. *Sumalia daraxa,* Doubleday and *Sumalia zulema,* Doubleday. The former species is dealt with Uttarakhand and *Sumalia trivena* is a Palaearctic Moore species but it a is frequent visitor of North India.

Key to Species

A broad pale green discal band present on upperside of wings ..... *daraxa* (Doubleday)

A broad pale green discal band present on upperside of wings ..... *trivena* Moore

144. ***Sumalia daraxa*** Doubleday
GREEN COMMANDER

1850. *Limenitis daraxa,* Doubleday : Hewitson, *Gen. Diurn. Lep.,* **2** : 276. pl. 34. Fig. 4.

1932. *Limenitis daraxa,* Doubleday : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 160.

1995. *Sumalia daraxa,* Doubleday Arora et al. Lepidoptera, Fauna of Western Himalaya, (part-1) *zool. Surv. India,* : 69.

Status : Not Rare.

Material examined : India : Uttarakhand. Nil.

Remark : The species recorded by and F. Hannyngton (1910) from Kumaon and Arora (1995) from Nainital.

Wingspan : 80-95 mm.

Distribution : India : Uttarakhand : Kumaon, Sikkim, Assam, Naga Hills. The species ranges from Sikkim to Assam.

Elsewhere : Bhutan, Nepal, Bangladesh and Myanmar.

145. ***Sumalia limenitis trivena*** Moore
INDIAN WHITE ADMNIRAL

1864. *Limenitis trivena* Moore *Ent. Month. Mag.* **1** : 133.

1932. *Limenitis trivena pallida* Tyt. Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 161.

1995. *Sumalia trivena* Moore : Arora et al. Lepidoptera, Fauna of Western Himalaya, (Part-1) *zool. Surv. India,* : 69.

Status : Common.

Material examined : India : Uttarakhand : Distt. Tehri Garhwal, Kaddu khal. 1ex., Reg. No. 16. 5.vi.2002 Coll. Vinod Khanna & party; Distt. Dehra Dun, Roorkee & around, 2exs., Reg. No. 11, 4.ix.2002, Coll. Arun Kumar & party; Maldevta, 1ex., Reg. No. 11, 24.ix.2002; Kalsi & around 3exs., Reg. No. 3, 22.viii.2003, Coll. S.K. Gupta & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie, Nag tiba and Arora (1995) from Nainital in Kumaon.

Wingspan : 80-95 mm.

Distribution : India : Uttarakhand : Mussoorie, Nag tiba in Garhwal and Nainital in Kumaon, Western Himalaya, Kashmir The species ranges from Kulu to Kumaon.

Elsewhere : Nepal and Pakistan.

Remarks : *Sumalia trivena* is a Palaearctic Moore species but it a is frequent visitor of North India.

Genus ***Auzakia*** Moore

1898. *Auzakia* Moore, *Lep. Indica,* 3(32) : 146, 148.

This genus is represented in India by a single species, *Auzakia danava* (Moore) :

146. ***Auzakia danava*** Moore
COMMONDOR

1857. *Limenitis danava* Moore Horsfield and *Moore, Cat. Lep. Mus. E.I.C.*, **1** : 180 fig. 2.

1932. *Limenitis danava* Moore : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc. (Second edition)* : 160.

1994. *Auzakia danava* (Moore) : Varshney, *Oriental Insects.* **28** : 182.

2003. *Auzakia danava* (Moore) : Gupta, *State Fauna Series-9, Fauna of Sikkim* (part-4) : 66.

Status : Rare.

Material examined : India : Uttarakhand : Dehra Dun, Mussoorie, Jharipani, 2exs., Reg. No. 7, 16.vii.2004, Coll. Vinod Khanna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie, Nag tiba and Tehri Garhwal in the month of April, May and September.

Wingspan : 80-85 mm.

Distribution : India : Uttarakhand : Mussoorie, Nag tiba The species ranges from Shimla to Dawans. Shimla, Himachal Pradesh.

Elsewhere : Nepal, Bhutan and Myanmar.

Genus ***Symphaedra*** Huebner

1818. *Symphaedra* Huebner, *Zutr., z. Samml. Exot. Schmett.*, **1** : 7.

The genus *Symphaedra* is represented in India by a single species, viz. *Symphaedra nais* (Forster) and found in Uttarakhand.

147. ***Symphaedra (Euthalia) nais*** (Forster)
BARONET

1771. *Papilio nais* (Forster) *Nov. spec. Ins. Cont.*, **1** : 73.

1932. *Euthalia nais* (Forster) : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 157.

1994. *Symphaedra nais* (Forster), Varshney, Oriental Insect, **28** : 184.

2003. *Symphaedra nais* (Forster), : Gupta, Fauna *Sikkim, State Fauna Series* **9** (part-4) : 67-68.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) fromMussorie and rare in Dehra Dun in and F. Hannyngton (1910) from Haldwani and Bhimtal in March in Kumaon.

Wingspan : 60-70 mm.

Distribution : India : Uttarakhand : Mussoorie, Dehra Dun (Garhwal) and Haldwani and Bhimtal (Kumaon), Sikkim, Arunachal Pradesh, Maharashtra, Orissa, South India, Uttar Pradesh and West Bengal.

Elsewhere : Nepal and Sri Lanka.

Genus ***Tanaecia*** Butler

1869. *Tanaecia* Butler *Proc. Zool. Soc. Lond.* (3) : 610.

The genus is represented in India by five species of which two are dealt with Uttarakhand.

Key to species

1. Fore wing with apex produced and outer margin falcate below apex., Outer margin of hind wing slightly angles at vein Cu 1a thereafter straight upwarde .... *lepidea* (Butler)

   Fore wing not falcate. Outer margin of hind wing evenly rounded 2

2. Upper side of wings with two dark discal lines composed of diffused spots ....*julii* (Menetries)

148. ***Tanaecia lepidea*** (Butler)
GREY COUNT

1868. *Adolias lepidea* Butler, *Ann. Mag. Nat. Hist. Lond.*, (4) : 71.

1911. *Tanaecia lepidea* (Butler) Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 59.

1932. *Euthalia lepidea lepidea* (Butler). Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 150.

2003. *Tanaecia lepidea lepidea* : Gupta, Fauna *Sikkim, State Fauna Series* **9** (part-4) : 68.

2006. *Tanaecia lepidea lepidea* (Butler) (Butler) : Gupta, Fauna *Nagaland, State Fauna Series* **12** : 244-245.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Ranibagh (Kumaon).

Diagnostic Characters : Sexes similar, upper side of wings blackish brown with a comparatively narrow band on hind wing occupying about terminal third of wing.

Wingspan : 70-80 mm.

Distribution : India : Uttarakhand : Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party:

Distribution : Dehra Dun, Mussoorie (Tehri Garhwal), Kumaon, Northwest Himalaya, Sikkim, Nagaland, UttarPradesh, Arunachal Pradesh.and Assam.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

149. ***Tanaecia julii apppiades*** (Menetries) COMMON EARL

1857. *Adolias apppiades* Menetries *Enum. Crop. An. Mus. Peter, Lep.*, **2** : 120, pl. 9. fig. iv.

1911. *Euthalia apppiades* (Menetries) Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 59.

1932. *Euthalia julii apppiades* (Menetries) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.*: 151.

2003. *Tanaecia julii apppiades* (Menetries) : Gupta, Fauna *Sikkim, State Fauna Series* **9** (part-4) : 68.

2006. *Tanaecia julii apppiades* (Menetries) Gupta, Fauna *Nagaland, StateFauna Series* **12** : 245.

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon.

Wingspan : 65-80 mm.

Distribution : India : Uttarakhand : Kumaon, Sikkim, Nagaland, UttarPradesh.

Genus ***Euthalia*** Huebner

1819. *Euthalia* Huebner *Zutr., z. Samml. Exot. Schmett.*, **(3)** : 41.

The genus includes more than 12 species in India, of which three are found in Uttarakhand.

150. ***Euthalia lubentina*** Cramer GAUDY BARON

1911. *Euthalia indica* Cramer Fruhstorfer, *Stett., Zg.*, **65** : 350.

1911. *Euthalia lubentina* Cramer : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1): 59.

1932. *Euthalia lubentina indica* Cramer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 155.

2006. *Euthalia lubentina indica* Cramer Gupta, Fauna *Nagaland, State Fauna Series* **12** : 246-246.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party; Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from in the Aglar valley below Mussoorie and a single specimen collected from Nag tiba at Mussoorie and not rare in Dehra Dun in the month of February and March and F. Hannyngton (1910) from Nalena at 4,000 feet in October and November and in Kali Valley in August from Kumaon.

Wingspan : 60-80 mm.

Distribution : India : Uttarakhand : Dehra Dun, Mussoorie (Garhwal) and Nalena in Kumaon, Sikkim, Nagaland, Himachal Pradesh, Arunachal Pradesh and Maharashtra to Bengal.

Elsewhere : Bangladesh and Myanmar.

151. ***Euthalia garuda anagama*** Fruhstofer ***Euthalia garuda/aconthea*** Cramer (Moore) BARON

1857. *Adolias garuda* Moore, Horsfield and *Moore, Cat. Lep. Mus. E.I.C.* **1**: 186. no. 374.

1911. *Euthalia garuda* Moore : *Tytler, J. Bombay nat. Hist. Soc.*, **21**(1) : 59.

1932. *Euthalia garuda anagama* Fruhstofer : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 154.

1990. *Euthalia aconthea* Cramer (Moore) *Revised nomenclature for Butterflies Taxa, Jounr. Bomb. nat. Hist. Soc.* **87** : 60.

1994. *Euthalia garuda anagama* (Forster), *Varshney, Oriental Insect,* **28** : 184.

Status : Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072,23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) in Dehra Dun in March to November and F. Hannyngton (1910) from Kumaonat at 2000 to 4,000 feet in April and October

Wingspan : 55-75 mm.

Distribution : India : Uttarakhand : Dehra Dun, Kumaon, Sikkim, Himachal Pradesh, Orissa and Maharashtra to Bengal.

Elsewhere : Sri Lanka and Myanmar.

152. ***Euthalia patala*** Kollar
GRAND DUCHESS

1844. *Adolias patala* Kollar, *Hugel's Kaschmir,* **4**(2) : 435.

1882. *Euthalia patala* Moore, *Proc. Zool. Soc. Lond.* : 229.

1886. *Euthalia patala* Kollar : DeNice ville, *The Butterflies of India, Burma and Ceylon,* **2** : 196.

1932. *Euthalia patala* Kollar : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 156.

Status : Common.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded F. Hannyngton (1910) from 4,000 to 8000 feet in May and June in Nainital and Bhowali, Kumaon.

Wingspan : 85-105 mm.

Distribution : India : Uttarakhand : Nainital and Bhowali (Kumaon).

Elsewhere : Nepaland Myanmar.

Tribe **Pseudergolini**

Cells closed in fore and hind wings. Fore tarsi clawed in females with a few exceptions.

Of the three genera occurring in India, all are found in Uttarakhand.

Key to genera

1. Eyes not hairy ..... ***Pseudergolis*** Felder

   Eyes hairy 2

2. Hind wing cell very short, barely one-third length of wing ..... ***Stibochiona*** Butler

   Hind wing cell proportionally longer being about half the length of wing .... ***Dichorragia*** Butler

Genus ***Pseudergolis*** Felder

1867. *Pseudergolis* Felder *Novara Reise, Lep.* **3** : 404.

The genus is represent in India by a single species and is found in Uttarakhand.

153. ***Pseudergolis wedah*** Kollar
TABBY

1844. *Ariadne wedah* Kollar, Hugel's Kaschmir, **4** (part-II) : 437.

1881. *Precis wedah* (Kollar) : De Niceville, J. *Asiat. Soc. Beng.,* **50**(1) : 54.

1882. *Pseudergolis wedah* Kollar, De Niceville, *J. Asiat. Soc. Beng.,* **50**(2-3) : 57.

1932. *Pseudergolis wedah* Kollar Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* 173.

2003. *Pseudergolis wedah* Kollar Gupta, Fauna *of Sikkim, State Fauna Series* **9** : 74.

Status : Very Common.

Material examined : India : Uttarakhand, Dehra Dun, Katta Patthar, 2exs., Reg. No., Lakhwad road, 2exs., Reg. No. 2, 15.x.2003, Coll. Vinod Khanna & party; Tehri Garhwal, Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie Distt. Dehra Dun in summer.

Wingspan : 55-60 mm.

Distribution : India : Uttarakhand Kullu to Myanmar, Jammu & Kashmir, Arunachal Pradesh, Sikkim, Himachal Pradesh, Meghalaya, West Bengal and Assam.

Elsewhere : Myanmar and Bangladesh.

Genus ***Stibochiona*** Butler

1816. *Stibochiona* Butler *Proc. Zool. Soc. Lond.* **3** : 614.

The genus is represent in India by a single species viz. *Stibochiona nicea* (Gray) and is found in Uttarakhand.

154. ***Stibochiona nicea nicea*** (Gray) POPINJAY

1846. *Adolias nicea* Gray, *Lep. Ins. Nepal*, : 13, pl. 12 fig. i.

1868. *Stibochiona nicea* (Gray) : Butler, *Proc. Zool. Soc. Lond.* : 614 n.i.

1881. *Stibochiona nicea* (Gray) : De Niceville, *J.Asiat Soc. Beng.*, **51**: (1) : 57.

1932. *Stibochiona nicea* (Gray) : Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 150.

1992. *Stibochiona nicea* (Gray) : Varshney, *Oreintal Insects*, **28** : 187.

2004. *Stibochiona nicea* (Gray) : Gupta, *State Fauna Series* **10**, *Fauna of Manipur* (part-4) : 564.

Status : Not Common.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gawaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in the month of April to June and in September and October The species recorded by F. Hannyngton (1910) in ravirines at 4000–7000 feet in May, June and July from Kumaon.

Wingspan : 60-80 mm.

Distribution : India : Uttarakhand : Mussoorie, Kumaon, Sikkim (North, South, West), Assam, Himachal Pradesh to Arunachal Pradesh. The species Ranges from Kulu to North Myanmar.

Elsewhere : Myanmar.

Genus ***Dichorragia*** Butler

1869. *Dichorragia* Butler *Proc. Zool. Soc. Lond.* **3** : 614.

The genus is represent in India by a single species viz. *Dichorragia nesimachus* Boisduval and is found in Uttarakhand.

155. ***Dichorragia nesimachus*** Boisduval CONSTABLE

1836. *Adolias nesimachus* Boisduval, *Cuv. Regne. Amen, Ins.*, **2** : pl. 129 bis, fig. 1.

1882. *Dichorragia nesimachus* Boisduval *De Niceville, J.Asiat Soc. Beng.*, **51** : (2-3) : 60.

1932. *Dichorragia nesimachus* Boisduval Evans, *The Identification of Indian Butterflies* Bombay *nat. Hist. Soc.* : 149.

2003. *Dichorragia nesimachus* Boisduval Gupta, *State Fauna Series*- **9**, *Fauna of Sikkim* (part-4) : 74-75.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) in river Valley at Binsar and Nalena at 4000 feet in the month of April and August in Kumaon.

Diagnostic Characters : The upper side of wings dark green with small whitis spots on fore wing as well as very prominent zigzag sub marginal line single in male but double in female.

Wingspan : 65-85 mm.

Distribution : India : Uttarakhand : Mussoorie, Kumaon, Sikkim, Assam, Himachal Pradesh, Arunachal Pradesh. The species Ranges from Kulu to Myanmar.

Elsewhere : Myanmar.

Tribe **Apaturini**

Labial palpi with second segment not inflated. Fore wing vein Sc not dilated at base, R4 ending at apex or on termen (with a few exceptions), R2 arising from R5 or from end cell, apex of cell closer to wing base than origin of vein Cu 1 a ; fore wing cell short and open. Hind wing precostal vein arising beyond origin of Sub-coidal and R1.

The tribe is represent in India by 10 genera, of which seven are delt with Uttarakhand.

Key to genera

1. Antennae longer than half the length of fore wing costa. Labial palpi white or brown throughout 2
- Antennae equal to half the length of fore wing costa. Labial palpi black or black and white 5
2. Cell closed in fore and hind wings ..... ***Dilipa*** Moore
- Cell open in fore and hind wings 3
3. Under side of fore wing with prominent small sub apical white dots in space M2, M1 and R4 ..... ***Rohana*** Moore
- Under side of fore wing without any of the minute sub apical white dots in space M2, M1 and R4 4
4. Under side of fore wing with black spot in cell ..... ***Apatura*** Fabricius
- Under side of fore wing without black spot in cell ..... ***chitoria*** Moore
5. Fore wing with vein R2 arising from cell ... . ***Hestina*** Westwood
- Fore wing with vein R2 arising from R5 ... 5
6. Labial palpi very long and black with white tip ..... ***Sephisa*** Moore

   Labial palpi short and white at base 6
7. Eyes smooth ..... ***Euripus*** Doubleday

   Eyes hairy ..... ***Diagora*** Snellen

Genus ***Dilipa*** Moore

1857. *Dilipa* Moore *Cat. Lep. Mus. East India Coy.* **1** : 201.

The genus is represent in India by a single species viz. *Dilipa morgiana* Westwood and is found in Uttarakhand.

156. ***Dilipa morgiana*** Westwood
GOLDEN EMPEROR

1850. *Aputura morgiana* Westwood, *Gen. Diurn. Lep.*, **2** : 305, no. 432.

1932. *Dilipa morgiana* Westwood. Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 146.

1994. *Dilipa morgiana* Westwood, Varshney, Oriental Insect, **28** : 187.

2006. *Dilipa morgiana* Westwood : Gupta, Fauna *Nagaland, State Fauna Series* **12** : 252.

Status : Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie and Upper Ganges Valley and F. Hannyngton (1910) from Pindari Valley and Bhimtal (Kumaon).

Wingspan : 70-80 mm.

Distribution : India : Uttarakhand : Mussoorie (Tehri Garhwal Garhwal), Pindari valley and Bhimtal (Kumaon) North-west Himalaya, Sikkim, Nagaland Arunachal Pradesh Assam, Himachal Pradesh and Jammu & Kashmir.

Elsewhere : Nepal and Myanmar.

Remarks : Its status is rare and it has been listed in Schedule-I (part-4) of the Indian Wildlife Protection Act.

Genus ***Rohana*** Moore

1880. *Rohana* Moore *Lep. Ceylon*, **1**(1) : 27.

The genus is representing in India by two species viz *Rohana parisatis* Westwood and *Rohana parvata* Moore and former is found in Uttarakhand.

157. *Rohana parisatis parisatis* Westwood
BLACK PRINCE

1850. *Apatura parisatis* Westwood, In Doubleday, Westwood and Hewitson, *Gen. Diurn. Lep.;* **2** : 305, no. 20.

1881. *Rohana parisatis* (Sic) Westwood De Niceville. *J. Asiat. Soc. Beng.*, **51**(1) : 58.

1932. *Apatura parisatis parisatis* Westwood Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 147.

1992. *Rohana parisatis* Westwood, Haribal, *Butterflies of Sikkim Himalayas* : 54.

2003. *Rohana parisatis parisatis* Westwood State Fauna Series 9, Fauna of *Sikkim* (Part-4) : 76-77.

Status : Not rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kumaon.

Wingspan : 45-50 mm.

Distribution : India : Uttarakhand, Kumaon, Sikkim and Assam.

Elsewhere : Myanmar.

Genus *Apatura* Fabricius

1807. *Apatura* Fabricius, *Mag. f. Insektenk (Illiger),* **6** : 280.

The genus is representing in India by two species viz *Apatura ambica* Kollar and *Apatura chevana* Moore and *Apatura ambica* Kollar is found in Uttarakhand.

158. *Apatura ambica* Kollar
INDIAN PURPLE EMPEROR

1844. *Apatura ambica* Kollar, *Hugel's Kaschmir,* **4**(2) : 431.

1882. *Apatura namouna* Double day : De Niceville. *J. Asiat. Soc. Beng.*, **51**(2-3) : 60.

1992. *Apatura ambica* Kollar Haribal, *Butterflies of Sikkim Himalayas* : 153.

2003. *Apatura ambica* Kollar Gupta, Fauna *of Sikkim, State Fauna Series* **9** : 77.

2006. *Apatura ambica* Kollar Gupta & Majumdar, Fauna *Nagaland, State Fauna Series* **12** : 253.

Status : Not rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072, 23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from outer ranges of Kumaon at 5000 feet from April to October.

Diagnostic Characters : Upperside dark brown with a single, broad white discal band across both wings. Submarginal row of white spots along edge of both wings, more prominent in female. Male on upperside iridescent blue.

Wingspan : 65-75 mm.

Distribution : India : Uttarakhand, Kumaon, Sikkim and Assam.

Elsewhere : Pakistan, Nepal, Bhutan and Myanmar.

Genus *Hestina* Westwood

1850. *Hestina* Westwood, *In* Doubleday's *Gen. Diurn. Lep.* **2** : 281.

The genus is representing in India by a single species *Hestina nama* Doubleday and is found in Uttarakhand.

159. *Hestina nama* Doubleday
CIRCE

1845. *Diadema nama* Doubleday *Ann. Mag. Nat. Hist.*, (1)**16** : 232.

1881. *Hestina nama* Doubleday De Niceville, *J. Asiat. Soc. Beng.*, **50**(1) : 57.

1932. *Hestina nama* Doubleday Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 148.

2003. *Hestina nama* Doubleday *Gupta,* Fauna *of Sikkim, State Fauna Series* **9** : 78.

Status : Not Rare.

Material examined : India. Uttarakhand : Tehri Garhwal, Jalgarh Nala, Kiriti Nagar, 1ex., Reg.

No. 4498, 17.ix.2002, Coll. J.P. Sati & party; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in March, April, July, August and September at 7000 feet and F. Hannyngton (1910) from Binsar in June from Kumaon region.

Wingspan : 95-105 mm.

Distribution : India : Uttarakhand : Mussoorie (Garhwal) and Binsar (Kumaon); Uttar Pradesh, Sikkim, Himachal Pradesh, Meghalaya, West Bengal and Assam.

Elsewhere : Myanmar.

Genus ***Sephisa*** Moore

1882. *Sephisa* Moore *Proc. Zool. Soc. Lond.* : 240.

The genus is represented in India by two species *Sephisa dichroa* (Kollar) and *Sephisa chandra Moore* and both are found in Uttarakhand

160. ***Sephisa dichroa*** (Kollar) THE WESTERN COURTIER

1844. *Limenitis dichroa* Kollar, *In :* Hugel's *Kaschmir und das Reich der Siek*, **4**(2) : 429, no. 1, pl. 8-figs. 1-2.

1932. *Sephisa dichroa* (Kollar) Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 147.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Dehra Dun, Maldevta, 1ex., Reg. No. 2129.v.2002, Coll. J.P. Sati & party; Tehri Garhwal, Dund Parayag, Kiriti Nagar, 2exs., Reg. No. 4522, 19.ix.2002; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party Distt. Pauri Garhwal, Vyas Ghat, 1ex., Reg. No. 4566, 16.x.2003, Coll. D.P. Uniyal & party, Distt. Rudra Prayag, Gupt Kashi, 1ex., Reg. No. 4770, 25.ii.2004; Distt. Pithoragarh, Selapani, 2exs., Reg. No. 5677, 10.xi.2005; Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in summer and autumn and F. Hannyngton (1910) at Takula (Uttarkashi), Binsar, Nainital (Kumaon) at 6000 to 8000 feet in the month of May and October.

Wingspan : 60-75 mm.

Distribution : India : Uttarakhand : Dehra Dun, Almora, Bageshwar, Chamoli, Champawat, Haridwar and Nainital and distributed from Chitral to Kumaon and ascends to about 8,000 feet in western Himalayas.

Elsewhere : Sri Lanka, Nepal and Myanmar.

161. ***Sephisa chandra*** Moore EASTERN COURTIER

1858. *Castalia chandra* Moore, *Cat. Lep. Ins. Mus.* East India Company, **1** : 200, pl. 6A.

1882. *Sephisa Chandra* Moore : De Niceville, *J. Asiat Soc. Beng.*, **51**(2-3) : 60.

1932. *Sephisa Chandra* Moore Evans, *The Identification of Indian Butterflies. Bombay nat. Hist. Soc.* : 147.

1994. *Sephisa Chandra* Moore Varshney, *Oriental Insects*, **28** : 187.

2003. *Sephisa Chandra* Moore Gupta, *State Fauna Series-9, Fauna of Sikkim* (part-4) : 254.

Status : Not Rare.

Material examined : India : Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) in the valley at 4000 feet Common in May in Kumaon.

Wingspan : 75 –90 mm.

Distribution : India : Uttarakhand : Kumaon, Nagaland Sikkim, Arunachal Pradesh and West Bengal.

Elsewhere : Myanmar, Nepal and Bhutan.

Remarks : The species has been included in Schedule (part-4) of the Indian Wildlife Protection Act.

Genus ***Euripus*** Doubleday

1848. *Euripus* Doubleday *In Doubleday's Gen. Diurn. Lep.* **2** : 41. fig. 2.

The genus is represented in India by two species *Euripus consimilis* Westwood and *Euripus consimilis nyctelius* Double day and both are found in Uttarakhand.

162. *Euripus consimilis consimilis* Westwood
PAINTED COURTESANS

1850. *Diadema consimilis* Westwood, *Gen. Diurn. Lep.*, **2** : 281, no. 20.

1932. *Euripus consimilis consimilis* Westwood Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 147.

1992. *Euripus consimilis consimilis* Westwood, *Butterflies of Sikkim Himalaya* : 155.

2003. *Euripus consimilis consimilis* Westwood : Gupta, Fauna *Sikkim, State Fauna Series* **9** (part-4) : 79.

Status : Very Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Dehra Dun in April, October and December and from Mussoorie in April, July and August and F. Hannyngton (1910) in Kumaon at 3,ooo feet.

Wingspan : 60-85 mm.

Distribution : India : Uttarakhand : Dehra Dun, Mussoorie (Tehri Garhwal Garhwal), Kumaon, Northwest Himalaya, Sikkim, Arunachal Pradesh, Assam, Jaipur (Rajasthan) ,Meghalaya, West Bengal.

Elsewhere : Myanmar.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

Genus *Diagora* Snellen

1844. *Diagora* Snellen *Tijdschr. Ent.*, **37** : 67.

The genus is represented in India by a single species viz. *Diagora persimilis* Butler and *Diagora Niceville* Moore and former is found in Uttarakhand.

163. *Diagora persimilis* Butler
SIREN

1850. *Diagora persimilis* Westwood *Gen. Diurn. Lep.*, **2** : 281.

1882. *Hestina persimilis* Westwood : De Niceville. *J. Asiat. Soc. Beng.*, **51**(2-3) : 58.

1932. *Hestina persimilis zella* Westwood Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 148.

1994. *Diagora persimilis* Butler, Varshney, Oriental Insects. **28** : 186.

2003. *Diagora persimilis* Butler Gupta, Fauna *of Sikkim, State Fauna Series* **9** : 79.

Status : Rare.

Material examined : India. Uttarakhand : Nil.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Mussoorie in May to September at 3000 to 6000 feet and Butler from Western Himalaya.

Wingspan : 95-105 mm.

Distribution : India : Uttarakhand : Shimla to Kumaon. Uttar Pradesh, Sikkim, Himachal Pradesh, Meghalaya, West Bengal and Assam.

Elsewhere : Myanmar.

Sub Family CHARAXINAE

Large and robust butterflies. In fore wing, cell closed, vein R4 arising nearer to end of cell than to termen. Cell open or closed in hind wing.

The sub-family is represent in India by two genus. Both the genera are found in Uttarakhand.

Key to Genera

Upper side prominently reddish to dark brown and discal areas not white. Hind wing cell slenderly closed, a single tooth or tail at vein M3 ..... ***Charaxes*** Ochsenheimer

Upper side prominently, Pale yellowish or greenish white. Hind wing with cell open, sub equal tails at vein Cu 1b and M3 ....***Polyura*** Billberg

Genus *Charaxes* Ochsenheimer

1816. *Charaxes* Ochsenheimer, *Schmett. Europe*, **4** : 18.

The genus is represented in India by six species and four are found in Uttarakhand.

Key to species

Upper side of wings with basal area black .. .. *fabius* (Fabricius)

Upper side of wings with basal area fulvous or ochraceous .....*polyxena* (Cramer)

Under side of wings more or less uniform and markings regular, fore wing with mid cell black bar macular, hind wing with more or less straight(except just beyond end cell) discal line beyond cell .... *marmax* Westwood

Under side of wings with markings prominent and irregular;central band much darker, fore wing with all cell bars entire, hind wing with discal line very irregular and broken and may be highly concave in area M1 .... *kahruba* (Moore)

164. *Charaxes fabius* Fabricius
BLACK RAJAH

1781. *Papilio fabius* Fabricius *Illus. Ins.*, **2** : 12. No. 47.

1992. *Charaxes fabius* Fabricius Haribal, *Butterflies of Sikkim Himalayas* : 151.

1932. *Charaxes fabius* Fabricius : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 142.

2003. *Charaxes fabius* Fabricius State Fauna Series 9, Fauna of Sikkim (part-4) : 80.

Status : Fairly Common.

Material examined : India. Uttarakhand : Tehri Garhwal, Dund Parayag, Kiriti Nagar, 2exs., Reg. No. 4522, 19.ix.2002; Dev Prayag, 2exs., 17.ix.2002, Reg. No. 4491, Jalgarh nala, Kirtinagar, 1ex., Reg. No. 4498, 17.xi.2002, Coll. Vinod Khanna & party.

Remark : The species recorded by recorded by Mackinnon and de Niceville (1898) from Mussoorie in April and September and F. Hannyngton (1910) from River valley (Kumaon) from July and August.

Wingspan : 70-80 mm.

Distribution : India : Mussoorie (Tehri Garhwal), Kumaon, Uttar Pradesh, Sikkim, Himachal Pradesh, Maharashtra, Orissa, West Bengal and Assam.

Elsewhere : Sri Lanka.

165. *Charaxes polyxena hemana* Butler
TAWNY RAJAH

1881. *Nymphalis polyxena* (Cramer) : De Niceville, *J. Asiat. Soc. Beng.*, **50**(1) : 58.

1882. *Haridra polyxena* (Cramer) : De Niceville, *J. Asiat. Soc. Beng.*, **50**(2-3) : 61.

1932. *Charaxes polyxena hemana* Butler : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 141.

Status : Rare.

Material examined : India. Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldarn, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs., Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072,23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by Mackinnon and de Niceville (1898) from Landour, Mussoorie in September at 4000 feet and F. Hannyngton (1910) from Kapkot in the Sarju, Kali and Gori Valley in August from Kumaon region.

Wingspan : 85-100 mm.

Distribution : India : Uttarakhand : Mussoorie (Garhwal) to Kapkot (Kumaon).

166. *Charaxes marmax* Westwood
YELLOW RAJAH

1848. *Charaxes marmax* Westwood, Cab. Or. Ent., : 43. pl. 21, male and female.

1932. *Charaxes. marmax* Westwood Evans, *The Identification of Indian Butterflies, Bombay nat Hist. Soc.* : 142.

1992. *Charaxes. marmax* Westwood : Haribal, *Butterflies of Sikkim Himalayas* : 150-151.

2003. *Charaxes. marmax* Westwood State Fauna Series 9, Fauna of Sikkim (part- 4) : 81.

Status : Rare.

Material examined : India. Uttarakhand : Distt. Nainital, 2exs., Reg. No. 5387, 2.iv.2005, Coll. Archana Bahuguna & party.

Remark : The species recorded by F. Hannyngton (1910) from Kali valley (Kumaon) from August and September and Arora (1995) from Nainital.

Wingspan : 90-120 mm.

Distribution : India : Kumaon, Uttar Pradesh, Sikkim, Assam.

Elsewhere : Myanmar and Bangladesh.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

167. ***Charaxes kahruba*** (Moore) VARIEGATED RAJAH

1895. *Haridra kahruba*, Moore, *Lep. Ind.*, **2** : 235, pl. 171. fig. 1, 1a-1c, male and female.

1932. *Charaxes. kahruba* (Moore) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 142.

1992. *Charaxes kahruba* (Moore) Haribal, *Butterflies of Sikkim Himalayas* : 150-151.

2003. *Charaxes. kahruba* (Moore) State Fauna Series 9, Fauna of Sikkim (part- 4) : 81.

Status : Not Common.

Material examined : India. Uttarakhand : Nil

Remark : The species recorded by Evans (1932) from Kumaon.

Diagonistic : It is very similar to yellow rajah, but unmistakably distinguished by the under side prominently marked with dark lines and bands.

Wingspan : 65-70 mm.

Distribution : India : Kumaon, Uttar Pradesh, Sikkim, Assam and Arunachal Pradesh.

Elsewhere : Myanmar, Bangaladesh, Nepal and Bhutan.

Remarks : Its status is rare and it has been listed in Schedule-II (part-2) of the Indian Wildlife Protection Act.

Genus ***Polyura*** Billberg

1820. *Polyura* Billberg, *Enum. Ins. Mus. Billb.*, : 79.

The genus is represented in India by nine species, four are dealt with Uttarakhand.

Key to species

1. Upper side of wings with ground colour black or deep indigo blue 2
   - Upper side of wings with ground colour yellowish white 3
2. Fore and hind wings with discal area or band pale yellow ..... *athamas* Drury
   Fore and hind wings with discal area or band pale yellow white ..... *arja* Felder
3. Upper side of fore wing with, only one or two, often without white spots on black apex of wing; post discal row of spots absent .... *delphis* (Doubleday)
   - Upper side of fore wing with one or two, prominent transverse post discal series of white spots 4
4. One transverse post discal series of white spots ..... *dolon* (Westwood)
   Two transverse post discal series of white spots ..... *eudamippus* (Doubleday)

168. ***Polyura athamas*** Drury COMMON NAWAB

1770. *Papilio athamas* Drury, *Ill. Exot. Ent.*, **1** : 5 pl. 2, fig. iv.

1911. *Eulepis athamas* (Drury) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 55.

1932. *Eriboea athamas athamas* Drury : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 143.

1982. *Polyura athamas athamas* Drury (Rothschild) : *Smiles, Bull. Brit. Mus. (Nat. Hist.), Entomology* **44**(3): 166.

2006. *Polyura athamas athamas* Drury : Gupta Fauna *of Nagaland, State Fauna Series* **12** : 259.

Status : Common.

Material examined : India. Uttarakhand : Nil.

Remark : The species recorded by recorded by Mackinnon and de Niceville (1898) from Landour, Mussoorie, Distt. Dehra Dun, Tons Valley, Garhwal and F. Hannyngton (1910) from Kumaon on outer hills at 3000 feet elevation from July to October and Arun Pratap Singh & R.S. Bhandari, FRI, from Dehra Dun (2003).

Diagonistic : Both sexes have broad dark border enclosing a white and broadly a large pale green spot near apex on both wings and on both sides. Hindwings have sharp tails and blue edged discal band on upperside.

Wingspan : 60-75 mm.

Distribution : India : Uttarakhand : Andhra Pradesh, Arunachal Pradesh, Himachal Pradesh, Karnataka, Maharashtra, Mizoram, North-west Himalaya, Orissa, Uttar Pradesh, Tamil Nadu, Sikkim, Assam, Manipur, Meghalaya, West Bengal and Nagaland.

Elsewhere : Bhutan, Bangladesh, China, Hainan, Hong Kong, Myanmar, Taiwan, West Malaysia and Nepal.

169. ***Polyura arja*** Felder
PALLID NAWAB

1867. *Charaxes arja* Felder& Felder, *Novara Reise, Lep. Rhap.*, : 438.

1911. *Eulepis arja* Felder & Felder : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 56.

1912. *Eulepis arja* Felder & Felder, *Evans : J. Bombay nat. Hist. Soc.*, **21**(2) : 572.

1932. *Eriboea arja* (Felder & Felder) Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 143.

1982. *Polyura arja* Felder & Felder Smiles, *Bull. Brit. Mus. (Nat. Hist.), Entomology* **44**(3) : 166.

2006. *Polyura arja* Felder & Felder Gupta Fauna *of Nagaland, State Fauna Series* **12** : 259.

Status : Locally Common.

Material examined : India. Uttarakhand : Distt. Nainital, Bhim Tal, 1ex., Reg. No. 5381, 1.iv.2005, Coll. Archana Bahuguna & party.

Remark : The species recorded by recorded by Mackinnon and de Niceville (1898) from Landour, Mussoorie distt. Dehara Dun.

Wingspan : 75-85 mm.

Distribution : India : Garhwal, Mussoorie, Sikkim, Assam, Manipur, Meghalaya, West Bengal and Nagaland.

Elsewhere : Bhutan, Myanmar Bangladesh and Thailand and Vietnam.

170. ***Polyura dolon*** Westwood
STATELY NAWAB

1848. *Charaxes dolon* Westwood, *Cab. Or. Ent.*, 55 pl. 27, figs. 2-3.

1885. *Haridra dodon*, Westwood, *Ann. Mag. of Nat. Hist., 5th series* **16** : 306. n. 52.

1932. *Charaxes dolon* Westwood Evans, *The Identification of Indian* Butterflies, *Bombay nat. Hist. Soc.* : 143.

Status : Rare.

Material examined : India. Uttarakhand : Nil.

Remark : The species recorded by F. Hannyngton (1910) from Kilberry near Nainital in September (Kumaon).

Wingspan : 80-90 mm.

Distribution : India : Kulu to Kumaon, Sikkim and Assam.

Elsewhere : Nepal, Bhutan and Myanmar.

171. ***Polyura eudamippus eudamippus*** Doubleday
GREAT NAWAB

1843. *Charaxes eudamippus* Doubleday, *Annals. Soc. ent. Fr.* (2)**1** : 218, Pl.8.

1911. *Eulepis eudamippus* (Doubleday) : Tytler, *J. Bombay nat. Hist. Soc.*, **21**(1) : 56.

1932. *Eriboea eudamippus eudamippus* Doubleday : Evans, *The Identification of Indian Butterflies, Bombay nat. Hist. Soc.* : 144.

1982. *Polyura eudamippus eudamippus* Doubleday Smiles, *Bull. Brit. Mus. (Nat. Hist.),Entomology* **44**(3) : 166.

2006. *Polyura eudamippus eudamippus* Doubleday Gupta Fauna *of Nagaland, State Fauna Series* **12** : 259-260.

Status : Not Rare.

Material examined : India : Uttarakhand : Distt. Chamoli, Dugal Bitta, 2exs, Reg. No. 4811, 27.ii.2004; Nand Parayag, 3exs, Reg. No. 4864, 1.iii..2004; Gwaldam, 1ex., Reg. No. 4881, 2.iii.2004; Narain bagad, 1ex., Reg. No. 4893, 3.iii.2004; Almora Distt. Gagas Village, 2exs.,

Reg. No. 5006, 22.xii.2004; Distt. Bageshwar, Kapkot, 1ex., Reg. No. 5072,23.xii.2004, Coll. J.P. Sati & party; Distt. Nainital, Garjia Village, 1ex., Reg. No. 5472, 21.ix.2005; Dhanmari, 2exs, Reg. No. 5479, 21.ix.2005, Coll. Archana Bahuguna & party; Distt. Pithoragarh, Munsari, 1ex., Reg. No. 5671, 10.xi.2005; Tanak Pur, Puna Giri Village, 2exs., Reg. No. 5886, 20.xi.2005, Coll. J.P. Sati & party.

Remark : The species recorded by F. Hannyngton (1910) from Low river valley (Kumaon) from September to November and Arora (1995) from Nainital.

Wingspan : 100-120 mm.

Distribution : India : Kumaon, Arunachal Pradesh, Sikkim, Assam, Manipur, Meghalaya, West Bengal and Nagaland.

Elsewhere : Bhutan, Bangladesh and Nepal.

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REFERENCES

Arora, G.S. & Mandal, D.K., 1977. On Scientific results of *Swiss Zoological Expedition* to India. Part **I.** Butterflies of Garhwal District. *Newl. zool. Surv. India*, **3**(4) : 229-234.

Arora, G.S. 1994. Lepidoptera : Butterflies. In *: Fauna of Rajaji National Park, Fauna* of Cons. Area Ser. **5** : *Zool. Surv. India,* pp. 245-300.

Arora, G.S. 1995. Lepidoptera : Rhopalocera. In : Fauna of Western *Himalaya, zool. Surv. India, Himalayan Ecosystem Series,* **1** : 61-73.

Arora, G.S. 1997. Lepidoptera : Rhopalocera. *In : Fauna of Nanda Devi Biosphere Reserve* (Uttaranchal), *zool. Surv. India, Fauna of Conservation Areas Series*, **9** : 67-88 pp.

Baindur, A. 1993. The Butterflies of Nanda Devi : *In : Scientific and Ecological Expedition., Nanda Devi,* 2nd May to 22nd July, **1993** : 35-43. Army H.Q. Delhi.

Barnardi, G. 1952. Lepidopteres recoltes par A. Barbezat Au Cours de 'Expedition Au Cours de L" Expedition Lyonaise 1951 *Au Garhwal Bull. Mens. Soc. Linn.*, Lyon, **21**(3) : 251–259.

Bhingham, C.T. (1905-07) : *The Fauna of British India and butterflies*. Vol. I-II. Taylor and Francis Ltd. London.

Evans, W.H. 1932. *The Identification of Indian Butterflies*, 2nd Revised edition, 454 pp., 32 pls. *Bombay nat. Hist. Soc.*, Bombay.*b Ghosh,* Mondal & Chaudhary, 1990. *Rec. zool. Surv India,* **86**(1) : 22.

Haribal., Meena (1992) : *The Butterflies of Sikkim Himalaya and their natural History. Sikkim* Nature Conservation Foundation, Gangtok.

Hannyngton, F. 1910-11. The butterflies of Kumaon. *J. Bombay nat. Hist. Soc.*, **20**(1) : 130-142; **20** (2) : 361-372; **20** (3) : 871-872.

Isaac Kehimkar (2008). The Book of Indian Butterflies, Bombay Natural History Society, Mumbai, India Oxford University : 1-487

Kumar, Parmod and Gupta, S.K. 2004. Lepidoptera : Rhopalocera. In some selected fauna of *Govind Pasu Vihar, Zool. Surv. India, Fauna of Conservation Areas Series*, **18** : 9-20 pp.

Kumar, Parmod 2008, Handbook of Common Butterflies of Uttarakhand *Zool. Surv. India* Pp. 1-139.

Lesse, H. 1952 Lepidopteres recoltes par A. Barbezat Au Cours de 'Expedition Lyonaise 1951 *Au Garhwal Bull. Mens. Soc. Linn.*, Lyon, **21**(3) : 203 –206.

Mani, M.S. and Singh, S. 1962. *Entomological Survey of Himalayas.* xxvi. *J. Bombay nat. Hist. Soc.* **59**(1) : 77-99.

Niceville, Lionel De (1886-1890); *Fauna of British India- Butterflies of India, Burmah and Ceylon.* Vols. 2 and 3. The Calcutta Central Press Co. Ltd., Calcutta.

Singh, A.P. and Bhandari, R.S. 2003. Butterflies Diversity in Tropical Moist Deciduous Forest of Doon Valley, *Indian Forester.* pp. 1257-1268.

Stempffer, H. 1952. Lepidopteres recoltes par A. Barbezat Au Cours de 'Expedition Au Cours de L" Expedition Lyonaise 1951 *Au Garhwal Bull. Mens. Soc. Linn.*, Lyon, **21**(3) : 181-184.

Talbot, G. 1939. The Fauna of British India, Butterflies, **1** : XXIX+600 pp., 3 pls.

Talbot, G. 1947, *The Fauna of British India including Ceylon and Burma (Butterflies),* **2** : XV+506 pp., 2 pls.1 map.(Published By Taylor and Francis, London).

Varshney, R.K. 1977. *Index Rhopalocera Indica* : An idea of local list of butterflies from India and neighbouring Countries, *Rec. zool. Surv. India* **73** : 159-178.

Varshney, R.K. 1979-90. Revised nomenclature for taxa in Wynter-Blyth book on the *Butterflies of the Indian Region. J. Bombay nat. Hist. Soc.*, **76**(1) : 33-40; **82**(2) : 309-321 & **87**(1) : 53-61.

Varshney, R.K. 1993, *Index Rhopalocera indica Pt.* III Genera of Butterflies from India and neighbouring countries. *Oriental Ins.*, **27** : 347-372.

Varshney, R.K. 1994, *Index Raphalocera Indica Pt III,* Genera of Butterflies from India and neighbouring countries. *Oriental Ins.*, **28** : 151-198.

Varshney, R.K. 1997. *Index Rhopalocera Indica Pt. III.* Genera of Butterflies from India and neighbouring Countries. *Oriental Ins.*, **31** : 83-138.

Wynter-Blyth, M.A. 1957. *Butterflies of Indian Region. The Bombay nat. Hist. Soc.*, Bombay; xx + 523 pp., 72 pls.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 691-700.

INSECTA : HYMENOPTERA : CHALCIDOIDEA

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INTRODUCTION

Chalcididae can be easily distinguished by their characteristic, swollen hind femora, which is beset with a row of small teeth on its outer surface.They are parasitic on Coleoptera, Lepidoptera, Diptera and Neuroptera. Some are Hyperparasites on other hymenopterans and dipterans. Their size range from 1.5mm to 20mm.

Considering the importance of Chalcididae as one of the potent biological control agents, being mostly parasitic on the agricultural pests, this study has been undertaken to know the strength and distribution of these insects on these high altitude, mountaneous habitats of Uttarakhand.

Important contributions to the chalcididae of Uttarakhand were provided by Cameron (1913) and Waterston (1922). Other notable contributions include Narendran (1989), Mani & Dubey (1972, 1973), Boucek (1982), Joseph et al (1972) and Westwood (1836). Narendran (1989) reported 190 species and 31 genera of chalcididae from India.

TOPOGRAPHY AND CLIMATE

Uttarakhand is liberated from Uttar Pradesh and established as a state with the capital Dehra dun, in September 2000, before which it was a part of Uttar Pradesh. It covers a total area of 55,845 sq. km., of which 34, 661 sq.km. is forest. Uttarakhand consists of two major hill ranges Kumaon and Garhwal; both together accommodate 13 districts.

The climate remains cold through out the year in higher ranges, mostly ice covered and in the lower ranges temperature varies from 11 to 45 degree celsius during summer and 2 to 32 degree Celsius in the winter seasons.The average occurrence of rain fall recorded as 2000mm/ annum.

ABBREVIATIONS USED

BMNH	-	British Museum (Natural History) London, U. K.
DZCU		Department of Zoology, Calicut University, India.
FRI		Forest Research Institute, Dehra dun, India.
HDEO	-	Hope Department of Entomology, University Museum, Oxford, England.
USNM		United States National Museum of Natural History, Washington D. C, U.S.A.
UZM		Universites Zoologiska Museum Copenhagen, Denmark.
ZDAMU		Department of Zoology, Aligarh Muslim University, Aligarh, India.
ZSI		Zoological Survey of India, Calcutta, India.

SYSTEMMATIC ACCOUNT

The family Chalcididae comes under the super family Chalcidoidea which include 18 families altogether in India. Again the family Chalcididae is divided in to five subfamilies and nine tribes. The genus *Brachymeria* seems to be the largest one. In this report 22 species from 10 genera have been found to be existing in Uttarakhand. Most of the species are recorded from the lower ranges. A list of species reported so far from Uttarakhand is given here based on the available literature with a key to genera, diagnostic features host record and distribution.

The list of species reported from Uttarakhand

Genus ***Antrocephalus*** Kirby

1. *Antrocephalus* mitys (Walker)

2. *A. hypsiphylae* Narendran
3. *A. phaeospilus* Waterston

Genus ***Kreichbaumerella*** Dalla Torre

1. *Kreichbaumerella destructor* Waterston

Genus ***Hockeria*** Walker

1. *Hockeria atra* Masi

Genus ***Uga*** Girault

1. *Uga menoni* Kerrich

Genus ***Invreia*** Masi

1. *Invreia crassicornis* (Masi)

Genus ***Haltichella*** Spinola

1. *Haltichella macrocera* Waterston

Genus ***Trigonura*** Sichel

1. *Trigonura tenuicaudis* Waterston
2. *Trigonura ruficaudis* (Cameron)

Genus ***Brachymeria*** Westwood

1. *Brachymeria euploeae* (West.)
2. *B. tachardiae* (Cam.)
3. *B. calopeplae* J. N. &J.
4. *B. atteviae* J. N. & J.
5. *B. albotibialis* (Ash.)
6. *B. dunensis* J. N. & J.
7. *B. minuta* (Linn.)
8. *B. lasus* (Walker)
9. *B. atridens* (Waterston)

Genus ***Dirhinus*** Dalman

1. *Dirhinus himalayanus* Westwood

Genus ***Epitranus*** Walker

1. *Epitranus ramnathi* (Mani & Dubey)
2. *E. erythrogaster* Cameron

Key to the genera of Chalcididae of Uttarakhand

1. Hind tibia almost straightly truncated at apex with two spurs, if apex with a curved spine then tibia without apical spurs 2

   Hind tibia obliquely truncated at apex, forming a strong spine extended beyond insertion of tarsus, between tip of spine and tarsus usually only one spur 7

2. Marginal vein of fore wing at the wing margin, post marginal and stigmal veins distinctly developed 3

   - There is a small gap between marginal vein and wing margin, post marginal vein absent, stigmal rudimentary ..... *Invreia* Masi

3. Scutellum greatly bulged in side view and hind margin overhanging the frenum, mesoscutum highly convex, interocular protuberances present ..... *Uga* Girault

   - Scutellum not bulged, other characters different 4

4. Hind tibia externally with an additional carina ..... *Haltichella* Spinola

   - Hind tibia without external carina 5

5. Frons with a strong horse shoe shaped carina, running from above, behind front ocellus along inner margin of eyes 6

   - Frons without such carina, if carinae present not running mesad dorsally behind front ocellus ..... *Hockeria* Walker

6. Hind femur characteristically trilobed, pronotal carina indistinct or restricted to sides only ... . *Kreichbaumerella* Dalla Torre

   - Hind femur either with one, two or not lobed, pronotal carinae with paired strong or weak tubercles in the middle .... *Antrocephalus* Kirby

7. Head with two projecting horns, gaster with petiole, ventral margin of hind femur with smoothly arched comb of teeth .... *Dirhinus* Dalman

   - Head without such horns 8

8. Gaster bulging ventrally and with slender striate petiole, antennal toruli located very low on a shield protruding over mouth, scrobe absent, marginal vein very long, post marginal rudimentary, stigmal absent .... *Epitranus* Fabricius

   Gaster not ventrally bulging, toruli located high above clypeus, post marginal as well as stigmal vein distinct 9

9. Frontogenal sulcus below eyes present, post marginal vein often longer than stigmal .... *Brachymeria* Westwood

   - frontogenal sulcus absent, post marginal shorter than stigmal ..... *Trigonura* Siche

The following are the specimens so far reported from Uttarakhand.

Genus ***Antrocephalus*** Kirby

1. ***Antrocephalus mitys*** (Walker)

1846. *Antrocephalus mitys* Walker 81, F., MAURITIUS (BMNH).

The known synonyms of this species are *Haltichella mitys* Walker (1846),*Chalcis pandens* Walker (1860), *Stomatocera sulcata* Ashmead (1900), *Antrocephalus humilis* Waterston (1922), *Antrocephalus vitatus* Husain & Agarwal (1982a), *Halticella simplex* Walker (1862), *Halticella divisicornis* Walker (1871), *Antrocephalus mahensis* Masi (1926) and *Stomatocera bergeraci* Girault (1921).

Diagnostic features : Pre and post orbital carinae present; fronto-genal sulcus distinct and usually carinate; genotemporal margin with a deep furrow; scrobe and scape reach front ocellus; thorax densely pitted with rather small pits on dorsum; interstices wide and weakly carinate on lateral parts of scutellum; pronotum shallowly depressed at middle; anterior carinae laterally distinct; scutellum with a median longitudinal fovea and apex forked; legs rufous; hind coxa with a dorso-basal tooth; hind femur possess an inner basal tooth and two week lobes which is studded with blunt teeth; fore wings smoky, dark brown near marginal; propodeum with distinct lateral teeth; gaster rufous black; first tergite with basal carinae.

Host : *Corcyra cephalonica* (Stainton) (Lepidoptera : Pyralidae), *Lamida moncusalis* Walker (Pyralidae)

Distribution : INDIA : Uttarakhand (Dehra dun), Kerala, Karnataka, Tamil Nadu, Uttar Pradesh.

Elsewhere : Africa, Asia and Australia.

2. ***Antrocephalus hipsiphylae*** Nar

1989. *Ahntrocephalus hipsiphylae* Narendran 58, F., INDIA, Dehra dun (DZCU).

Diagnostic features : Pre orbital carinae distinct, faintly joining auricular carinae; post orbital carinae and genotemporal furrow absent; scrobe reaching front ocellus; thorax with carinae on pronotal collar; pits on median portion of meso scutum and scutellum not close, interstices shagreened, broader than diameter of pits; apex of scutellum distinctly bilobed; hind coxa with a weak dorsal tubercle or teeth; sixth tergite of gaster with distinct pits; epipygium with a median carina.

Host : *Hipsiphyla robusta* (Moore) (Pyralidae), *Phycoides radiata* (Lepidoptera : Nymphalidae) and *Tetramesa maticulosalis* Guen (Pyralidae).

Distribution : INDIA : Uttarakhand (Dehra dun), Tamil Nadu.

Elsewhere : Malaya.

3. ***Antrocephalus phaeospilus*** Waterston

1922. *Antrocephalus phaeospilus* Waterston 22, F. INDIA, Bhim Tal, Kumaon (BMNH).

1926. *Antrocephalus sinicornis* Masi : 46.

Diagnostic characters : Genotemporal furrow "distinct, deep; post orbital carinae indistinct; eyes moderately pubescent; apex of scutellum bilobed; post marginal vein longer than marginal vein, a brown infuscation near by marginal vein; hind femur red, without an inner basal tooth; its length distinctly less than twice its maximum width; gaster distinctly longer than thorax, first tergite with a pair of carinae on the base.

Distribution : INDIA : Uttarakhand (Bhim Tal, Kumaon), Kerala.

Genus ***Kreichbaumerella*** Dalla Torre

1. ***Kreichbaumerella destructor*** (Waterston)

1922. *Antrocephalus destructor* Waterston. 64, F. INDIA, Dehradun (BMNH).

1984. *Eucepsis longigaster* Roy & Farooqi, : 21.

Diagnostic Features : Pre orbital carinae present, three fourth of frontogenal sulcus from base carinate; post orbital carinae present; genotemporal furrow absent; scape reaching front ocellus; thorax with distinct close pits, interstices narrow, microsculptured; apex of scutellum weakly emarginate; hind coxa with a tooth on baso-dorsal side; first gastral tergite posteriorly emarginate.

Host : *Hipsiphyla robusta* (Moore) Pyralidae.

Distribution : INDIA : Uttarakhand (Dehra dun).

Genus ***Hockeria*** Walker

1. ***Hockeria atra*** Masi

1929. *Hockeria atra* Masi, 180, F., INDIA, Aligarh (ZDAMU).

The known synonyms of this species are *Hockeria vulgaris* Husain & Agarwal (1982a) and *Hockeria dehradunensis* Roy & Farooqi (1984).

Diagnostic features : Scrobe not reaching front ocellus; fronto-genal sulcus distinct; apex of scutellum bilobed; forewing with brown infuscation; post marginal vein distinctly shorter than marginal; no lateral teeth on propodeum; hind femoral lobes toothed.

Host : *Spilosoma* sp. (Lepidoptera : Arctiidae).

Distribution : INDIA : Uttarakhand (Dehra dun), Uttar Pradesh, Kerala.

Elsewhere : Philippines, Java.

Genus ***Uga*** Girault

1. ***Uga menoni*** Kerrich

1960. *Uga menoni* Kerrich115, F., INDIA, Orissa (BMNH).

1982a. *Neotainania brevicorpis* Husain & Agarwal.

Diagnostic features : Head anteriorly very broadly and deeply emarginate in dorsal view, but strongly narrowed and rounded behind eyes; pre orbital carinae distinct; antennal sockets placed away from clypeal suture; scape not reaching front ocellus; flagellum of female distinctly swollen, having seventh segment broader than long; ocellar area raised into two short horns; pronotum with lateral carinae; scutellum with a distinct longitudinal carina in the middle, scutellum bilobed at apex; fore wings smoky with a hyaline patch just below marginal vein; post marginal as long as marginal; outer ventral margin of femora bilobed.

Host : *Epilachna* sp. (Coleoptera : Coccinellidae)

Distribution : INDIA : Uttarakhand (Dehra dun), Assam.

Elsewhere : Taiwan.

Genus ***Invreia*** Masi

1. ***Invreia crassicornis*** (Masi)

1929. *Euchalcidia crassicornis* Masi 173, F., INDIA, N. Bengal (ZSL).

1984. *Invreia menoni* Roy & Farooqi.

Diagnostic features : Antenna with club a little longer than three preceding segments together; propodeal accessorial carinae not well developed; gaster has short carinae at its base.

Distribution : INDIA : Uttarakhand (Dehra dun), N. Bengal.

Genus ***Haltichella*** Spinola

1. ***Haltichella macrocera*** Waterston

1922. *Halticella macrocerus* Waterston : 23, M., INDIA, Kumaon valley (BMNH).

1974. *Dromochalcidia indica* Mani & Dubey : 4.

Diagnostic features : Scape clearly reaching front ocellus; apex of scutellum distinctly bilobed with large teeth; forewing with dark infumation behind marginal which tends to form a transverse band; another broad band extends beyond veins on distal half; first gastral tergite smooth with two basal carinae; second tergite with characteristic pits.

Distribution : INDIA : Uttarakhand(Bhim Tal, -Kumaon), Kerala.

Elsewhere : Nepal, Malaysia.

Genus ***Trigonura*** Sichel

1. ***Trigonura tenuicaudis*** Waterston

1922. *Trigonura tenuicaudis* Waterston 12-14, F., INDIA, Dehra dun (BMNH).

Diagnostic features : Colour black, tegulae brownish, pronotum, tarsi and tergites rufous; wings with brownish tint; inside of femora paler, inter ocular area triangular and reaching upwards to about 1/5 from top of antennal furrows. Below toruli and between clypeus are two hollows; pronotum coarsely punctate; sub marginal, marginal, post marginal, stigmal = 10:3:1:1; stigmal vein more pedunculate than in ruficaudis; first gastral tergite smooth on dorsal side; epipygium extends about half of ovipositor sheath.

Host : *Chrysobothris* Coleoptera : (Buprestidae) *Gleonea* (Coleoptera : Lamiidae), *Ozotomerus maculosus* Perr. (Coleoptera : Anthribidae).

Disribution : INDIA : Uttarakhand (Dehra dun).

2. *Trigonura ruficaudis* (Cameron)

1913. *Centrochalcis ruficaudis* Cameron : 2, F. INDIA, Dehra dun (BMNH).

Diagnostic features : Thoracic notum rufous with black patches; sixth tergite, epipygium and ovipositor sheath rufous, inter ocular area short with sub parallel sides; toruli approximated with no hollw below and between them and clypeus is a narrow shining median line; sub marginal & marginal = 4 : 1, post marginal and stigmal equal; first gastral tergite with microsculptures; epipygium extends to the tip of ovipositor sheath.

Host : *Chrysobothris* (Buprestidae), *Gleonea.*

Distribution : INDIA : Uttarakhand (Dehra dun).

Elsewhere : Java.

Genus *Brachymeria* Westwood

Key to the species of *Brachymeria* of Uttarakhand

1. Hind femur with a distinct tooth at inner basal side 2
- Hind femur without inner basal tooth 3
2. Hind femur with a very large yellow patch occupying almost half of femur .... *calopeplae* J., N. & J.
- Hind femur black with only apex yellow .... *minuta* (Linn.)
3. Hind coxa with a distinct ventromesal tooth 4
- Hind coxa without tooth 6
4. Hind tibia yellow with base black or red with ventral margin black 5
- Hind tibia completely liver brownish black with a small yellowish patch at apex .... *dunensis* J., N. & J.
5. Gaster globose or subglobose; first tergite shagreened ..... *albotibialis* (Ash.)
- Gaster not globose; first tergite smooth .... *lasus* (Walk.)
6. Hind tibia yellowish with base black or brown or reddish brown; ventrolateral margin of hind tibia with or without black colour .... *euploeae* (West.)

Colour different 7

7. Hind femora red without yellow patch at apex; hind tibia black or ferruginous with base and apex red; pre orbital carinae hardly indicated; if apex of scrobe clearly reaching front ocellus, then the pre orbital carinae well developed and hind femora often with varying size of black patch on disc and both mandibles bidentate ..... *atridens* (Waterst.)

Characters different 8

8. Scape of antennae reaching front ocellus, longer than segments 4-7 combined; interstices on scutellum half as broad as diameter of pits ..... *tachardiae* (Cam.)

Scape of antennae not reaching front ocellus, shorter than length of segments 4-7 combined; interstices on scutellum narrow .. .. *atteviae* J., N. & J.

1. *Brachymeria euploeae* (Westwood)

1837. *Chalcis euploeae* Westwood, 6, F., INDIA (HDEO).

The known synonyms of this species are *Brachymeria flavotibialis* Husain & Agarwal (1982b) and *B. hearseyi* var. *xanthoterus* (Waterston 1922).

Diagnostic features : Pre orbital carinae indistinct; post orbital carina distinct; area below scrobe with an indistinct raised portion; thorax with umbilicate close pits; interstices narrow and rugose; tegulae, distal end of hind femora, hind tibia and tarsi yellow; hind femur black with apex yellow; first tergite of gaster smooth and shiny; second tergite shagreened with a single row of "indistinct punctures on baso dorsal side; sixth tergite with five to seven rows of distinct pits.

Host : Several Lepidopteran and Dipteran species.

Distribution : INDIA : Uttarakhand (Dehra dun), Kerala, Karnataka, Tamil Nadu, West Bengal.

Elsewhere : Java, Sumatra, Philippines, North Borneo.

2. *Brachymeria tachardiae* (Cameron)

1913. *Chalcis tachardiae* Cameron 93, F., INDIA, Dehra dun (BMNH).

Diagnostic features : Pre orbital carina obliterated near malar ridge; post orbital carina faintly indicated; thorax with round umbilicate pits, interstices smooth and as broad as pits in some places and as half as broad in some other places on mesoscutum and scutellum; femur reddish black with apex yellow, hind tibia reddish black with yellow patches sub basally and apically and its base pale brownish yellow; hind femur one and four-fifths as long as wide; first tergite of abdomen smooth, sixth with about five transverse rows of faint pits.

Host : *Eublemma amabilis* Moore (Lepidoptera : Noctuidae), *Hypsiphyla* sp. (Pyralidae), *Earias* sp. (Noctuidae), *Kerria lacca* (Hemiptera : Kerridae), *Acridomyia sachrovi* Stackelberg (Diptera : Muscidae).

Distribution : INDIA : Uttarakhand (Dehra dun).

3. ***Brachymeria calopeplae*** Joseph *et al.*

1972. *Brachymeria calopeplae* Joseph, Narendran & Joy : 554, F., INDIA, Dehra dun (FRI).

Diagnostic features : Frons with distinct pre and post orbital carinae; scape of antennae with a yellow patch on ventral margin from base to almost three fourths length; scrobe deep, smooth and shiny; thorax with umbilcate, round pits; interstices as broad as pits in median portion of meso scutum, scutellum and scapulae; interstices on remaining portions half as wide as pits; apical flange of scutellum deeply emarginate forming two lobes; tegulae, distal ends of femora, tibiae except brownish patch in the middle, almost half distal portion of femora and tarsi dorso apically yellow; hind femur with an inner basal tooth; first tergite of gaster smooth with a few punctures and pubescence on the sides; sixth tergites with five transverse rows of distinct pits, each row with several pits, interstices between pits rugulose.

Host : *Calopepla leayana* (Coleoptera : Cassididae).

Distribution : INDIA : Uttarakhand (Dehra dun), West Bengal.

4. ***Brachymeria atteviae*** Joseph *et al.*

1972. *Brachymeria atteviae* Joseph, Narendran & Joy : 556, F., INDIA, Neepa Nagar (FRI).

1973. *Brachymeria hime attevae* (misspelling) Joseph *et al.* : 123.

Diagnostic features : Frons with distinct pre and post orbital carina; scrobe deep; thorax with close umbilicate pits, interstices narrow and rugulose; apex of scutellum entire; tegulae clear yellow; femora black with apex yellow; hind tibia yellow with a median black band; first tergite of gaster smooth; second tergite with a few small punctures on baso-dorsal area, other parts microsculptured; sixth tergite with about five to seven transverse rows of vey faint pits; interstices between them rugose.

Host : *Atteva fabriciella* (Lepidoptera : Yponomeutidae), *Hapalia machaeralis* (Pyralidae), *Opisina arenosella* (Lepidoptera : Oecophoridae), *Corcyra cephalonica* (Stainton) Pyralidae.

Distribution : INDIA : Uttarakhand (Dehra dun), Kerala.

Elsewhere : Philippines, Malaysia.

5. ***Brachymeria albotibialis*** (Ashmead)

1904. *Chalcis albotibialis* Ashmead.

1982b. *Brachmeria (B.) rufogasteri Husain & Agarwal,* : 503.

Diagnostic characters : Scrobe deep, smooth, shiny; pre orbital carina absent; post orbital carina distinct; thorax with reticulate round close pits, interstices narrow; apex of scutellum entire; hind coxa with a distinct inner basal tooth; hind femur without basal tooth; first gastral tergite faintly shagreened; second tergite finely microsculptured except on sides and baso lateral regions of dorsal aspect, sixth tergite with about six transverse rows of pits. Colour varies.

Host : *Erionota thrax* L.(Lep. : Hesperiidae), *Pelopidas mathias* (F.) (Hesperiidae), *Pericyma cruegeri* B. (Lep. : Noctuidae) and *Pieris brassica* L. (Lepidoptera : Pieridae).

Distribution : INDIA : Uttarakhand (Pant Nagar), Tamil Nadu, Kerala, Karnataka.

Elsewhere : Philippines, Singapore.

6. ***Brachymeria dunensis*** Joseph *et, al.*

1972. Brachymeria dunensis Joseph, Narendran & Joy : 27, Holotype, INDIA : Karnataka (BMNH).

Diagnostic features : Black with tegulae, distal tip of femora, base and apex of fore and mid tibiae, tarsi, tip of hind tibia and hind tarsi yellow; fore and mid tibiae liver brown; base of tegulae pale brownish yellow; hind tibia and gaster liver brownish black; scrobe deep; pre and post orbital carinae absent; thorax with umbilicate, close pits; interstices narrow and rugose; metanotum below scutellum is distinctly forming a semicircle; hind coxa with an inner basal tooth; hind femur without inner basal tooth; basal abdominal tergite faintly shagreened and shiny; second tergite with a few pits on the baso dorsal and lateral sides, rest of portions finely shagreened; sixth tergite distinctly pitted.

Hosts : *Dasychira* pupa (Lep. : Lymantriidae).

Distribution : INDIA : Uttarakhand (Dehra dun).

7. ***Brachymeria minuta*** (Linnaeus)

1767. *Vespa minuta* Linnaeus : 952, F. Europe (?UZM).

The known synonyms of this species are *Chalcis pusilla* Rossi (1790), *Chalcis brevicornis* Klug (1834), *Chalcis scrobiculata* Forster (1859), *Chalcis tricolor* For. (1859), *Chalcis fumata* Thompson (1875), *Chalcis paraplesia* Crawford (1910), *Chalcis jezoensis* Matsumura (1912), *Brachymeria putturensis* Joseph et al. (1971), *B. fuchuensis* Habu (1962), *Chalcis bilobata* Cameron (1905).

Diagnostic features : Black; tegula and tip of femora yellow; hind tibiae with its apical and pre basal parts yellow; scrobe deep; pre and post orbital carinae distinct; thorax pitted, interstices partially carinate, smooth except faint microsculpture on pronotum; apex of scutellum bilobe coxa without ventro mesal tooth; femur with inner basal tooth; first tergite of gaster smooth, second tergite with micro sculptures; sixth tergite weakly pitted with distinct microsculptures.

Host : Dipteran and Lepidopteran pests.

Distribution : INDIA : Uttarakhand (Bhim Tal, -Nainital, Peora, Bhowali), World wide.

8. ***Brachymeria lasus*** (Walker)

1841. *Chalcis lasus* Walker : 219, F. INDIA : Calcutta (BMNH).

The known synonyms of this species are *Oncochalcis marginata* Cameron (1904), *Chalcis obscurata* Walker (1874), *Chalcis inclinator* Walker (1812), *Chalcis punctiventris* Cameron (1911), *Chalcis nitator* Walker (1862), *Chalcis papuana* Cameron (1913), *Tumidicoxa regina* Girault (1913), *Chalcis regina* var. *dentata* Girault (1915), *Chalcis regina* var. *copernaci* Girault (1936).

Diagnostic features : Black with apex of femur, tegula, fore and mid tibiae yellow; scrobe deep; pre orbital carinae absent; post orbital carinae distinct; thorax with small round pits, interstices broad; apex of scutellum weakly bilobed; hind coxa with distinct ventro-mesal tooth;hind femur without inner basal tooth; first gastral tergite smooth; second tergite minutely compactly punctate on dorsal side, dorsolateral half with dense, bristled large punctures; sixth tergite with many dense large puntures.

Host : Several Lepidopteran pests.

Distribution : Uttarakhand (Pant Nagar),World wide.

9. ***Brachymeria atridens*** (Waterston)

1922. Chalcis atridens Waterston, 56, F. INDIA Dehra dun (BMNH).

Diagnostic features : Tegulae dark brown, apically yellow; wings faintly brownish; legs basally black, middle brown and apically yellow; femoral teeth black; hind femora ferrugeneous with a dark spot externally; head with stout antennae; between and below toruli surface of the clypeus entirely smooth but without lateral ridges or keels; scutellar plate well developed and broadly incised in the middle; hind coxa, hind femur and propodeum without teeth or tubercles; basal tergite smooth, second tergite with numerous punctures at sides but reduced to a single row across middle; remaining tergites smooth basally but with transverse rows of strong punctures apically.

Distribution : INDIA : Uttarakhand (Dehra dun), Manipur.

Genus ***Dirhinus*** Dalman

1. ***Dirhinus himalayanus*** Westwood

1836. *Dirhinus himalayanus* Westwood, : 10, F., INDIA, Uttarakhand (lost).

The known synonyms of this species are *Dirhinus lakhimpuriensis* Husain & Agarwal (1981a), *D. crythoceras* Cameron (1906), *D. luzonensis* Rohwer (1923), *D. luciliae* Rohwer (1923), *D. pachycerus* Masi (1927), *D. vlasovi* Nikolskaya (1952) & *Dirhinoides mathuri* Mani and Dubey (1972).

Diagnostic features : Head below apex of each horn without distinct additional teeth; Sides of scrobe almost straight; apex of each horn in dorsal view more or less rounded with out any notch; thorax with rather sparse punctation; wings hyaline, without distinct pilosity; distal half of hind tibia with another groove outside tarsal sulcus, which is delimited by additional external carina.

Hosts : *Chrysomyia megacephala* (Fab.) (Diptera : Calliphoridae), *Hypantria cunea* Drury (Arctidae), *Lucila* spp. (Calliphoridae), *Musca domestica* Linn. (Muscidae), *Sarcophaga* spp. (Diptera : Sarcophagide), *S. tuberosa, Lucilla cuprina* Weidemann (Calliphoridae).

Distribution : INDIA : Uttarakhand (Dehra dun), Uttar Pradesh, Kerala, Karnataka, West Bengal, Bihar.

Elsewhere : Saudi Arabia, Iraq, Turkmenia, Pakistan, Malaysia, China, Philippines, Japan, Cocos Islands, Sumatra and Hawai.

Genus ***Epitranus*** Walker

1. ***Epitranus ramnathi*** (Mani& Dubey)

1973. *Arretocera ramnathi* Mani & Dubey, : 21-23, F. INDIA, Uttar Pradesh (USNM).

The known synonyms of this species are : *Epitranus melaogenus* Husain & Agarwal (1981b), *E. giganticus* Husain & Agarwal (1981b), *E. simplexus* Husain & Agarwal (1981b), *E. areolatus* Husain & Agarwal (1981b), *E. rossicorpus* Husain & Agarwal (1981b), *Chalcitella annexia* Mani & Dubey (1973), *Arretocera ophiomontana* Mani & Dubey (1973), Arretocera *sancti-iohani* Mani& Dubey (1973).

Diagnostic features : Small species with rusty red colour on thorax and head; clypeal roof rounded angulate; interstices on thorax with distinct reticulation; tarsal sulcus on hind leg extending over more than three fourths up towards sub basal tooth; hind tibia with weak sub basal hump and tarsal sulcus without oblique carinae; fore wing pilosity strongly reduced.

Hosts : *Crypsithyris longicornis* Stainton (Teneidae), *Lucinodes orbonalis* Guen, *Chilo simplex.*

Distribution : INDIA : Uttarakhand (Dehra dun), Kerala, Karnataka, Uttar Pradesh.

Elsewhere : Nepal.

2. ***Epitranus erythrogaster*** Cameron

1888. *Epitranus erythrogaster* Cameron, 119. Lectotype, F., JAPAN (BMNH).

The known synonyms of this species are *Anacryptus sculpturatus* Crawford (1910), *A. kankauensis* Masi (1933), *A. raoi* Mani & Kurian (1953), *Arretoceroides ceylonensis* Mani (1936), *Chalcitelloides devadatta* W. Fernando (1957), *C. ajatasattu* W. Fernando (1957), *Chalcitella cina* W. Fernando (1958), *C. nilamburensis* Mani & Dubey in Mani et al (1974), *Par arretoceroides austini* E. Fernando (1959), *Arretocera ambadevia* Mani & Dubey In Mani et al (1973), *A. nilamburensis* (!) Mani & Dubey in Mani et al (1973), *A. pallava* Mani & Dubey in Mani et al (1973), *A. tanjorensis* Mani & Dubey in Mani et al (1973), *A. malabarensis* Mani & Dubey in Mani et al (1974).

Diagnostic features : Body black with reddish colour variably spreading on legs and gaster; scrobal area fiat, reticulate to trans-striate with two converging carinae from toruli to median ocellus; malar space hairy; propodeum with percurrent median area delimited by submedian carinae which posteriorly clearly reach the cross carina delimiting the area at post petiole.

Host : Corcyra cephalonica (Stainton) (Pyralidae).

Distribution : INDIA : Punjab, Uttarakhand (Dehra dun, Pant Nagar, Nainital), Delhi, Bihar, West Bengal, Kerala, Tamil Nadu.

Elsewhere : All over Oriental Region, S. Japan.

SUMMARY

From the available literature, 22 species from 10 genera have been reported here as existing in various parts of Uttarakhand.

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REFERENCES

Ashmead, W. H. 1900. New genera and species of Hymenoptera from the Philippines. *Proc. U. S. natn. Mus.* **23** : 397-413.

Ashmead, W. H. 1904. Classification of the Chalcid Flies of the superfamily Chalcidoidea with $-descriptions of new species in Canergie Museum, Collected in South America by Herbert H. Smith. *Mem. Carneg. Mus.* **1**(4) : 1-11, 1-551.

Boucek, Z. 1982. Oriental chalcid wasps of the genus *Epitranus J. Nat. Hist.* **16** : 577-622.

Cameron, P. 1888. Descriptions of one new genus and some new species of parasitic Hymenoptera. *Proc. Man. Lit. Phil. Soc.* **26** : 117-137.

Cameron, P. 1904. Descriptions of new genera and species of Hymenoptera from Mexico. *Trans. Am. ent. Soc.* **30** : 251-267.

Cameron, P. 1906. Descriptions of new species of parasitic Hymenoptera chiefly from Sikkim, Himalaya. *Zeitschr. Syat. Hym. Dipt.* **5** : 285.

Cameron, P. 1911. Descriptions of new genera and species of Hymenoptera Chalcididae collected by Mr. John Hewitt, B. A. in Borneo. *Societas ent.* 26, 7-8, 11-12, 14, 19, 23-24, 28.

Cameron, P. 1913. On the parasitic Hymenoptera reared at Dehra dun Northern India from the Lac (Tachardiae) and Gall insects *Indian For. Rec.* **4** : 91-110.

Crawford, J. C. 1910. New Hymenoptera from the Philippine Islands. *Proc. U. S. natn. Mus.* **38** : 128.

Fernando, E. F. W. 1959. Two new species of parasitic Hymenoptera from Ceylon. *Ceylon J. ofSci. Bio. Sci. 2* : 241-243.

Fernando, W. 1957. Contributions to a knowledge of the insects of Ceylon. 5. New Parasitic Hymenoptera (Chalcidoidea). *Ceylon J. of Sci.* (B) **25** : 209-219.

Fernando, W. 1958. New species of insects from Ceylon (3) *Cey. J. Sc, Bio. Sc.* **1** : 85-93.

Girault, A. A. 1915. Australian Hymenoptera Chalcidoidea I-XIV. The family chalcididae with description of new genera and species Mem. Qd. Mus. **3-4** : 142-365

Girault, A. A. 1921. Miscellaneous species of Chalcid-flies from Austrlia (Hymenoptera : Chalcididae). *Insecutor. Inscit. Menstr.* **9** : 186-191.

Girault, A. A. 1936. Terror-Errors and novitates of pterygota (or earth realities not state bound) Privately printed paper : pages 1-4.

Husain, T. & Agarwal, M. M. 1981a. Systematic studies on Indian Dirhininae (Hymenoptera : Chalcididae) *Oriental Ins.* **15** : 179-193.

Husain, T. & Agarwal, M. M. 1981b. Taxonomic studies on Indian Epitraninae (Hymenoptera : Chalcididae). *Oriental Ins.* **15** : 413-432.

Husain, T. & Agarwal, M. M. 1982a. Taxonomic studies on Haltichellinae of India (Hymenoptera : Chalcididae) P. T. I. Haltichellini *Oriental Ins.* **16** : 313-336.

Husain, T. & Agarwal, M. M. 1982b. Indian species of *Brachymeria* Westwood (Hymenoptera : Chalcididae) Oriental Ins. **16** : 491-509.

Joseph, K. J., Narendran, T. C. & Joy, P. J. 1972. Two new species and a sub species of *Brachymeria* (Hymenoptera : Chalcididae) in the collections of Forest Research Institute, Dehra dun. *Indian For.* **98**(9) : 552-559.

Kerrich, G, J. 1960. A systematic study of the chalcid genus Uga Girault (Hymenoptera : Chalcididae) parasites of Epilachinine beetles. *Proc. R. ent. Soc. Lond. Ser.* B. **29** : 113-119.

Mani, M. S. 1936. Chalcids (Parasitic Hymenoptera) from India. *Rec. Ind. Mus.* **38**(2) : 125-129.

Mani, M. S., Dubey, O. P., Kaul, B. K. & Saraswat, G. G. 1973. On some Chalcidoidea from India. *Mem. Sch. Ent. St. John's Coll.* **2** : 1-128.

Mani, M. S., Dubey, O. P., Kaul. B. K. & Saraswat, G. G. 1974. Descriptions of some new and new records of some known Chalcidoidea (Hymenoptera) from India. *Mem. Sch. Ent. St. John s Coll.* **3** : 1-108.

Mani, M. S. & Dubey, O. P. 1972. On some Dirhinini (Hymenoptera : Chalcidoidea) from India. *Oriental Ins.* **6** : 401-407.

Mani, M. S. & Dubey, O. P. 1974. Descriptions of some new and records of some known Chalcidoidea (Hymenoptera) from *India, Mem. Sch. Ent. St. John's Coll.* **2** : 1-128.

Mani, M. S. & Kurian, C. 1953. Descriptions and records of chalcids (Parasitic Hymenoptera) from India. *Indian J. of Ent.*, **15** : 1-21

Masi, L. 1926. H. Sauters Formosa - Asbeute. Chalcididae (Hym.) *Konowia,* **5** : 8-20, 170-178, 264-268.

Masi, L. 1929. Contributo alia conoscenza dei Chalcidídi Orientali della Sottofamiglia Chalcidinae. *Boll. Lab. Ent. R. 1st. Sup. agr. Bologna.,* **2** : 155-188.

Masi, L. 1933. H. Sauters Formosa Ausbeute. Chalcididae (Hym.) *Konowia,* **12** : 1-15.

Narendran, T. C. 1989. *Oriental Chalcididae.* Zoological Monograph. P58.

Nikolskaya, M. N. 1952. *The Chalcid fauna of the U. S. S. R. (Chalcidoidea),* pp.85-89. (Translated from Russian by A. Birron and Z. S. Cole in 1963).

Rohwer, S. A. 1923. New Hymenoptera from the Malayan region. Philippines *J. Sci.* 22 : 345-356.

Roy, C. S. & Farooqi, S. I. 1984. Taxonomy of Indian Haltichellinae (Hemenoptera : Chalcididae) at National Pusa ollection, IARI, New Delhi, *Mem. Ent. Soc. India.* **10** : 1-59.

Walker, F. 1841. Descriptions of Chalcidites. Entomologist. **1** : 217-220.

Walker, F. 1846. List of the specimens of Hymenopterous insects in the collections of the British Museum. Part I *Chalcidites* VI+100pp. London.

Walker, F. 1860. Characters of some apparently undescribed Ceylon insects. *Ann. Mag. Nat. Hist.* **6** : 357.

Walker, F. 1862. Notes on Chalcidites and characters of undescribed species. *Trans. Ent. Soc. Lond.* (3)**1** : 345-397.

Walker, F. 1871. Notes on Chalcididae. Part IV. Chalcididae, Leucospidae, Eucharidae, Perilampidae, Ormyridae, Eurytomidae. London; pp. 20-70.

Walker, F. 1874. In Smith, Description of new species of Tenthredinidae. Ichneumonidae, Chrysidide, Formicidae & Chalcididae of Japan. *Trans. Ent. Soc. London.* 899-401.

Waterston, J. 1922. On Chalcidoidea (Mainly bred at Dehra dun, U.P. from Sal, Toon, Chi and Sundri) *Ind. For. Rec.* **9** : 1-44.

Westwood, J. 0.1837. Exhibitions, memoirs, etc., *Journ. Proc. Ent. Soc. London,* V-VI in *Trans Ent Soc. Lond.,* **2** : (1837-40).

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 701-723.

INSECTA : HYMENOPTERA : ACULEATA : SPHECIDAE

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INTRODUCTION

The family Sphecidae comprises the wasps, which are commonly known as the blue mud-dauber, the black and yellow mud-dauber, the digger or sand wasps. Some of them are also called as cicada killers or hunting wasps. The family Sphecidae belongs to superfamily Sphecoidea in Aculeate Hymenoptera.

These sphecid wasps are sufficiently advanced and most diverse group of insects, which are world-wide distributed. They are generally useful as well as harmless to man. These wasps show complexities in their behaviour, and are always being subject of biological studies.

The different types of habitation are also observed in this family. Some members are ground nesters; some of them nest in sandy soil around the beaches or sand-dunes; some nest in pre-existing cavities, used by beetle larvae; some species construct their own mud cells.

The most of the members of this family are predatory on a great variety of terrestrial insects; but some are cleptoparasitic, i.e., their larvae develop on the provisions in the nest of other wasps. Because of their predatory and cleptoparasitic habits, it may be possible to exploit them for the control of insect pests.

Bingham (1897) published his valuable work *"The Fauna of British India including Ceylon and Burma"* on wasps and bees. Besides this, Cameron (1902), Turner (1912), van der Vecht (1949), van Lith (1959, 1962, 1965), Roy and Kundu (1985), Krombein and van der Vecht (1987), Sudheendrakumar and Narendran (1989), Jonathan *et al.* (2000, 2003), Madhavikutty (2004), Kundu *et al.* (2006) and Gupta (2007) have made their valuable contributions on Indian Sphecidae, but no one other than Bingham (1897), has exclusively studied on this group of insects from the state of Uttarakhand.

Bohart and Menke (1976) Published a voluminous work on generic classification of the world Sphecidae. Very recent, Goulet and Huber (1993) edited and published another classification of Sphecidae, which is based on the classification of Brothers (1975) and gave the family status to most of the subfamilies. Prior to this, Krombein *et al.* (1979) also restored the subfamilies recognised by Bohart and Menke (1976), to family rank. However, the classification followed here is after Bohart and Menke (1976). It is considered an authenticated document on Sphecidae till to date throughout the world.

Northern part of India, especially the state of Uttarakhand, is very important from the view point of faunal diversity. An attempt has been made here to provide a consolidated account on the fauna of Sphecidae from the state of Uttarakhand, India. So 25 species under 18 genera are recorded here from this state.

MATERIAL AND METHOD

Mostly the sphecid wasps occur in the agriculture fields, various vegetables and flower gardens, and crop fields etc. So they are being collected by sweeping with the help of insect nets. The collected materials are killed in a killing jar using benzene or ethyl acetate. Afterward, they are kept in the insect envelops with proper labels mentioning locality, altitude, date and name of collector etc. Then all the collection are preserved dry with paradichlorobenzene and nephthalene adding carbolic acid as antifungal agent in a box properly in the field.

In the laboratory of the department, the specimens are set, pinned and mounted to display properly for easy handling under binocular microscope during the process of identification. Then the identified specimens are kept in insect

boxes or cabinets with proper labels. Smaller specimens are generally preserved in alcohol permanently with proper labels after study. For detailed specific identification, the genital structures, mandibles and other mouth-parts are also dissected out and mounted on slides.

This taxonomic work of sphecid wasps of Uttarakhand is based on the collection made by the authors and various scientists of the department from this state time to time. Besides this, the specimens lying in the National Zoological Collection of this department have also been incorporated. The entire materials studied under this project, have been deposited in the collection of Zoological Survey of India, Kolkata.

SYSTEMATICS

The family Sphecidae is a moderately large family which is represented by nine subfamilies from the world. More than 1500 species of Sphecidae are known from the world. Of these, more than 450 species are known to occur in India. The present paper represents 25 species belonging to 18 genera and 6 subgenera under 8 subfamilies from the state of Uttarakhand.

The keys to the subfamilies, tribes, genera, subgenera, species and their general information and some important characters are provided here for the identification of various taxa of this region, which are mainly based on the works of Bingham (1897) and Bohart and Menke (1976). The diagnostic characters of the family, subfamilies are also incorporated. The species/subspecies, not available in the collection but known from Uttarakhand, have been reviewed from literature and also incorporated here in the systematic account.

TAXONOMIC TERMINOLOGY

The terms of morphological characters used in the text are mainly based on the works of Bingham (1897), Bohart and Menke (1976) and Krombein (1981-1987). The abbreviation used in the text are : M = Male; F = Female; coll. = The name(s) of the collector(s); m. = Metre; ex. = Number of specimens/example(s); mm. = Millimetre; des. = The species is described or there is a descriptive note; syn. = The synonymy or taxonomic position of the species; key = A key is provided in the publication to identify the species; distr./loc. = The place, from where the species/subspecies was recorded or collected, is given; fig. = The species/subspecies is illustrated in whole or in part.

SYSTEMATIC ACCOUNT

Family SPHECIDAE
Subfamily AMPULICINAE
Tribe **Ampulicini**
Genus ***Ampulex*** Jurine, 1807

1. *Ampulex compressa* (Fabricius), 1793

Subfamily SPHECINAE
Tribe **Sceliphronini**
Genus ***Sceliphron*** Klug, 1801
Subgenus ***Sceliphron*** s. str.

2. *Sceliphron (Sceliphron) madraspatanum* (Fabricius), 1793

Tribe **Sphecini**
Genus ***Sphex*** Linnaeus, 1758
Subgenus ***Sphex*** s. str.

3. *Sphex (Sphex) pruinosus* Germar, 1817
4. *Sphex (Sphex)* sp.

Tribe **Ammophilini**
Genus ***Ammophila*** W. Kirby, 1798

5. *Ammophila punctata* F. Smith, 1856
6. *Ammophila atripes* F. Smith, 1852

Subfamily PEMPHREDONINAE
Tribe **Pemphredonini**
Genus ***Pemphredon*** Latreille, 1796

7. *Pemphredon fuscipennis* (Cameron), 1897

Subfamily ASTATINAE
Tribe **Astatini**
Genus ***Dryudella*** Spinola, 1843

8. *Dryudella maculifrons* (Cameron), 1889

Subfamily LARRINAE
Tribe **Larrini**
Genus ***Liris*** Fabricius, 1804
Subgenus ***Leptolarra*** Cameron, 1900

9. *Liris (Leptolarra) jaculator* (F. Smith), 1856

Genus ***Tachytes*** Panzer, 1806

10. *Tachytes argyreus* (F. Smith), 1856
11. *Tachytes modestus* F. Smith, 1856

12. *Tachytes vischnu* Cameron, 1889

Genus ***Parapiagetia*** Kohl, 1896

13. *Parapiagetia erythropoda* (Cameron), 1889

Tribe **Trypoxylonini**
Genus ***Trypoxylon*** Latreille, 1796
Subgenus ***Trypoxylon*** s. str.

14. *Trypoxylon (Trypoxylon) canaliculatum* Cameron, 1889

Genus ***Pison*** Jurine in Spinola, 1808
Subgenus ***Pison*** s. str.

15. *Pison (Pison) punctifrons* Shuckard, 1838

Subgenus ***Pisonoides*** F. Smith, 1858

16. *Pison (Pisonoides) obliteratum* F. Smith, 1858

Subfamily CRABRONINAE
Tribe **Crabronini**
Genus ***Crabro*** Fabricius, 1775

17. *Crabro* sp.

Genus ***Dasyproctus*** Lepeletier and Brullé, 1834

18. *Dasyproctus agilis* (F. Smith), 1858
19. *Dasyproctus buddha* (Cameron), 1889

Genus ***Ectemnius*** Dahlbom, 1845

20. *Ectemnius palitans* (Bingham), 1896

Genus ***Lestica*** Billberg, 1820

21. *Lestica quadriceps* (Bingham), 1897

Subfamily NYSSONINAE
Tribe **Stizini**
Genus ***Bembicinus*** A. Costa, 1859

22. *Bembicinus reversus* (F. Smith), 1856

Tribe **Bembicini**
Genus ***Bembix*** Fabricius, 1775

23. *Bembix latitarsis* Handlirsch, 1893

Subfamily PHILANTHINAE
Tribe **Cercerini**
Genus ***Cerceris*** Latreille, 1802-03

24. *Cerceris vigilans* F. Smith, 1856
25. *Cerceris* sp.

Family SPHECIDAE

The family Sphecidae is recognised by the following characters : Pronotum essentially fixed with the mesothorax; its posterior margin in dorsal view nearly straight and usually separated from the scutum by a constriction that contributes to the formation of a raised collar; pronotal lobe well-separated from the tegula, so that the mesoscutum and mesopleuron are in contact with each other, but in some cases the pronotal lobe is very close to tegula or in narrow contact. Hind leg with a cleaning pecten or brush in a basal depression on the inner side of the basitarsus; this apparatus is opposed by the pectinate inner tibial spur. The setae simple and unbranched. Inner eye margin not notched or emarginate, except for Trypoxylonini and Philanthini. Cerci on tenth tergum of male absent in most higher sphecids, but are present in Dolichurini, some Sphecini, most Sceliphronini and Astatinae. The thorax with episternal sulcus on the mesopleuron.

Key to the subfamilies of family Sphecidae
(After Bohart and Menke, 1976)

1. Gaster with cylindrical petiole composed of sternum only, except in *Ammophila* with two sections; jugal lobe of hind wing large, with an anal vein ..... SPHECINAE

– Gaster variable, if petiolate and petiole composed of sternum only, then jugal lobe of hind wing very small 2

2. Middle tibia with two apical spurs or none 3

– Middle tibia with only one apical spur 5

3. Claws with one inner tooth; notauli usually present and very long ..... AMPULICINAE

– Claws simple 4

4. Hind wing with jugal lobe less than half the length of anal area; mandible not notched nor strongly angulate externo-ventrally ..... NYSSONINAE

– Hind wing with jugal lobe usually much more than half the length of anal area, but if not, then mandible notched externo-ventrally .... ASTATINAE

5. Middle coxae contiguous; jugal lobe of hind wing subequal to the length of anal area, and ocelli normal ..... LAPHYRAGOGINAE*

– Middle coxae variable but if contiguous, then hind wing jugal lobe one-half or less as long as anal area, or hind ocelli deformed 6

6. Gaster with petiole composed of sternum only ..... PEMPHREDONINAE (in part)

– Gaster sessile or with petiole composed of both tergum and sternum 7

7. Gaster sessile, fore wing with two or few submarginal cells and either (a) stigma as large as single discoidal cell; or (b) stigma nearly equal in area to first discoidal cell, two submarginal cells present; mandible simple; inner eye margin not angulate .... PEMPHREDONINAE (in part)

– Gaster variable, but if sessile, fore wing with three submarginal cells or if less, then stigma much smaller than first discoidal cell; or not agreeing as above 8

8. Hind ocelli deformed or greatly reduced 9

– Hind ocelli normal 10

9. Jugal lobe of hind wing subequal to length of anal area, rarely two-third as long as anal area ..... LARRINAE (Tribe Larrini)

– Jugal lobe of hind wing at most a little more than half the length of anal area .... NYSSONINAE (in part)

10. Scutal carina present, oblique; episternal-scrobal sulcus often present; metapleuron broad below, not tapering .... NYSSONINAE (Tribe Stizini)

– Scutal carina absent 11

11. Antennal sockets above fronto-clypeal suture by at least one-third of a socket diameter, fore wing with three submarginal cells; mandibular socket closed by a forward extension of the hypostoma .... PHILANTHINAE

– Antennal sockets contiguous with fronto-clypeal suture, or if not contiguous, fore wing with fewer than three submarginal cells; mandibular socket usually open 12

12. Middle coxae with a dorso-lateral carina or crest-like elevation. Fore wing usually with three submarginal cells, or with one cell which is not confluent with first discoidal, or with none ..... LARRINAE

– Middle coxae without a dorso-lateral carina; fore wing with one submarginal cell or this cell is fused with first discoidal cell .... CRABRONINAE

(*Not recorded here from the state of Uttarakhand)

Subfamily AMPULICINAE

The subfamily Ampulicinae is mostly primitive group of insects in the family Sphecidae. These beautiful insects prey upon cockroaches. So the members of this subfamily are commonly known as "Cockroach wasps." They occur in the tropic of Old and New World.

Diagnostic characters : Inner orbits entire; ocelli normal; antennae inserted low on face, sockets contiguous with fronto-clypeal suture, male with 13 and female with 12 segments. Clypeus transverse or strongly nasiform; mandible without a notch on externo-ventral margin; mandibular socket open except in *Ampulex*. Pronotal lobe close to or touching tegula. Notauli long and deep. Propodeum or median segment moderately long with U-shaped to nearly triangular enclosure. Middle tibia with two apical spurs. Claws with a single tooth or bifid. Fore wing with two or three submarginal cells and two recurrent veins, first recurrent received by submarginal I or II, second recurrent received by submarginal II or III. Gaster or abdomen sessile or with a petiole, composed of sternum and tergum; no pygidial plate. Male genitalia : Volsella with movable digitus and cuspis; aedeagus with teeth on ventral edge; cerci present, except in Ampulicini.

This subfamily is represented by two tribes, viz., Ampulicini and Dolichurini in India. Only the tribe Ampulicini is reported here from the state of Uttarakhand. A key to both Indian tribes is given below for ready reference.

Key to the tribes of Ampulicinae

1. Antennal sockets with an over hanging frontal lobe; metasternum Y-shaped. Gastral petiole inserted between and on same level as hind coxae ..... **Ampulicini**

– Antennal sockets not covered or both over laid by a single median platform-like lobe; metasternum not Y-shaped. Gastral petiole inserted above and somewhat after hind coxae. (not recorded from Uttarakhand) ... . **Dolichurini**

Tribe **Ampulicini**

The tribe Ampulicini represents majority of the species under the subfamily Ampulicinae. All of

them belong to the genus *Ampulex* Jurine, 1807 under this tribe. The members of this tribe are small to large in size, 5 to 32 mm long. They are metallic green to blue in colour. The genus *Ampulex* has been reported here from the state of Uttarakhand.

Genus *Ampulex* Jurine

1807. *Ampulex* Jurine, *Nouv. Méth. Class. Hym. Dipt., Geneva,* **1** : 132, pl. 14.

Type-species : *Sphex compressa* Fabricius, 1793.

This is a moderately large genus comprising most of the species of the subfamily Ampulicinae. This genus is represented by above 23 species and subspecies in India. Of these, only the type-species *Ampulex compressa* (Fabricius, 1793) is the sole representative in the state of Uttarakhand, which is detailed below.

1. *Ampulex compressa* (Fabricius)

1793. *Sphex compressa* Fabricius, *Ent. Syst.,* **2** : 206.

1807. *Ampulex compressa* (Fabricius) : Jurine, *Nouv. Méth. Class. Hym. Dipt., Geneva,* **1** : 134.

2003. *Ampulex compressa* (Fabricius) : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9** (Part-4) : 423.

2006. *Ampulex compressa* (Fabricius) : Kundu *et al., Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series,* **13** (Part-2) : 404.

Material examined : India : Uttarakhand : Dehradun : Chandipur, 1ex., 29.iii.2003, coll. B.G. Kundu and Party; Udhamsingh Nagar : Rudrapur, Kichha, 1ex., 13.xii.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Garhwal and Kumaun), Arunachal Pradesh, Sikkim, Meghalaya, Assam, West Bengal, Orissa, Bihar, Maharashtra, Andaman and Nicobar Is. and throughout India.

Elsewhere : Myanmar, Sri Lanka, China, Africa, Australia, Chagos Archipelago, East Indies, Hawaii, Mauritius, New Caledonia, St. Helena, Seychelles, Midway, Réunion.

Remarks : This species is readily distinguished by having head, thorax and abdomen more or less with close to sparse punctures; body deep metallic blue, sometimes green; middle and hind femora red; the antennae filiform, long; fore wing with three submarginal cells, the 1st and 3rd subequal and 2nd cell small, nearly square.

Subfamily SPHECINAE

Some members of this subfamily are popularly known as "Yellow and black mud-daubers, such as, the genus *Sceliphron,* but some are commonly called as "Digger or Sand" wasps, viz., the genera *Sphex, Ammophila* etc. They are generally found in fields, forests and also in human habitats.

Diagnostic characters : Inner orbits entire, converging, diverging, or parallel; ocelli normal. Antennae in male 13 and in female 12-segmented. Mandible without notch on externo-ventral margin. Pronotal lobe broadly separated from tegula. Middle tibia usually with two apical spurs; middle coxal cavities and coxae usually approximate, middle coxae without dorso-lateral carinae; precoxal lobe present; hind femur simple apically; claws with one to five teeth, or simple; aroleum usually large. Propodeum or median segment usually long with or without U-shaped enclosure. Fore wing with three submarginal cells, except in *Ammophila*. Gaster with cylindrical petiole composed of sternum only unless it has two sections. Jugal lobe of hind wing large containing an anal vein.

This subfamily is divided into three tribes. A key to the tribes is given below.

Key to the tribes of Sphecinae

1. Tarsi with plentulae and or claws of some legs with one basal tooth on inner margin ..... **Sceliphronini**

– Tarsi without plentulae; claw simple or with one or more basal teeth on inner margin 2

2. Claw with two or more teeth; second recurrent vein usually received by submarginal cell III, but if not then claw with at least three teeth or apico-ventral setae of hind tarsomere V very broad, separated at base by not more than one and half times of setal widths; tarsi without plantulae .... **Sphecini**

– Claw usually simple or with one tooth, if with two teeth then apico-ventral setae of hind tarsomere V narrow, separated by three or more times of setal widths; second recurrent vein usually received by submarginal cell II; tarsi some times with plentulae .... **Ammophilini**

Tribe **Sceliphronini**

The tribe Sceliphronini, the slender wasps, is represented by three genera, viz., *Sceliphron* Klug, 1801; *Chlorion* Latreille, 1802 and *Chalybion* Dahlbom, 1843 in India. Of these, only the genus *Sceliphron* is reported here from the state of Uttarakhand. A key to three Indian genera is given below for ready reference.

Key to the genera of Sceliphronini

1. Propodeal dorsum at most with a median longitudinal groove. (Mandibles simple or with a subapical tooth on inner margin; third anal vein of hind wing broadly separated from wing margin; body usually metallic blue or black and yellow .... ***Chalybion*** Dahlbom

– Propodeum with a U-shaped dorsal enclosure, defined posteriorly by a semicircular sulcus or furrow 2

2. Both recurrent veins received by second submarginal cell; spiracular groove absent; body usually with yellow areas; female without fore tarsal rake ....***Sceliphron*** Klug

– Second recurrent vein received by the third submarginal cell or interstitial between II and III; spiracular groove present; body often with metallic blue or green; female with fore tarsal rake; antennal sockets contiguous with fronto-clypeal suture in female, separated by less than the diameter of a socket in male ..... ***Chlorion*** Latreille

Genus ***Sceliphron*** Klug

The members of the genus *Sceliphron* are small to large in size, varying 11-36 mm in length. They are mostly black in colour with conspicuous yellow marked legs and very long petiole. The wings vary from clear to yellowish. They are usually found in almost all temparate and tropical areas. This genus has been divided into two subgenera, viz., *Sceliphron* s. str. and *Prosceliphron* van der Vecht. These can be distinguished by the following key. Only the subgenus *Sceliphron (Sceliphron)* is reported here from the state of Uttarakhand.

Key to the subgenera of *Sceliphron*

1. 8th tergite without cerci in male; hypostomal carina long, ending near the base of mandible .....***Sceliphron*** Klug

– 8th tergite with cerci in male; hypostomal carina evanescent, extending about half the length to the base of mandible .... ***Prosceliphron*** van der Vecht

Subgenus ***Sceliphron (Sceliphron)*** s. str.

1801. *Sceliphron* Klug, *Neue Schrift. Ges. Naturf. Freunde Berlin*, **3** : 561.

Type-species : *Sphex spirifex* Linnaeus, 1758.

1976. *Sceliphron (Sceliphron)* Klug : Bohart and Menke, *Univ. Calif. Press* : 39, 105.

Above nine species/subspecies under this subgenus are known to occur in India. Of these, only the species, viz., *madraspatanum* (Fabricius), 1793 is recorded here from this state, which is detailed below.

2. ***Sceliphron (Sceliphron) madraspatanum*** (Fabricius)

1793. *Sphex madraspatanus* Fabricius, *Ent. Syst.*, **2** : 204.

1897. *Sceliphron madraspatanum* (Fabricius) : Bingham, *Fauna Brit. India, Hym.*, **1** : 237, F., M., des., syns.

1976. *Sceliphron (Sceliphron) madraspatanum* (Fabricius) : Bohart and Menke, *Univ. Calif. Press* : 106, syns.

2003. *Sceliphron (Sceliphron) madraspatanum* (Fabricius) : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part-4) : 425.

2006. *Sceliphron (Sceliphron) madraspatanum* (Fabricius) : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 406.

Material examined : India : Uttarakhand : Dehradun : Rishikesh, Kalikamli, 1ex., 9.iv.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Meghalaya, Sikkim, West Bengal, Bihar, Orissa, Madhya Pradesh,

Maharashtra, Gujarat, Uttar Pradesh, Himachal Pradesh and throughout India.

Elsewhere : Sri Lanka, Myanmar, Maldives, Malaysia, Indonesia, Vietnam.

Remarks : This is one of the common species and widely distributed in India and its adjoining countries. This species can readily be distinguished by having head finely and closely punctured; mesonotum and median segment or propodeum finely and transversely striate; apical two-thirds of femora and tibiae of posterior legs black and their bases with yellow bands; petiole of abdomen or gaster marked with yellow colour.

Tribe **Sphecini**

The tribe Sphecini includes large and robust wasps. Most of the members of this tribe are ground nesting. They are mostly colourful, specially *Sphex*. This tribe is represented by three genera, viz., *Sphex* Linnaeus, 1758; *Isodontia* Patton, 1881 and *Prionyx* van der Linden, 1827 from India. Of these, only the genus *Sphex (Sphex)* Linnaeus has been recorded here from the state of Uttarakhand.

Genus ***Sphex*** Linnaeus

The members of the genus *Sphex* are moderate to very large colourful wasps, varying 11-47mm in length. They are basically black in colour, but sometimes the abdomen or gaster and legs may be partly or fully red in colour. In some cases, head and thorax may be partly red. Wings vary from clear to red, black or yellowish.

The genus *Sphex* is divided into two subgenera, viz., *Sphex* s. str. and *Fernaldina* Bohart and Menke, 1976. All species and subspecies reported from India, are represented under the subgenus *Sphex (Sphex)*. But the *Sphex (Fernaldina)* has been reported from Holactic region.

Subgenus ***Sphex (Sphex)*** s. str.

1758. *Sphex* Linnaeus, *Syst. Nat., (10th ed.)*, **1** : 569.

Type-species : *Sphex flavipennis* Fabricius, 1793.

1976. *Sphex (Sphex)* Linnaeus : Bohart and Menke, *Univ. Calif. Press* : 39, 114.

The subgenus *Sphex (Sphex)* is represented by more than ten species/subspecies from Indian subregion. Of these, only the species *Sphex (Sphex) pruinosus* Germar, 1817 alongwith one unknown species (identified up to generic level) have been recorded here from the state of Uttarakhand. Due to non-availability of sufficient literature as well as specimens for study, a key to the species could not be provided here.

3. ***Sphex (Sphex) pruinosus*** Germar

1817. *Sphex pruinosus* Germar, (No reference).

1897. *Sphex vicinus* Lepeletier : Bingham, *Fauna Brit. India, Hym.*, **1** : 245, F., syns. Loc. Mussoorie.

1976. *Sphex (Sphex) pruinosus* Germar : Bohart and Menke, *Univ. Calif. Press* : 116, syns.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Myanmar, USSR, Mediterranean area to Ethiopia.

Remarks : Bohart and Menke (1976) listed the species *S. vicinus* Lepeletier, 1845 as one of the junior synonyms under the species *S. (S.) pruinosus* Germar, 1817.

This species is recognised by having head, thorax and the petiole of abdomen densely pruinose; clypeus broad, convex, anterior margin rounded; femora, tibiae of legs and the abdomen red; tarsal claws bidentate.

4. ***Sphex (Sphex)*** sp.

Material examined : India : Uttarakhand : Nainital : Kilbury, 1ex., 2528 m., 13.iv.2002, coll. S. Roychowdhury and Party.

Distribution : India : Uttarakhand (Kumaun).

Tribe **Ammophilini**

The members of the tribe Ammophilini are mostly large wasps, which have a long, slender gaster or abdomen alongwith a long petiole. This is the most advanced tribe. Three genera, viz., *Ammophila* W. Kirby, 1798, *Parapsammophila* Taschenberg, 1869 and *Podalonia* Fernald, 1927 are the main representatives of the tribe Ammophilini. Of these, only the genus *Ammophila* has been reported here from the state of Uttarakhand.

Genus ***Ammophila*** W. Kirby

1798. *Ammophila* W. Kirby, *Trans. Linn. Soc. London*, **4** : 199.

Type-species : *Sphex sabulosa* Linnaeus, 1758.

The genus *Ammophila* consists of small to large wasps, about 8 to 37 mm in length, body more than slender than the genus *Sceliphron*. Some species of the genus *Ammophila* are entirely black, but head or thorax of some species are red. Most of the members of this genus have partly or fully red gaster and legs are generally partly red and wings are mostly clear.

The *Ammophila* is the largest genus of the tribe Ammophilini. But it is poorly represented in Oriental region, specially in India. This genus is represented by more than eight species in India. Of these, only two species, *A. punctata*, Smith, 1856 and *A. atripes* Smith, 1852 are recorded here from the state of Uttarakhand. These can be recognised by the following key.

Key to the species of *Ammophila*

1. Pronotum, mesonotum and propodeum striate ..... *atripes* F. Smith

   Pronotum, mosonotun punctate, propodeum only striate ..... *punctata* F. Smith

5. *Ammophila punctata* F. Smith

1856. *Ammophila punctata* F. Smith, *Cat. Hym. Brit. Mus.*, 4 : 218.

1976. *Ammophila punctata* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 153.

2003. *Ammophila punctata* F. Smith : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, 9 (Part-4) : 429.

Distribution : India : Uttarakhand (Garhwal), Sikkim, Punjab, Himachal Pradesh, Uttar Pradesh and Northern India.

Elsewhere : Sri Lanka, Myanmar.

Remarks : While reporting this species *punctata* under the same genus *Ammophila*, Bingham (1897) noted "Mussoorie" as one of its localities. This species is readily distinguished by having head, pro- and mesonotum punctate; Propodeum with a marked medial longitudinal carina; abdomen with apical first segment black and following two segments red; petiole of abdomen two-jointed and abdomen more or less cylindrical; legs black.

6. *Ammophila atripes* F. Smith

1852. *Ammophila atripes* F. Smith, *Ann. Mag. Nat. Hist.*, (2)9 : 46.

1897. *Ammophila atripes* F. Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 229, F., M., des., syns.

1976. *Ammophila atripes* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 151.

1007. *Ammophila atripes* F. Smith : Gupta, *Zool. Surv. India, Faunal Diversity Western Doon Shiwaliks, Spl. Publ.* : 39, M. Loc. Dehradun (Karuapani and around).

Distribution : India : Uttarakhand (Garhwal), Sikkim, Assam, Meghalaya, Tripura, Himachal Pradesh, Orissa, West Bengal, Madhya Pradesh, Uttar Pradesh, Karnataka.

Elsewhere : Sri Lanka, Myanmar, China.

Remarks : This is a distinct species by having pronotum, mesonotum anteriorly striate; propodeum laterally transversely striate and dorsally along the middle line sometimes reticulate; legs red in female and black in male.

Subfamily PEMPHREDONINAE

Most of the species/subspecies of this subfamily are very small, the smallest being 2 mm in size. They prey on Homoptera, Thysanoptera or Collembola. They usually nest in ground or use pre-existing cavities in the twigs, galls etc.

Diagnostic characters : Inner orbits essentially parallel, converging, usually widely separated; ocelli normal. Antennal sockets contiguous with or well-separated from fronto-clypeal suture; male with 13 and female with 12-antennal segments. Mandible without notch, apex sometimes bi- to pentadentate. Pronotal lobe and tegula well-separated, but sometimes very close to each other. Middle tibia with one apical spur; claws simple. Propodeum short to moderately long. Fore wing with three, two, one, or no submarginal cell and one or two recurrent veins. Jugal lobe of hind wing small without an anal vein. Gaster or abdomen sessile or petiolate, the petiole usually composed of sternum I only. Volsella with digitus and cuspis, cerci absent.

This subfamily is represented by two tribes, viz., Psenini and Pemphredonini in India. Of these, only the tribe Pemphredonini is recorded here from the state of Uttarakhand. A key to the tribes is given below for ready reference.

Key to the tribes of Pemphredoninae

1. Fore wing with three submarginal cells; antennal sockets placed well above clypeal margin, usualy near middle of face .... **Psenini**

– Fore wing with not more than two submarginal cells; antennal sockets usually placed just above clypeal margin .... **Pemphredonini**

Tribe **Pemphredonini**

The tribe Pemphredonini is more specialized than the tribe Psenini, due to diversity of body size and structure and reduced wing venation. This tribe contains mostly half of the species in the subfamily Pemphredoninae.

This tribe represents eighteen genera. Of these, only 6 genera are known to occur in India. They are *Pemphredon* Latreille, 1796; *Diodontus* Curtis, 1834; *Polemistus* Saussure, 1892 under the subtribe Pemphredonina and *Stigmus* Panzer, 1804; *Spilomena* Shuckard, 1838; *Carinostigmus* Tsuneki, 1954 under the subtribe Stigmina. But here only the genus *Pemphredon* Latreille is the sole representative from the state of Uttarakhand.

Genus ***Pemphredon*** Latreille

1796. *Pemphredon* Latreille, *Précis Caract. Gen. Ins.* : 128.

Type-species : *Pemphredon lugubris* (Fabricius), 1793 [= *Crabro lugubris* Fabricius, 1793].

Pemphredon is the second largest genus in the subtribe Pemphredonina under the tribe Pemphredonini. It has a long petiole. Some large size wasps in this subfamily Pemphredoninae, moderately ranging up to 12 mm, are found in this genus. This genus preys on aphids.

In India, the genus *Pemphredon* is found in the high elevations in the Himalayas. Though it is poorly recorded in India. Here the genus is represented by a single species, *Pemphredon fuscipennis* (Cameron), 1897 from the state of Uttarakhand.

7. ***Pemphredon fuscipennis*** (Cameron)

1897. *Cemonus fuscipennis* Cameron, *Mem. Manch. Lit. Phil. Soc.*, **41**.

1897. *Pemphredon fuscipennis* (Cameron) : Bingham, *Fauna Brit. India, Hym.*, **1** : 265, F. Loc. Mussoorie, Northern India.

1976. *Pemphredon fuscipennis* (Cameron) : Bohart and Menke, *Univ. Calif. Press* : 181.

Distribution : India : Uttarakhand (Garhwal), Northern India.

Remarks : This species is easily recognised by having head subquadrate, broad; clypeus apically with silvery hairs; propodeum smooth with semicircular longitudinal short carinae; tegulae black.

Bohart and Menke (1976) listed this species under the genus *Pemphredon* in their catalogue and noted that *P. fuscipennis* is originally transferred from the genus *Cemonus*. Prior to this, Bingham (1897) also synonymized the genus *Cemonus* Jurine, 1807 with the genus *Pemphredon* Latreille, 1796.

Subfamily ASTATINAE

The subfamily Astatinae is a small group, ranging 4-16 mm in size. It contains some specialized characters. The males of some members of this subfamily have developed holoptic eyes. Most of the species make nests in the soil and provision them exclusively with Hemiptera.

Diagnostic characters : Inner orbits entire, converging above; ocelli normal. Antennae low on face, sockets contiguous with fronto-clypeal suture; male with 13 and female with 12-segmented antennae. Mandible without notch on externo-ventral margin. Clypeus transverse. Pronotal lobe separated from tegula. Mesopleuron usually with episternal sulcus. Middle tibia generally with two apical spurs. Propodeum moderately long with U-shaped dorsal enclosure. Fore wing with two or three submarginal cells. Jugal lobe of hind wing subequal to length of anal area. Gaster or abdomen sessile. Pygidial plate present. Male genitalia with volsella differentiated into digitus and cuspis. Cerci present.

This subfamily is divided by two tribes, viz., Astatini and Dinetini. Both the tribes are known to occur in India. But only the tribe Astatini is represented in the state of Uttarakhand. A key to both Indian tribes is given below for ready reference.

Key to the tribes of Astatinae

1. Fore wing with two submarginal cells; anal vein (A_2) of hind wing absent; jugal lobe of hind wing moderate, length not more than three-fourths of anal area. (Not recorded from Uttarakhand) ..... **Dinetini**

– Fore wing with three submarginal cells; anal vein (A_2) of hind wing present; jugal lobe of hind wing large, nearly as long as anal area ..... **Astatini**

Tribe **Astatini**

The members of the tribe Astatini are quite distinctive and are widely distributed. They are mostly bright in colour. Most of them are having consistent characters of wing venation except the genus *Dryudella*.

The tribe Astatini is represented by two genera, viz., *Astata* Latreille, 1796 and *Dryudella* Spinola, 1843 in India. Only *Dryudella* is known to occur in Uttarakhand. These can be distinguished by the following key.

Key to the genera of Astatini

1. Malar space short, base of mandible nearly touching lower eye margin; submarginal cell II as long as or often longer than submarginal cell I in fore wing; pygidial plate bordered with stout, recurved spines ..... ***Astata*** Latreille

– Malar space longer than midocellus diameter; submarginal cell II shorter than submarginal cell I in fore wing; pygidial plate not bordered by stout spines..... ***Dryudella*** Spinola

Genus ***Dryudella*** Spinola

1843. *Dryudella* Spinola, *Ann. Soc. Ent. Fr.*, **1** : 135.

Type-species : *Dryudella ghilianii* Spinola, 1843 [= *Astata tricolor* van der Linden, 1829].

The genus *Dryudella* is represented by 2 species, viz., *D. maculifrons* (Cameron, 1889) and *D. orientalis* (Smith, 1856) in India. Only *maculifrons* is known to occur in the state of Uttarakhand. A key to both Indian species of this genus is given below :

Key to the species of *Dryudella*

1. Comparatively body large size, ranging 10-13 mm in length; mesonotum anteriorly carinated and furrowed. (Median segment or propodeum above coarsely reticulated)..... ..... *orientalis* (Smith)

– Body smaller size, ranging 7-10 mm in length; mesonotum simple. (Median segment or propodeum above enclosed by lateral convergent furrows)..... ..... *maculifrons* (Cameron)

8. ***Dryudella maculifrons*** (Cameron)

1889. *Astata maculifrons* Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 149, M.

1976. *Dryudella maculifrons* (Cameron) : Bohart and Menke, *Univ. Calif. Press* : 214.

2006. *Dryudella maculifrons* (Cameron) : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 413.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh.

Remarks : Bingham (1897) also recorded this species under the genus *Astata* Latreille, 1802 and mentioned its locality "Mussoorie"

This is a distinct species by having the head, thorax and abdomen or gaster with soft, erect fuscous pubescence; mesonotum mostly simple; median segment or propodeum above enclosed by lateral convergent furrows; the basal three segments and sides of 4th segment of abdomen red.

Subfamily LARRINAE

This is the largest subfamily in the family Sphecidae. The members of the subfamily Larrinae are commonly known as "digger wasps." They are very small to large (2-30 mm) in size, often dark in colour. They prey upon the adults of spiders, Coleoptera, Diptera, Hemiptera, Hymenoptera, Orthoptera and also larvae of Lepidoptera.

Diagnostic characters : Inner orbits usually converging above, parallel, rarely converging below; posterior ocelli usually normal. Antenna inserted low on face except near middle in some genera, sockets contiguous with fronto-clypeal suture or separated. Female with 12 and male with 13-antennal segments. Clypeus transverse except about as high as broad in some genera. Palpal

formula 6-4 except 5-3 in some *Tachytes*. Pronotal lobe separated from tegula. Mesopleuron usually with an episternal sulcus. Metapleuron consisting only of upper area, definitive pleuron tapering ventrad. Middle tibia with one apical spur; middle coxae usually separated, each with a dorso-lateral carina or crest-like elevation; claws simple except toothed in some females of Larrini. Propodeum or median segment short to long, dorsal enclosure present or absent. Fore wing usually with 3 submarginal cells but sometimes none. Hind wing with jugal lobe varying from as long as anal area to very small or absent. Gaster or abdomen usually sessile, but sometimes pedunculate or petiolate; tergum I and occasionally II with lateral carina; male with 7 visible terga; pygidial plate present or absent. Volsella in male simple without digitus, rarely absent; cerci absent.

This subfamily is represented by four tribes, viz., Larrini, Palarini, Miscophini and Trypoxylonini in India. Only two tribes are represented in the state of Uttarakhand. A key to four Indian tribes is given below :

Key to the tribes of Larrinae

1. Hind ocelli reduced to flat, opaque scars of various shapes; jugal lobe of hind wing large, nearly as long as anal area ..... **Larrini**
– Hind ocellus with a convex or somewhat flattened, complete, transparent lens; jugal lobe of hind wing small or absent, never more than one-half length of anal area 2
2. Inner orbits emarginate ..... **Trypoxylonini**
– Inner orbits straight, bowed or sinuate but not emarginate 3
3. Clypeus divided into three parts by two vertical suture-like lines; antennal sockets separated from fronto-clypeal suture by one-third or more of a socket diameter; hind ocelli usually flattened and elliptical. (Not recorded from Uttarakhand) ..... **Palarini**
– Clypeus not divided into three parts; antennal sockets essentially contiguous with fronto-clypeal suture; hind ocelli round and convex. (Hind femoral apex simple, femur thickest near middle, gradually tapering toward apex; inner orbits parallel or converging above). (Not recorded from Uttarakhand) .... **Miscophini**

Tribe **Larrini**

According to number of species/subspecies, the Larrini is considered as the largest tribe of the subfamily Larrinae. They are usually medium in size and mostly dark in colour. Though morphologically the Larrini is treated as primitive tribe, but due to its hind ocellar deformation it shows a high degree of specialization (Bohart and Menke, 1976).

The tribe Larrini is represented by ten genera in India. Of these, 3 genera, viz., *Liris* Fabricius, 1804; *Tachytes* Panzer, 1806 and *Parapiagetia* Kohl, 1896 are recorded here from the state of Uttarakhand. These can be recognised by the following key.

Key to the genera of Larrini

1. Frons below median ocellus with a transverse swelling extending between the eyes and joining a linear swelling along inner orbit to form an M or inverted U-shaped swelling. ..... ***Liris*** Fabricius
– Frons variable and without swelling as above 2
3. Ocellar scars very long, distance between middle ocellus and end of tail less than the length of scar; pygidial plate covered with dense setae which obscure integument..... ..... ***Tachytes*** Panzer
– Ocellar scars oval or oblong; distance between middle ocellus and lower end of scar equal to or greater than length of scar; pygidial plate usually present in female, absent in male. (Petiole socket isolated from metacoxal cavities by a pair of dark propodeal sternites; gaster slender, often petiolate; inner tarsal claw of male much shorter than outer claw) .... ***Parapiagetia*** Kohl

Genus ***Liris*** Fabricius

1804. *Liris* Fabricius, *Syst. Piez.* : 227.

Type-species : *Sphex auratus* Fabricius, 1787.

Liris is a large cosmopolitan genus. The members of this genus are small to large in size, ranging 5-30 mm in length. They are mostly dull black in colour. More than 48 species/subspecies under this genus are known to occur in India.

The genus *Liris* is divided into three subgenera, viz., *Liris* Fabricius, 1804; *Motes* Kohl, 1892 and *Leptolarra* Cameron, 1900. Of these, only the subgenus *Liris (Leptolarra)* is represented here from the state of Uttarakhand. A key to the Indian subgenera of the genus *Liris* is given below.

Key to the subgenera of *Liris*

1. Mandible entire or with a small V-shaped notch on externo-ventral margin. (Not reported from Uttarakhand) ..... ***Liris*** Fabricius

– Mandible with a broad, deep, emargination on externo-ventral margin 2

2. Apex of female pygidial plate with transverse rows of stout setae, surface usually at least partially covered with appressed setae or hairs; female with one or two mandibular teeth on inner margin near base; female tarsal claw usually simple but when toothed within, the pygidial plate is not completely glabrous; hind tibia often with a sharp, polished carina ..... ***Leptolarra*** Cameron

– Apex of female pygidial plate without transverse row of stout setae, surface glabrous or at most with a fine dust-like bloom; mandible of both sexes without inner teeth; inner margin of female tarsal claw with 2 teeth set side by side; hind tibia without a sharp, polished carina. (Not reported from Uttarakhand) ..... ***Motes*** Kohl

Subgenus ***Liris (Leptolarra)*** Cameron

1900. *Leptolarra* Cameron, *Ann. Mag. Nat. Hist.*, (7)**5** : 29.

Type-species : *Leptolarra reticulata* Cameron, 1900.

1976. *Liris (Leptolarra)* Cameron : Bohart and Menke, *Univ. Calif. Press* : 43, 243, syn.

The subgenus *Leptolarra* includes the majority of the species of the genus *Liris*. According to Bohart and Menke (1976), these species may be belonged either to this subgenus or other unknown subgenus. Anyway, the species *L. jaculator* (Smith), 1856 is placed here under the subgenus *Liris (Leptolarra)*, which is recorded from the state of Uttarakhand.

9. ***Liris (Leptolarra) jaculator*** (F. Smith)

1856. *Larrada jaculator* F. Smith, *Cat Hym. Brit. Mus.*, **4** : 279., F.

1889. *Notogonia jaculator* (F. Smith) : Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 129.

1897. *Notogonia jaculatrix* : Bingham, *Fauna Brit. India, Hym.*, **1** : 203, F. Loc. Mussoorie, Barrackpore, Poona, Burma.

1976. *Liris (Leptolarra) jaculator* (F. Smith) : Bohart and Menke, *Univ. Calif. Press* : 246.

1985. *Liris (Leptolarra) jaculator* (F. Smith) : Roy and Kundu, *Rec. zool. Surv. India*, **82**(1-4) : 224.

2006. *Liris (Leptolarra) jaculator* (F. Smith) : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 416.

Distribution : India : Uttarakhand (Garhwal), Arunachal Pradesh, Sikkim, Himachal Pradesh, Maharashtra, Tamil Nadu, West Bengal.

Elsewhere : Myanmar.

Remarks : This species is readily distinguished by having sides of propodeum transversely striate; wings hyaline, with a decided tinge of yellow; legs entirely black; gaster dull and opaque.

Genus ***Tachytes*** Panzer

1806. *Tachytes* Panzer, *Krit. Rev. Insektenf. Deutsch.*, **2** : 129.

Type-species : *Sphex tricolor* Fabricius, 1793.

Tachytes is a large genus. These bee-like wasps are very stout and hairy, ranging 4-25 mm in length. They are mostly black in colour, but gaster or abdomen and legs sometimes may be partly or fully red. Wings are clear or yellowish. They nest in the ground and sometimes in the sandy situations.

More than 26 species/subspecies under this genus are known to occur in India. Of these, only three species, viz., *T. argyreus* (F. Smith), 1856; *T. modestus* F. Smith, 1856 and *T. vischnu* Cameron, 1889 are recorded here from the state of Uttarakhand. A key to the species is given below.

Key to the species of *Tachytes*

1. Abdomen red or red and black. (Median segment closely and minutely punctured, presence of a median longitudinal groove

from the base to apex of median segment) ..... *argyreus* (F. Smith)

– Abdomen black 2

2. Body medium size, 11-15 mm in length; legs testaceous red ..... *modestus* F. Smith

– Body small size, 7-9 mm in length; legs black ..... *vischnu* Cameron

10. *Tachytes argyreus* (F. Smith)

1856. *Larrada argyrea* F. Smith, *Cat. Hym. Brit. Mus.*, **4** : 276, M.

1889. *Tachysphex argyrea* (F. Smith) : Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 143.

1897. *Tachysphex argyreus* (F. Smith) : Bingham, *Fauna Brit. India, Hym.*, **1** : 194, F., M., syns. Loc. North-West Provinces; Mussoorie.

1976. *Tachytes argyreus* (F. Smith) : Bohart and Menke, *Univ. Calif. Press* : 263, syns.

Distribution : India : Uttarakhand (Garhwal), North-West Provinces.

Elsewhere : N. Africa to sw. USSR.

11. *Tachytes modestus* F. Smith

1856. *Tachytes modesta* F. Smith, *Cat. Hym. Brit. Mus.*, **4** : 299, F.

1976. *Tachytes modestus* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 266.

2003. *Tachytes modestus* F. Smith : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part-4) : 434.

Material examined : India : Uttarakhand : Uttarkashi : Tilodh Road, 1ex., 1160 m., 2.iv.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Garhwal), Sikkim, Meghalaya, Orissa, West Bengal, Uttar Pradesh, Kerala.

Elsewhere : Myanmar, China, Japan, Taiwan.

Remarks : Bingham (1897) recorded this species under the genus *Tachytes* and mentioned "Mussoorie" as one of its localities.

This species is distinguished by the apical half of the femora, tibiae and tarsi testaceous red; stiff hairs on pygidium in both sexes silvery.

12. *Tachytes vischnu* Cameron

1889. *Tachytes virchu* Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 138., M.

1897. *Tachytes vishnu* Cameron : Bingham, *Fauna Brit. India, Hym.*, **1** : 191, M. Loc. Mussoorie.

1976. *Tachytes vischnu* Cameron : Bohart and Menke, *Univ. Calif. Press* : 267, syns.

Distribution : India : Uttarakhand (Garhwal), Jammu and Kashmir.

Remarks : This species is recognised by median segment not so long as the mesonotum, narrow posteriorly; pygidial area short, truncate posteriorly and covered with thin short silvery pubescence.

Genus *Parapiagetia* Kohl

1896. *Parapiagetia* Kohl, *Ann. Naturhist. Hofmus. Wien*, **11** : 373.

Type-species : *Piagetia odontostoma* Kohl, 1884.

The genus *Parapiagetia* is closely allied group with the genus *Tachysphex* Kohl, 1883. These wasps are mostly black in colour, ranging 4-12 mm in length, the legs partly yellow or red, and the gaster or abdomen sometimes partly or fully red. The wings are clear or slightly infumate.

More than 19 species under this genus have been reported from the world. India represents only 2 species, viz., *erythropoda* (Cameron), 1889 and *substriatula* (Turner), 1917 under this genus. Of these, only the species *P. erythropoda* is recorded here from the state of Uttarakhand.

13. *Parapiagetia erythropoda* (Cameron)

1889. *Tachytes erythropoda* Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 135, F.

1897. *Tachytes erythropoda* Cameron : Bingham, *Fauna Brit. India, Hym.*, **1** : 187, F. Loc. Mussoorie.

1976. *Parapiagetia erythropoda* (Cameron) : Bohart and Menke, *Univ. Calif. Press* : 281.

Distribution : India : Uttarakhand (Garhwal).

Elsewhere : Libya, Egypt.

Remarks : This species is readily distinguished by having abdomen or gaster red or red and black; transverse pilose bands on abdomen silvery white; pygidial area covered with dense short pubescence; femora, tibiae and tarsi of legs and basal three segments of abdomen or gaster red; vertex marked with a shallow V-shaped groove or furrow.

Tribe **Trypoxylonini**

The tribe Trypoxylonini is cosmopolitan. The members of this tribe are a highly developed group of wasps in the subfamily Larrinae. They are termed as "Keyhole" wasps, due to their close association with human habitations by nesting in various household niches. This tribe can be distinguished by having notched eyes and reduced wing venation.

This tribe is divided into five genera. Of these, only two genera, viz., *Trypoxylon* Latreille, 1796 and *Pison* Jurine in Spinola, 1808 are known to occur in India. Both of them are also recorded here from the state of Uttarakhand. A key to both Indian genera is given below.

Key to the genera of Trypoxylonini

1. Fore wing with one submarginal cell; antennal socket not contiguous with fronto-clypeal suture. (Gaster long, clavate, often petiolate, segment I usually slender, at least two times as long as wide) ..... ***Trypoxylon*** Latreille

– Fore wing with 2 or 3 submarginal cell; antennal sockets contiguous with fronto-clypeal suture. (Gaster compact, sessile, segment I not petiolate or at most pedunculate in dorsal view) ..... ***Pison*** Jurine in Spinola

Genus ***Trypoxylon*** Latreille

Trypoxylon is a large genus in the subfamily Larrinae, varying 4-24 mm in length. They are mostly black in colour. This genus is well known for its slender bodies. It is divided into two subgenera, viz., *Trypoxylon* s. str. and *Trypargilum* Richards. Only the subgenus *Trypoxylon (Trypoxylon)* is represented in India. A key to the subgenera is given below.

Key to the subgenera of *Trypoxylon*

1. Transverse interantennal carina present; frontal carina weak or strong; dorsal margin of petiole socket convex, narrowly band-like or merely sharp edged; omaulus absent; propodeal sternite often present ..... ***Trypoxylon*** Latreille

– Transverse interantennal carina absent; frontal carina weak; dorsal margin of petiole socket a broad, flat or concave band; omaulus sometimes present; propodeal sternite absent. (Not recorded from Uttarakhand) ..... ***Trypargilum*** Richards

Subgenus ***Trypoxylon (Trypoxylon)*** s. str.

1796. *Trypoxylon* Latreille, *Précis Caract. Gen. Ins.* : 121.

Type-species : *Sphex figulus* Linnaeus, 1758.

1976. *Trypoxylon (Trypoxylon)* Latreille : Bohart and Menke, *Univ. Calif. Press* : 45, 339, syns., des.

This subgenus is represented by more than 25 species/subspecies in India. Of these, only the species *T. (T.) canaliculatum* Cameron, 1889 is the sole representative in the state of Uttarakhand.

14. ***Trypoxylon (Trypoxylon) canaliculatum*** Cameron

1889. *Trypoxylon canaliculatum* Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 118, 122.

1897. *Trypoxylon canaliculatum* Cameron : Bingham, *Fauna Brit. India, Hym.*, **1** : 225, F. Loc. Mussoorie, Barrackpore, Tirhoot.

1976. *Trypoxylon (Trypoxylon) canaliculatum* Cameron : Bohart and Menke, *Univ. Calif. Press* : 345.

Distribution : India : Uttarakhand (Garhwal), West Bengal.

Remarks : This species is recognised by having head minutely and closely punctured, clypeus bluntly carinated in the middle, median segment or propodeum with a more gradual slope, enclosing triangular space at base.

Genus ***Pison*** Jurine in Spinola

The genus *Pison* is found mostly throughout the world, varying 5-21 mm in length. Most of the species of this genus are black, but sometimes legs are red.

The genus is divided into four subgenera, viz., *Pison* s. str.; *Pisonoides* F. Smith, 1858; *Krombeiniellum* Richards, 1962 and *Entomopison* Menke, 1968. The first three subgenera are known to occur in India. Here only two subgenera, *Pison* and *Pisonoides* are recorded from the state of Uttarakhand. A key to the subgenera is given below.

Key to the subgenera of *Pison*

1. Externo-ventral margin of mandible notched or strongly angulate ..... ***Entomopison*** Menke

– Mandible bare 2

2. Eyes densely covered with short hair ..... ***Krombeiniellum*** Richards

– Eyes bare 3

3. Fore wing with 2 or 3 submarginal cells; gaster sessile, not pedunculate, segment I bell-shaped in dorsal view ..... ***Pison*** Jurine in Spinola

– Fore wing with two submarginal cells; gaster pedunculate, segment I subparallel in dorsal view ..... ***Pisonoides*** F. Smith

Subgenus ***Pison (Pison)*** s. str.

1808. *Pison* Jurine in Spinola, *Ins. Lig.*, **2**(4) : 255.

Type-species : *Pison jurini* Spinola, 1808.

1976. *Pison (Pison)* Jurine in Spinola : Bohart and Menke, *Univ. Calif. Press* : 45, 332, syns., des.

Representation of the subgenus *Pison (Pison)* is not rich in India. More than seven species are reported from India. Of these, only the species *P. (P.) punctifrons* Shuckard, 1838 is recorded here from the state of Uttarakhand.

15. ***Pison (Pison) punctifrons*** Shuckard

1838. *Pison punctifrons* Shuckard, *Trans. Ent. Soc. London*, **2**(1) : 77, F.

1976. *Pison (Pison) punctifrons* Shuckard : Bohart and Menke, *Univ. Calif. Press* : 336, syns.

Distribution : India : Uttarakhand (Garhwal), Sikkim, Himachal Pradesh, North-West Provinces, Karnataka.

Elsewhere : Myanmar, Singapore, Java, Japan, Bonins, Marianas, Carolines, Marshalls, Hawaii, St. Helena.

Remarks : Bingham (1897) recorded this species from Sikkim, Burma and another species *Pison striolatum* Cameron, 1897 from Mussoorie separately. Later on, Bohart and Menke (1976) listed *striolatum* as a junior synonym with this species, *P. (P.) punctifrons.*

This species is distinguished by having head, thorax and abdomen or gaster with silvery pubescence; presence of a deep transverse furrow or groove on the vertex; fore wing with three submarginal cells; abdomen smooth and shining.

Subgenus ***Pison (Pisonoides)*** F. Smith

1858. *Pisonoides* F. Smith, *J. Proc. Linn. Soc. London Zool.*, **2** : 104.

Type-species : *Pison obliteratum* F. Smith, 1858 [= *Pisonoides obliteratus* F. Smith, 1858].

1976. *Pison (Pisonoides)* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 45, 337.

The subgenus *Pison (Pisonoides)* is poorly represented in India. Only the species *P. (P.) obliteratum* F. Smith is recorded here from the state of Uttarakhand.

16. ***Pison (Pisonoides) obliteratum*** F. Smith

1858. *Pisonoides obliteratus* F. Smith, *J. Proc. Linn. Soc. London Zool.*, **2** : 104, F.

1897. *Pison obliteratum* F. Smith : Bingham, *Fauna Brit. India, Hym.*, **1** : 222, F., M., syns. Loc. Kumaun, North India; Borneo.

1976. *Pison (Pisonoides) obliteratum* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 337.

Distribution : India : Uttarakhand (Kumaun).

Elsewhere : Malaysia, Indonesia.

Remarks : This species is readily recognised by having head, thorax and median segment finely, but not closely punctured; fore wing with two submarginal cells; transverse silvery bands on the posterior margin of abdominal segments 2-4.

Subfamily CRABRONINAE

This subfamily includes a great variety of forms. They are commonly known as "Silver mouth or mustache wasps" due to presence of a transverse silvery clypeus, which together with the vertical pale stripes on the scapes, forms an inverted pi-mark (ɯ). They prey upon the most orders of insects, but Dipterans are favourite.

Diagnostic characters : Eyes moderately separated, converging below, ocelli normal. Antennal sockets close to fronto-clypeal suture; male with 11-13 and female with 12-antennal segments. Mandible with externo-ventral notch. Pronotal lobe and tegula separated. Notauli short and indistinct. Middle tibia with one apical spur, sometimes none in male, rearely none in females; middle coxae slightly to broadly separated, without dorso-lateral carina; hind femoral apex sometimes

thickened and truncate; claws simple; fore tarsus with or without a rake. Propodeum or median segment short, dorsal enclosure sometimes present; propodeal sternite absent. Fore wing usually with one submarginal cell, which may be fused with first discoidal cell, third discoidal cell absent. Jugal lobe of hind wing small, shorter to longer than submedian cell; second anal vein and subcosta absent. Gaster sessile or pedunculate, tergite I with lateral carina; male with 7 visible tergites; pygidial plate always present in females and in some males. Volsella simple and cerci absent.

This subfamily is represented by two tribes, viz., Oxybelini and Crabronini in India. Only the tribe Crabronini is known to occur in the state of Uttarakhand. However, a key to the tribes is given below.

Key to the tribes of Crabroninae

1. Submarginal and discoidal cells fused. (Not recorded from Uttarakhand) ..... **Oxybelini**
– Submarginal and discoidal cells separate, not fused ..... **Crabronini**

Tribe **Crabronini**

The tribe Crabronini is a large group of wasps in the subfamily Crabroninae. They are small to moderate in size, ranging 2 to 15 mm in length. Their thorax and legs are mostly stout, body generally elongated and gaster or abdomen pedunculate.

This tribe is represented by 12 genera in India. Of these only four genera, viz., *Crabro* Fabricius, 1775; *Dasyproctus* Lepeletier and Brullé, 1834; *Ectemnius* Dahlbom, 1845 and *Lestica* Billberg, 1820 have been recorded from the state of Uttarakhand. Of course, Bingham (1897) reported the genera *Dasyproctus* and *Ectemnius* as junior synonyms under the genus *Crabro*. But later on, Bohart and Menke (1976) gave them the generic status. A key to above reported 4 genera from Uttarakhand is given below.

Key to the genera of Crabronini

1. Gaster with slender peduncle, which is nodose toward the apex. (Body mostly dull, mat; scape bicarinate; varticaulus elongate or sometimes weak, approaching scrobe ... . ***Dasyproctus*** Lepeletier and Brullé
– Gaster sessile or pedunculate, but not nodose toward the apex 2
2. Female pygidial plate always flat, but absent in male; verticaulus absent, but sometimes replaced by an angle or sharp tooth. (Mandible usually bidentate apically) .... ***Crabro*** Fabricius
– Female pygidial plate may be flat or more commonly gutter-like; verticaulus present.. 3
3. Orbital foveae absent or shallow; male antennae with 12 segments or rarely with 13 segments ..... ***Ectemnius*** Dahlbom
– Orbital foveae distinct; male antennae always with 12 segments .... ***Lestica*** Billberg

Genus ***Crabro*** Fabricius

1775. *Crabro* Fabricius, *Syst. Ent.* : 373.

Type-species : *Vespa cribraria* Linnaeus, 1758.

Bingham (1897) recorded 18 species under the genus *Crabro*. Most of these species are known to occur in India. Subsequently, Bohart and Menke (1976) transferred all these species from *Crabro* to another different genera. But they *(op. cit.)* recorded another five species from India which were described by different scientists after Bingham's (1897) publication. Here the material received from Uttarakhand is identified up to generic level.

17. ***Crabro*** sp.

Material examined : India : Uttarakhand : Haridwar : Bahadrabad, 1ex., 15.iv.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Garhwal).

Remarks : Due to less number of example as well as lack of literature, the specimen was identified up to generic level.

Genus ***Dasyproctus*** Lepeletier and Brullé

1834. *Dasyproctus* Lepeletier and Brullé, *Ann. Soc. Ent. France*, **3** : 801.

Type-species : *Dasyproctus bipunctatus* Lepeletier and Brullé, 1834.

Dasyproctus is a widely distributed small genus. In India, it is represented by four species, viz., *agilis* (F. Smith), 1858; *buddha* (Cameron), 1889; *pulveris* (Nurse), 1902 and *oppidanus* Leclercq, 1972. Of these, only former two genera are recorded here from the state of Uttarakhand. A key to the species is given below.

Key to the species of *Dasyproctus*

1. Enclosed space at base of median segment coarsely obliquely striate, sides smooth; 2nd and 4th abdominal segments with oblique spots, 5th segment with a transverse band greenish yellow ..... *agilis* (F. Smith)

– Enclosed space at base of median segment coarsely reticulate, sides obliquely striate; 3rd, 4th and 5th abdominal segments marked with bright yellow..... *buddha* (Cameron)

18. ***Dasyproctus agilis*** (F. Smith)

1858. *Crabro agilis* F. Smith, *J. Proc. Linn. Soc. London Zool.*, **2** : 42-130.

1976. *Dasyproctus agilis* (F. Smith) : Bohart and Menke, *Univ. Calif. Press* : 420, syns.

2003. *Dasyproctus agilis* (F. Smith) : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9** (Part-4) : 438.

Distribution : India : Uttarakhand (Kumaun), Sikkim, Himachal Pradesh, Meghalaya, Maharashtra, West Bengal.

Elsewhere : Myanmar, Philippines, Indonesia, Taiwan.

Remarks : Bingham (1897) recorded the species *Crabro orientalis* Cameron, 1890 and mentioned "Kumaun" as one of its localities. But subsequently, Bohart and Menke (1976) placed *orientalis* as a junior synonym with this species *Dasyproctus agilis* (F. Smith), 1858.

This species can be distinguished by having head closely and finely punctured; median segment obliquely striate, bearing a Y-shaped furrow on its posterior side; clypeus raised and keeled in the middle and other characters given in the key.

19. ***Dasyproctus buddha*** (Cameron)

1889. *Rhopalum buddha* Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**2** : 18.

1890. *Crabro buddha* Cameron : Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)**3** : 270.

1976. *Dasyproctus buddha* (Cameron) : Bohart and Menke, *Univ. Calif. Press* : 420, syns.

Distribution : India : Uttarakhand (Kumaun), West Bengal, Maharashtra, Tamil Nadu and probably throughout Northern India.

Remarks : Bingham (1896) established the species *Crabro brookii* from Kumaun. Later on, Bohart and Menke (1976) listed *C. brookii* as a junior synonym under the species *Dasyproctus buddha* (Cameron), 1889 in their catalogue.

This is a distinct species by having head finely, closely and strongly punctured; pronotum notched in the middle; pro- and mesonotum, scutellum sparsely punctured; abdomen with petiole almost clavate and other characters given in the key.

Genus ***Ectemnius*** Dahlbom

1845. *Ectemnius* Dahlbom, *Hym.* Europaea, **1** : 389.

Type-species : *Crabro guttatus* Dahlbom, 1845.

Ectemnius is the second largest genus in the tribe Crabronini. It is world-wide distributed. Most of the species/subspecies of this genus are originally transferred from the genus *Crabro*.

More than 17 species under this genus are known to occur in India. Only one species *E. palitans* (Bingham) has been recorded here from the state of Uttarakhand.

20. ***Ectemnius palitans*** (Bingham)

1896. *Crabro palitans* Bingham, *Proc. Zool. Soc. London* : 446, pl. 15, fig. 6, F.

1976. *Ectemnius palitans* Bingham : Bohart and Menke, *Univ. Calif. Press* : 427, syns.

Distribution : India : Uttarakhand (Kumaun), Uttar Pradesh, probably throughout India.

Elsewhere : Sri Lanka, Indonesia, Philippines, Taiwan.

Remarks : Bingham (1897) further recorded *Crabro palitans* which was described by him in 1896 and mentioned "Kumaun" as one of its localities.

This species can be distinguished from other species by having head and thorax finely aciculate

and dull; mesonotum densely and minutely punctured; clypeus with obscure vertical carina in the middle; median segment short, enclosing triangular space at base obliquely striate.

Genus ***Lestica*** Billberg

1820. *Lestica* Billberg, *Enumeratio Insectorum*, **2** : 107.

Type-species : *Crabro subterraneus* Fabricius, 1775.

Lestica is a small genus, but it is widely distributed including Oriental region. It is close to the genus *Ectemnius*. But due to presence of orbital foveae, it can easily be separated from *Ectemnius*.

The genus *Lestica* is poorly represented in India. Only a single species, *Lestica quadriceps* (Bingham), 1897 has been recorded from the state of Uttarakhand, which is discussed below.

21. ***Lestica quadriceps*** (Bingham)

1897. *Crabro quadriceps* Bingham, *Fauna Brit. India, Hym.*, **1** : 327, F., des., fig. Loc. Kumaun, North-West India.

1976. *Lestica quadriceps* (Bingham) : Bohart and Menke, *Univ. Calif. Press* : 431.

Distribution : India : Uttarakhand (Kumaun), probably throughout North-West India.

Remarks : This species is recognised by having head square above; presence of a double-keel in the anterior margin of clypeus; mesonotum coarsely punctured; median segment or propodeum short, slightly concave posteriorly and coarsely reticulate; legs short and stout; wings with a brownish tint along the costal margins.

Subfamily NYSSONINAE

Nyssoninae is moderately a large subfamily of this family, containing small to medium-large size wasps. Generally they nest in the ground. But some of them are called as "sand wasps", because of their sandy habitations, such as, the tribes Bembicini, Stizini etc.

In this subfamily, the most of the species prey upon the variety of other insects, from grasshoppers to flies. A few members are well-known as "Cicada killers" present in the tribe Gorytini. Some wasps are also named as "Cleptoparasites", found in the tribes Nyssonini, Stizini etc.

Diagnostic characters : Eyes parallel or converging below, rarely above. Mandible not notched nor toothed. Scutellum without complete notauli. Middle tibia with two or one or none apical spurs; claws simple. Propodeal sternite absent. Fore wing with two or three submarginal cells, of which second cell usually receives at least one recurrent vein; three discoidal cells present. Jugal lobe of hind wing usually small, rarely absent, at most half as long as anal area. Gaster or abdomen usually sessile, when pedunculate, made up of both tergite and sternite. Male genitalia usually with volsella differentiated into cuspis and digitus.

This subfamily is represented by 5 tribes, viz., Alyssonini, Nyssonini, Gorytini, Stizini and Bembicini in India. The state of Uttarakhand is represented by 2 tribes, viz., Stizini and Bembicini. A key to the tribes is given below.

Key to the tribes of Nyssoninae

1. Labrum exserted and at least as long as broad; hind ocelli deformed and often scar-like, middle tibia with one apical spur (rarely none in male *Bembix*) ..... **Bembicini**

– Labrum if exserted, the exposed area broader than long; hind ocelli rarely deformed; middle tibia with two apical spur (except a few *Stezoides)* ..... **Stizini**

Tribe **Stizini**

The members of the tribe Stizini are medium to large size stout wasps. They are mostly all black, or sometimes red black or yellow black in colour. Some of them are known as "sand wasps" (the genus *Bembecinus*) and some are Cleptoparasites (the genus *Stezoides*).

This tribe is represented by three genera, viz., *Stizus* Latreille, 1802-1803; *Stizoides* Guérin, 1844 and *Bembecinus* A. Costa, 1859 in India. The genus *Bembecinus* is known from the state of Uttarakhand.

Genus ***Bembecinus*** A. Costa

1859. *Bembecinus* A. Costa, *Fauna Regn. Nap.* : 4.

Type-species : *Bembecinus meridionalis* A. Costa, 1859.

Bembecinus is a cosmopolitan genus. It is the second largest genus in the subfamily Nyssoninae.

The species/subspecies of this genus are medium in size. They generally nest in hard dirty soil, or sometimes in sandy habitations.

This genus is represented by more than six species in India. Of these, only the species *Bembecinus reversus* (F. Smith), 1856 is known to occur in the state of Uttarakhand.

22. *Bembecinus reversus* (F. Smith)

1856. *Larra reversa* F. Smith, *Cat. Hym. Brit. Mus.*, **4** : 349, F., M.

1890. *Stizus reversus* (F. Smith) : Cameron, *Mem. Manch. Lit. Phil. Soc.*, (4)2 : 245.

1897. *Stizus reversus* (F. Smith) : Bingham, *Fauna Brit. India, Hym.*, **1** : 281, F., M., des. Loc. Mussoorie, Barrackpore, Sikkim, Central India, Bombay, Burma, Sumatra.

1976. *Bembecinus reversus* (F. Smith) : Bohart and Menke, *Univ. Calif. Press* : 532.

Distribution : India : Uttarakhand (Garhwal), Sikkim, West Bengal, Maharashtra, Central India.

Elsewhere : Myanmar, Indonesia.

Remarks : This species is mainly distinguished by having head black, vertex around the ocelli punctured, the scape of antennae yellow; mesonotum anteriorly with two parallel longitudinal impressed lines; abdomen or gaster as long as the head and thorax united.

Tribe **Bembicini**

The tribe Bembicini consists of medium to large size stout wasps. They are in general black, with white or yellow bands on the abdomen. The majority are commonly known as "sand wasps", because they prefer sandy habitats, such as, the genera *Bembix, Microbembex* etc.

Bohart and Menke (1976) noted that some members of this tribe are the best fliers. Because they can fly very fast in a straight line. Some females may sting, if they are caught and handled carelessly. But they are not at all dangerous.

So this tribe is very much interesting group of wasps in the subfamily Nyssoninae. It is represented by more than 15 genera. Of these, only the genus *Bembix* Fabricius, 1775 is the sole representative from India. Here the state Uttarakhand is recorded the same genus, which is detailed below.

Genus *Bembix* Fabricius

1775. *Bembix* Fabricius, *Syst. Ent.* : 23.

Type-species : *Bembix rostrata* (Linnaeus), 1758 [= *Apis rostrata* Linnaeus, 1758].

1775. *Bembyx* Fabricius, *Syst. Ent.* : 361.

1776. *Bembex* Fabricius, *Genera insect.* : 122.

1976. *Bembix* Fabricius : Bohart and Menke, *Univ. Calif. Press* : 54, 543, syns.

Bembix is a widely distributed genus. It is the largest genus in the subfamily Nyssoninae. Most of the members are well-known as "sand wasps" because they build their nest in sandy or hard soil. Some of them are the best fliers.

Bingham (1897) mentioned that the Indian species, *B. fossoria* Smith, 1878 nest their own tunnels in the sandy banks with the help of their powerful ciliated anterior legs in the manner of a dog digging.

Bohart and Menke (1976 : 54, Footnote-26) noted, "According to Pate (1937), *Bembix* is the etymologically correct spelling. They *(op. cit.)* accepted Pate's (1937) view and placed *Bembyx* Fabricius, 1775, *Bembex* Fabricius, 1776, *Apobembex* Pate, 1937 and *Epibembex* Pate, 1937 as junior synonyms under the genus *Bembix* Fabricius, 1775.

India represents more than 26 species/ subspecies under the genus *Bembix*. Of these, only one species *Bembix latitarsis* Handlirsch, 1893 is reported here from the state of Uttarakhand.

23. *Bembix latitarsis* Handlirsch

1893. *Bembex latitarsus* Handlirsch, *Sitzungsb. Akad. Wiss. Wien* : 707.

1897. *Bembex latitarsus* Handlirsch : Bingham, *Fauna Brit. India, Hym.*, **1** : 289, F., M., des. Loc. Mussoorie.

1976. *Bembix latitarsis* Handlirsch : Bohart and Menke, *Univ. Calif. Press* : 547.

Material examined : India : Uttarakhand : Tehri Garhwal : Chamba, Chaubel Gaon, 1 ex., 1672 m., 6.iv.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Garhwal), Himalayas.

Remarks : This species can be recognised by having head and thorax covered with griseous

pubescence; inner orbits prominently divergent towards the clypeus; antennae black; mesonotum without any U-shaped mark; anterior tarsi of both male and female distinctly slender, legs yellow and black.

Subfamily PHILANTHINAE

Philanthinae is a large subfamily, containing small to large size wasps. They are mostly colourful wasps, sculptured or ornamented with red, yellow or white bands or marks. They are found in and around the flowers and help to carry the pollens, specially the tribe Cercerini. Most of them are ground nesting. The nests are provisioned with Hymenoptera, especially aculeates, or Coleoptera.

Diagnostic characters : Eyes widely separated, inner orbit emarginate or entire, converging above. Antennal sockets separated from fronto-clypeal suture; male with 13 and female with 12-antennal segments. Mandible without externo-ventral notch. Notauli usually distinct; omaulus, sternaulus and acetabular carina absent. Middle tibia with one apical spur; claws simple. Propodeum or median segment short to moderately long; dorsal enclosure present, without propodeal sternite. Fore wing with three submarginal cells, II and III each usually receiving one recurrent vein; jugal lobe of hind wing small to large; second anal vein and subcosta absent. Gaster sessile, pedunculate, or occasionally petiolate, petiole clearly composed of tergite and sternite; male with 7 exposed terga; pygidial plate usually present. Volsella simple or with digitus and cuspis; cerci usually absent.

This subfamily is divided into six tribes. Of these, only two tribes, viz., Philanthini and Cercerini are known to occur in India. Uttarakhand also represents only the tribe Cercerini. A key to both Indian tribes is given below.

Key to the tribes of Philanthinae

1. Apex of hind femur simple; episternal sulcus present and usually reaching ventral area of mesopleuron; volsella with a digitus and cuspis. (Inner orbit of eye sharply angled or notched, but sometimes weak in some male of genus *Philanthus* whose eyes converge strongly towards vertex) ..... **Philanthini**

– Apex of hind femur somewhat truncate, flattened area sometimes kidney-shaped or forming an apico-ventral process; episternal sulcus absent or very short; volsella simple or divided into a digitus and cuspis. (Mesopleuron with a broad, deep scrobal sulcus) ..... **Cercerini**

Tribe Cercerini

The members of the tribe Cercerini are very colourful with sculptured body. They are moderately small to large in size. This tribe is represented by two genera, viz., *Cerceris* Latreille, 1805 and *Eucerceris* Cresson, 1856 in world fauna. Only the genus *Cerceris* is known to occur in India. The same is also recorded here from the state of Uttarakhand. A key to the genera is given below for ready reference.

Key to the genera of Cercerini

1. Outer veinlet of submarginal cell III meeting marginal cell before its outer third; terga without median or submedian transverse depressions ..... ***Cerceris*** Latreille

– Outer veinlet of submarginal cell III meeting marginal cell well beyond its outer third; terga with median or submedian transverse depressions ..... ***Eucerceris*** Cresson

Genus *Cerceris* Latreille

1802-03. *Cerceris* Latreille, *Hist. Nat. Crust. Ins.*, **3** : 367.

Type-species : *Philanthus ornatus* Fabricius, 1790 [= *Sphex rybyensis* Linnaeus, 1771].

Cerceris is a largest sphecid genus which is widely distributed. It contains a huge number of species/subspecies in relation to other genera. More than 48 species/subspecies have been reported from India. Of these, only the species *Cerceris vigilans* Smith, 1856 along with one unknown species (identify up to generic level) are recorded here from the state of Uttarakhand.

Due to non-availability of sufficient literature as well as specimens for study, a key to the species could not be provided here.

24. *Cerceris vigilans* F. Smith

1856. *Cerceris vigilans* F. Smith, *Cat. Hym. Brit. Mus.*, **4** : 454, M.

1976. *Cerceris vigilans* F. Smith : Bohart and Menke, *Univ. Calif. Press* : 589.

2003. *Cerceris vigilans* F. Smith : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9** (Part-4) : 444.

Distribution : India : Uttarakhand (Kumaun), Sikkim, Orissa, West Bengal, Maharashtra, Tamil Nadu.

Elsewhere : Myanmar.

Remarks : Bingham (1897) also recorded this species *C. vigilans* F. Smith, 1856 and mentioned "Kumaun" as one of its localities.

This species can easily be distinguished by having head, thorax and abdomen or gaster closely and coarsely punctured, clypeus large, arched anteriorly; median segment with enclosed space at base sparsely punctured; abdominal or gastral segments 2-4 ferruginous red, but the 4th shaded with fuscous black.

25. ***Cerceris*** sp.

Material examined : India : Uttarakhand : Nainital : Ramnagar, Himmatpur, 1 ex., 17.xii.2003, coll. B.G. Kundu and Party.

Distribution : India : Uttarakhand (Kumaun).

SUMMARY

The present paper deals with the Sphecidae fauna of the state Uttarakhand, India. The members of the family Sphecidae are commonly known as blue mud-dauber, black and yellow mud-dauber, digger, sand or hunting wasps. They are mainly beneficial to man.

The majority of the members of this family are predatory on a great variety of terrestrial insects, but some are cleptoparasitic. They show complexities in their behaviour, and are always being subject of biological studies.

The family Sphecidae is represented by more than 450 species/subspecies in India. Here only 25 species belonging to 18 genera under 8 subfamilies have been reported from the state of Uttarakhand.

The keys to the subfamilies, tribes, genera, subgenera and species are provided for the identification of various taxa of the family Sphecidae.

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REFERENCES

BINGHAM, C.T. 1897. Wasps and Bees. *The Fauna of British India, including Ceylon and Burma, Hymenoptera,* **1** : 1-579 and i-xxix. Taylor and Francis, London.

BOHART, R.M. and MENKE, A.S. 1976. Sphecid wasps of the World (A generic revision). *University of California Press, California* : 1-695.

BROTHERS, D.J. 1975. Phylogeny and classification of the Aculeate Hymenoptera with special reference to Mutillidae. *Kansas Univ. Sci. Bull.,* **50**(11) : 483-648.

CAMERON, P. 1888-1890. Insecta, Hymenoptera, vol. 2 (Fossores), xi + 413 pp. In : F.D. Godman and D. Salvin, Biologia Centrali-Americana, Taylor and Francis, London (pp. 1-32 = 1888, 33-46 = 1889, 65-128 = 1890, 129-176 = 1891, Sphecidae = pp. 1-158).

CAMERON, P. 1902. Descriptions of new genera and species of Hymenoptera collected by Major C.S. Nurse at Deesa, Simla and Ferozepore, *J. Bombay Nat. Hist. Soc.,* **14** : 267-293.

GOULET, H. and HUBER, J. 1993. Hymenoptera of the world, An identification guide to families. Centre for Land and Biological Resources Research, Ottawa, Ontario.

GUPTA, S.K. 2007. Insecta : Hymenoptera : Aculeata. *Zool. Surv. India, Faunal Diversity Western Doon Shiwaliks, Spl. Publ.* : 35-39.

JONATHAN, J.K., RAY, K.K. and KUNDU, B.G. 2000. Insecta : Hymenoptera : Sphecidae. *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series,* **4**(Part-7) : 161-222.

JONATHAN, J.K. and KUNDU, B.G. 2003. Insecta : Hymenoptera : Sphecidae. *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9**(Part-4) : 417-446.

KIRBY, W. 1798. *Ammophila,* a new genus of insects in the class Hymenoptera, including the *Sphex sabulosa* of Linnaeus. *Trans. Linn. Soc. London,* **4** : 195-212.

KOHL, F.F. 1892. Neue Hymenopterenformen. *Ann. Naturhist. Hofmus. Wien,* **7** : 197-234.

KROMBEIN, K.V. 1936. Biological notes on some solitary wasps. *Ent. News,* **47** : 93-99.

KROMBEIN, K.V. 1981. Biosystematic studies of Ceylonese wasps, VIII : A monograph of the Philanthidae (Hymenoptera : Sphecoidea). *Smithsonian Institution Press, Washington D.C.,* No. **343** : 1-75.

KROMBEIN, K.V. 1984a. Biosystematic studies of Ceylonese wasps, XII : Behavioral and life history notes on some Sphecidae (Hymenoptera : Sphecoidea). *Smithsonian Institution Press, Washington D.C.,* No. **387** : 1-29.

KROMBEIN, K.V. 1984b. Biosystematic studies of Ceylonese wasps, XIII : A monograph of the Stizinae (Hymenoptera : Sphecoidea : Nyssonidae). *Smithsonian Institution Press, Washington D.C.,* No. **388** : 1-37.

KROMBEIN, K.V., HUD, P.D., SMITH, D.R. and BURK, B.D. 1979. Catalogue of Hymenoptera in America North of Mexico. *Smithsonian Institution Press, Washington D.C.,* **2** : 1195-2209.

KROMBEIN, K.V. and VAN DER VECHT, J. 1987. Biosystematic studies of Ceylonese wasps, XVII : A revision of Sri Lankan and South Indian *Bembix* Fabricius (Hymenoptera : Sphecoidea : Nyssonidae). *Smithsonian Institution Press, Washington D.C.,* No. **451** : 1-30.

KUNDU, B.G., GHOSH, S.N. and TIWARI, R.N. 2006. Insecta : Hymenoptera : Aculeata : Sphecidae. *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series,* **13** (Part-2) : 399-426.

MADHAVIKUTTY, M. 2004. Description of a new species of the genus *Trirogma* Westwood (Hymenoptera : Spheciformes) from India, *Perspectives on Biosystematics and Biodiversity* T.C.N. Com. Vol. March 2004 : 593-596.

PATE, V.S.L. 1937. The generic name of Sphecid wasps and their type-species. *Mem. Amer. Ent. Soc.,* **9** : 1-103.

ROY, S.B. and KUNDU, B.G. 1985. Fauna of Namdhapa, Arunachal Pradesh (Insecta : Hymenoptera). *Rec. zool. Surv. India,* **82**(1-4) : 221-229.

SAUSSURE, H. de 1867. Hymenoptera, pp. 1-138, In : Reise der osterreichischen Frigatte Novara etc., *Zoologischer Theil,* vol. **2** : 1-156, Wien.

SMITH, F. 1856. Catalogue of Hymenopterous insects in the collection of the British Museum, part IV, Sphecidae, Larridae and Crabronidae. : 207-497. London.

SUDHEENDRAKUMAR, V.V. and NARENDRAN, T.C. 1989. Sphecoid wasps of Kerala, India. *Sphecos,* **18** : 11-12.

TURNER, R.F. 1911. Notes on fossorial Hymenoptera, IV. *Ann. Mag. Nat. Hist.,* (8)**7** : 479-485.

TURNER, R.E. 1912. A monograph of the wasps of the genus *Cerceris* inhabiting British India. *J. Bombay Nat. Hist. Soc.,* **21** : 476-516.

TURNER, R.E. 1916. Notes on the wasps of the genus *Pison* and some allied genera. *Proc. Zool. Soc. London* : 591-629.

VAN DER VECHT, J. 1949. On Indo-Australian *Bembecinus,* with special reference to the species occurring in Java. *Treubia,* **20** : 289-307.

VAN LITH, J.P. 1959. Contribution to the knowledge of the Indo-Australian Pseninae. *Zool. Verh.,* (39) : 1-69.

VAN LITH, J.P. 1962. Contribution to the knowledge of the Indo-Australian Pseninae. Part II. *Psenulus* Kohl, 1896. *Zool. Verh.,* (52) : 1-118.

VAN LITH, J.P. 1965. Contribution to the knowledge of the Indo-Australian Psenini. Part III. *Zool Verh.,* (73) : 1-80.

Zool. Surv. India
Fauna of Uttarakhand, State Fauna Series, **18**(Part-2), 2010 : 725-748.

INSECTA : HYMENOPTERA : ACULEATA (VESPIDAE AND APIDAE)

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INTRODUCTION

The members of the families Vespidae and Apidae are mostly colourful hymenopteran insects. They are minute to large in size. They have highly specialized morphological features. Here the state Uttarakhand represents both the families which belong to superfamilies Vespoidea and Apoidea respectively under Aculeate Hymenoptera.

The family Vespidae includes the true or yellow wasps and the family Apidae comprises social bees. They are mostly fascinating groups of insects for their complex social organization and nest architecture. Mentally they are considered most highly developed groups among all insects. They are widely distributed in all ecosystems.

Both wasps and bees are economically, medically and biologically important groups of insects in the order Hymenoptera. They are characterized by having thorax with three pairs of strong appendages and two pairs of membranous wings, the hind wings smaller than fore wings, their mouth-parts with biting mandibles and labium adapted for licking juices of flowers, presence of true stings.

The important work available on Indian wasps and bees is by Bingham (1897). He (*op. cit.*) published a valuable work *"The Fauna of British India, including Ceylon and Burma"* on wasps and bees. Subsequently, Das and Gupta (1983, 1989) made valuable contributions on Vespidae from India and its adjacent countries. But no one other than the above workers has exclusively studied on these groups (Vespidae and Apidae) of insects from the state of Uttarakhand.

Besides the above publications, there are some important contributions on wasps and bees from India made by Smith (1871, 1875), Bingham (1908), Aiyar (1916-1917), Dover and Rao (1922), Schwarz (1939), van der Vecht (1941, 1957, 1959, 1962, 1966, 1981), Dixit (1956), Chhotani and Ray (1975), Gupta and Das (1977), Day (1979), Yamane *et al.* (1980), Williams (1983, 1988), Gadagkar and Joshi (1984), Roy and Kundu (1985), Jacobson (1986), Petersen (1987), Archer (1991), Jonathan *et al.* (1999, 2000), Engel (2002), Lambert and Narendran (2002), Ray (2003), Jonathan and Kundu (2003), Michener *et al.* (2003), Lambert (2004), Jobiraj (2004), Gusenleitner (2004, 2006), Lambert *et al.* (2005a, 2005b, 2007, 2008), Kundu *et al.* (2006), Gupta (2007) and Kojima *et al.* (2007).

Northern part of India, especially the state of Uttarakhand, is very important from the view point of faunal diversity. An attempt has been made here to provide a consolidated account on the fauna of families Vespidae and Apidae from the state of Uttarakhand. The classification of Vespidae followed here is after Das and Gupta (1989), Carpenter (1996a & b), Carpenter and Kojima (1997), Carpenter and Nguyen (2003), Kojima *et al.* (2007) and Apidae after Michener (1965), Engel (2002).

TOPOGRAPHY

Uttarakhand, the newly constituted 27th state of India, is the terrain of western Himalayas. It is separated from Uttar Pradesh in the month of September in 2000. It lies in between 28° 48' to 31° 30' N longitude and 77° 30' to 81° 66' E latitude. The state Uttarakhand is bounded by Himachal Pradesh in north-west, China in north, Haryana in west, Nepal in east and Uttar Pradesh in south. Dehradun is the capital of this new state.

The state Uttarakhand consists of two major hill ranges, viz., Garhwal and Kumaun. Garhwal hill range comprises 7 districts, namely, Dehradun, Haridwar, Uttar Kashi, Tehri Garhwal, Pauri

Garhwal, Rudraprayag and Chamoli. Kumaun hill range consists of 6 districts, namely, Bageshwar, Almora, Pithoragarh, Nainital, Champawat and Udham Singh Nagar. The state occupies an area of 55,845 sq. km. (approx.), of which 62% of area is covered by forest.

Uttarakhand especially in Garhwal hills is a land, which blessed with snow-bounded peaks, rolling meadows, scenic valleys, meandering rivers, dense forests, etc. The holy rivers Ganga and Yamuna have their sources in this hills of the state. The queen of hills Mussoorie, the world famous Chardhams Sri Badrinath-Sri Kedarnath-Gangotri-Yamunotri, the lake district of India Nainital, Ranikhet, Almora, etc., the world famous Jim Corbett National Park and many more tourist destinations are the part of Uttarakhand.

The average temperature varies during summer 45° C to 11° C and in winter from 32° C to 2° C. At higher elevations it remains cold throughout the year. Rainfall is related to the monsoon rainfall of India and is on the average about 2000 mm/annum in most of the areas of Uttarakhand. On the basis of topography, climate and geographical locations, this state influences the forest vegetation remaining faunal diversity. Uttarakhand has its flora and fauna which are diverse as well as rare. The altitudinal variations and rainfall patterns have also contributed to the vegetation diversity.

MATERIAL AND METHOD

These groups of insects (wasps and bees) mostly occur in the agriculture fields, various vegetables and flower gardens and crop fields, etc. So they are being collected by sweeping with the help of insect nets. The collected specimens are killed in a killing jar using benzene or ethyl acetate. Afterward, they are kept in the insect envelop with proper labels mentioning locality, altitude, date and name of the collector, etc. Then all the collection are preserved dry with paradichlorobenzene and naphthalene adding carbolic acid as antifungal agent in a box properly in the field.

In the laboratory of the department, the specimens are set, pinned and mounted to display properly for easy handling under binocular microscope during the process of identification. Then the identified specimens are kept in insect boxes or cabinets with proper labels. Smaller specimens are generally preserved in 70-80% alcohol permanently with proper labels after study. For detailed specific identification, the genital structures, mandibles and other mouth-parts are also dissected out and mounted on slides.

This taxonomic work of these groups of insects (wasps and bees) of Uttarakhand is based on the collection made by the authors and various scientists of the department from this state time to time. Besides this, the specimens lying in the National Zoological Collection of this department have also been incorporated. The entire materials studied under this project have been deposited in the collection of the Zoological Survey of India, Kolkata (NZSI).

SYSTEMATICS

The present taxonomic paper incorporates 37 species/subspecies belonging to 7 genera and 2 subfamilies under the family Vespidae. The authors excluded the subfamily Eumeninae under the family Vespidae, due to lack of sufficient literatures and specimens. Under the family Apidae, 8 species belonging to 3 genera and 2 subfamilies are reported here from the state of Uttarakhand. Out of 37 species/subspecies under the family Vespidae, 3 species are new record from this state which are marked with single asterisk (*) in the systematic account.

The keys to the families, subfamilies, tribes, genera, subgenera, species and subspecies are provided here for the identification of various taxa of this region, which are mainly based on the works of Bingham (1897), van der Vecht (1957, 1959), Michener (1965), Das and Gupta (1989), Goulet and Huber (1993), Engel (2002), Carpenter and Nguyen (2003) and Kojima *et al.* (2007). The diagnostic characters of families are also incorporated. The diagnostic characters of the species are provided, where the genus is represented by a single species or subspecies. The species/subspecies, not available in the collection but known from Uttarakhand, have been reviewed from literature and also incorporated here in the systematic account.

TAXONOMIC TERMINOLOGY

The terms of morphological characters used in the text are mainly based on the works of Bingham

(1897), Richards (1956), Michener (1965), Das and Gupta (1989) and Goulet and Huber (1993). The abbreviations used in the text are : cat. = The reference itself is a catalogue; key = A key is provided in the publication to identify the species/ subspecies; syn. = The synonymy or taxonomic position of the species/subspecies; sex = M, F, W are used to cite male, female and worker sexes of the taxa described; distr. = The place from where the species/subspecies was recorded is given; m. = Metre, indicating here the total elevation from the sea-level; mm. = Millimetre, indicating here the total amount of rainfall in a particular area and also length of the boby; ex. = Number of specimen(s)/example(s); des. = The species/subspecies is described or there is a descriptive note; fig. = The species/subspecies is illustrated in whole or in part; coll. = The name of collector who collects the specimen(s) from a particular locality.

SYSTEMATIC ACCOUNT

Family VESPIDAE
Subfamily POLISTINAE
Tribe **Polistini**
Genus ***Polistes*** Latreille, 1802
Subgenus ***Polistes (Gyrostoma)*** Kirby, 1828

1. *Polistes (Gyrostoma) olivaceus* (De Geer), 1773
2. *Polistes (Gyrostoma) rothneyi carletoni* van der Vecht, 1968
3. *Polistes (Gyrostoma) rothneyi krombeini* van der Vecht, 1968
4. *Polistes (Gyrostoma) rothneyi rothneyi* Cameron, 1900
5. *Polistes (Gyrostoma) tenebricosus* Lepeletier, 1836
6. *Polistes (Gyrostoma) wattii* Cameron, 1900

Subgenus ***Polistes (Polistella)*** Ashmead, 1904

7. *Polistes (Polistella) adustus* Bingham, 1897
8. *Polistes (Polistella) quadricingulatus* Gusenleitner, 2006
9. *Polistes (Polistella) sagittarius* de Saussure, 1853
10. *Polistes (Polistella) stigma tamula* (Fabricius), 1798
11. *Polistes (Polistella) strigosus atratus* Das and Gupta, 1989

Tribe **Ropalidiini**
Genus ***Ropalidia*** Guérin-Meneville, 1831

12. *Ropalidia brevita* Das and Gupta, 1989
13. *Ropalidia colorata* van der Vecht, 1941
14. *Ropalidia cyathiformis* (Fabricius), 1804
15. *Ropalidia fasciata* (Fabricius), 1804
16. *Ropalidia jacobsoni* (du Buysson), 1908
17. *Ropalidia marginata* (Lepeletier), 1836
18. *Ropalidia mathematica* (Smith), 1860
19. *Ropalidia rufocollaris* (Cameron), 1900
20. *Ropalidia rufoplagiata* (Cameron), 1905
21. *Ropalidia stigma* (Smith), 1858
22. *Ropalidia variegata* (Smith), 1852

Genus ***Parapolybia*** de Saussure, 1853

23. *Parapolybia varia varia* (Fabricius), 1787

Subfamily VESPINAE
Genus ***Vespa*** Linnaeus, 1758

24. *Vespa affinis* (Linnaeus), 1764
25. *Vespa analis* Fabricius, 1775
26. *Vespa auraria* Smith, 1852
*27. *Vespa basalis* Smith, 1852
28. *Vespa bicolor* Fabricius, 1787
29. *Vespa mandarinia* Smith, 1852
*30. *Vespa orientalis* Linnaeus, 1771
*31. *Vespa tropica* (Linnaeus), 1758
32. *Vespa vivax* Smith, 1870

Genus ***Provespa*** Ashmead, 1903

33. *Provespa anomala* (de Saussure), 1853

Genus ***Dolichovespula*** Rohwer, 1916

34. *Dolichovespula lama* (du Buysson), 1903

Genus ***Vespula*** Thomson, 1869

35. *Vespula flaviceps* (Smith), 1870
36. *Vespula orbata* (du Buysson), 1902
37. *Vespula structor* (Smith), 1870

Family APIDAE
Subfamily APINAE
Tribe **Apini**
Genus ***Apis*** Linnaeus, 1758

1. *Apis (Megapis) dorsata* Fabricius, 1793
2. *Apis (Micrapis) florea* Fabricius, 1787

Tribe **Meliponini**
Genus ***Trigona*** Jurine, 1807

3. *Trigona* sp.

Subfamily BOMBINAE
Tribe **Bombini**
Genus ***Bombus*** Latreille, 1802

4. *Bombus atrocinctus* Smith, 1870
5. *Bombus festivus* Smith, 1861
6. *Bombus haemorrhoidalis* Smith, 1852
7. *Bombus orientalis* Smith, 1854
8. *Bombus tunicatus* Smith, 1852

Key to the families

1. Tegula touching pronotum when wings folded so that mesonotum separated from mesopleuron by tegula; body hairs thin, smooth ..... VESPIDAE

- Tegula separated from pronotum so that mesonotum touches mesopleuron; body hairs with short to long branches, especially on propodeum, near bases of wings, around coxae, or on margin of terga ..... APIDAE

Family VESPIDAE

The Vespidae is a cosmopolitan, but predominantly tropical family. The members of this family, commonly known as hornet wasps, yellow jackets, hover wasps, potter wasps or paper wasps, are chiefly predators of many insect larvae. Some of the species are also used as bio-control agent of agriculture (insect) pests. Their painful sting may, sometimes prove fatal yet their venom has its utilization in immunization.

The family Vespidae is recognised by the following characters : Antennae 13-segmented in male and 12-segmented in female; eyes emarginate; pronotum extending back to tegula, and mesopleuron without any oblique suture; wings longitudinally folded in repose (except in Masarinae and Stenogastrinae); fore wing with first discoidal cell elongate and longer than submedian cell; hind wing with an anal cell and enclosed cells; tronchanters not divided and trochantellus absent; middle tibiae with one or two apical spurs; tarsal claws toothed, bifid or simple; thorax and gaster joined together by a long and slender or short petiole; gaster with spiracles on 1-7 segments and a sting without sheaths; male genitalia with characteristic spiniform parameres.

The family Vespidae is represented by six subfamilies. Of these, two subfamilies, viz., Euparagiinae and Masarinae do not occur in India. Other four subfamilies are recognised by the following key. Of course, only two subfamilies, viz., Polistinae and Vespinae are reported here from the state of Uttarakhand.

Key to the subfamilies of family Vespidae

1. Pronotal lobe separated from tegula by a distance several times in length; clypeus projecting ventrally in a point or rounded; fore wings not longitudinally folded at rest .... STENOGASTRINAE#

   Pronotal lobe separated from tegula by a distance equal to its length or less; clypeus variable, pointed, truncate or rounded in males of some species; fore wings longitudinally folded at rest 2

2. Parategula (horizontal lobe projecting from posterolateral corner of mesoscutum) usually present; claws usually bifid; posterior lingual plate longer than broad ..... EUMENINAE#

   Parategula absent, mesoscutum often with vertical lamella along posterolateral edge, but without horizontal lobe; claws simple; posterior lingual plate as broad as long 3

3. Hind coxa with dorsal carina on posterior surface; hind wing without jugal lobe; metasoma sessile with first tergum having abrupt declivity, shape broad trapezoid in dorsal view ..... VESPINAE

- Hind coxa without dorsal carina; hind wing with jugal lobe; metasoma variable in shape, petiolate to subsessile or funnel shaped in dorsal view ..... POLISTINAE

(# not recorded here from Uttarakhand)

Subfamily POLISTINAE

The members of the subfamily Polistinae are commonly known as paper wasps. Their nests consist of a single comb which is not enclosed in a paper envelop. According to Kojima and Carpenter (1997), this subfamily is divided into 2 tribes, viz., Polistini and Ropalidiini. They are known to occur in India including Uttarakhand. These can be distinguished by the following key.

Key to the tribes of Polistinae

1. First gastral segment always petiolate and usually strongly swollen apically; pronotal lobe apically in front of tegula without a carina; dorsal episternal groove always absent; subtegular area basally in front of pronotal lobe not margined with a carina; second gastral tergite and sternite fused ..... **Ropalidiini**

- First gastral segment subpetiolate, shorter than second segment; pronotal lobe apically in front of tegula with a distinct carina; dorsal episternal groove either present or absent; subtegular area basally in front of pronotal lobe margined with distinct carina; second gastral tergite and sternite never fused. (Muscle slit of propodeum long and narrow; subdiscoideus joins postnervulus at or close to middle; apical margin of postscutellum usually almost truncate) ..... **Polistini**

Tribe **Polistini**

The tribe Polistini is represented by a single genus, *Polistes* Latreille from Indian subregion.

Genus ***Polistes*** Latreille

1802. *Polistes* Latreille, *Hist. Nat. Crust. Insect.*, **3** : 363.

Type- species : *Vespa gallica* Linnaeus, 1767.

Richards (1973) divided the genus *Polistes* into elevan sybgenera. Subsequently, Carpenter (1996a) divided the genus *Polistes* into four subgenera, viz., *P. (Polistes)* Latreille, 1802, *P. (Gyrostoma)* Kirby, 1828, *P. (Polistella)* Ashmead, 1904 and *P. (Aphanilopterus)* Meunier, 1888, of which the first three subgenera are recorded from Indian subregion. In Uttarakhand, only two subgenera have been recorded. A key is provided for ready reference.

Key to the Indian subgenera of *Polistes*

1. Pronotal fovea present; clypeus not extending far beyond the anterior tentorial pits; anal lobe of hind wing large and separated from the rest of the wing membrane by a smooth incision 2

- Pronotal fovea absent; clypeus extending far beyond the anterior tentorial pits; anal lobe of hind wing more or less reduced ..... ***Polistes (Polistella)*** Ashmead

2. First gastral sternite with well-developed margin at base. In males, clypeus touching the inner eye margin; terminal antennal segment coiled apically ..... ***Polistes (Polistes)*** Latreille#

First gastral sternite with or without well-developed margin at base. In males, clypeus touching or not touching the inner eye margin; terminal antennal segment usually not coiled apically ..... ***Polistes (Gyrostoma)*** Kirby

(# not recorded here from Uttarakhand).

Subgenus ***Polistes (Gyrostoma)*** Kirby

1828. *Gyrostoma* Kirby, *in* Kirby and Spence, *Introd. Entomol.*, Ed. 5, Ed. 2 (vol. 3) : 36, 631.

Type-species : *Cyclostoma gigas* Kirby and Spence, 1826.

1996. *Gyrostoma* Kirby : Carpenter, *Amer. Mus. Nov.*, **3188** : 1-39, syns.

The subgenus *Polistes (Gyrostoma)* Kirby is represented by 51 species/subspecies from the world. Of these, only 9 species/subspecies have been reported from India (Carpenter, 1996b). Here the state Uttarakhand represents only 6 species/ subspecies. They are recognised by the following key.

Key to the species of *Polistes (Gyrostoma)*

1. Mesepisternum without epicnemial carina. In males, subgenital plate not squarish, narrow at apex, without apophyses; digitus long and narrow ..... *tenebricosus* Lepeletier

Mesepisternum with distinct epicnemial carina. In males, subgenital plate squarish, with a pair of apophyses; digitus basally wide 2

2. Transverse striations of propodeum weak, not distinct near lower margin of side; ventral metapleuron nearly impunctate or with scattered fine punctures 3

Transverse striations of propodeum strong, almost reach the lower margin of side; ventral metapleuron with distinct punctures. In males, apophyses longer than wide with some pubescence ..... *rothneyi* Cameron

3. Occipital carina incomplete in female. In males, apophyses flattened and spatulate at

apex, shiny and without pubescence .... *olivaceus* (De Geer)

- Occipital carina complete in female. In males, apophyses long, narrow and densely pubescent ..... *wattii* Cameron

1. ***Polistes (Gyrostoma) olivaceus*** (De Geer)

1773. *Vespa olivacea* De Geer, *Mem. Hist. Insect.*, **3** : 582, fig.

1787. *Vespa hebraea* Fabricius, *Mant. Ins.*, **1** : 292.

1897. *Polistes hebraeus* (Fabricius) : Bingham, *Fauna Brit. India, Hym.*, **1** : 398, F, W, des., fig., syn.

1989. *Polistes (Megapolistes) olivaceus* (De Geer) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 52. Loc. Kumaun and Garhwal Hills in Uttarakhand.

1996. *Polistes (Gyrostoma) olivaceus* (De Geer) : Carpenter, *Nat. Hist. Evol. Paper-Wasps* : 53.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Assam, Meghalaya, Manipur, Sikkim, Tripura, Jammu & Kashmir, Uttar Pradesh, Himachal Pradesh, West Bengal, Madhya Pradesh, Karnataka.

Elsewhere : Nepal, Sri Lanka, Myanmar, China, Japan (?), Philippines, Vietnam, Laos, Cambodia, Thailand, Iran, Malaysia, North and East Africa, Fiji, Tahiti, Samoa, Amirantes, Seychelles, Madagascar, Reunion, Mauritius, Tanzania, Chile, Indonesia, Singapore, Marianas, New Caledonia, Tongas, Tuamotu Archipelago, Marquesas, Easter Is., U.S.A., Hawaii, Australia, New Zealand, Chagos Archipelago, Egypt, Oman, Afghanistan.

Polistes (Gyrostoma) rothneyi Cameron

Carpenter (1996b) listed 17 subspecies under the species *Polistes (Gyrostoma) rothneyi* Cameron from the world. Of these, 5 subspecies viz., *rothneyi rothneyi* Cameron, 1900, *rothneyi carletoni* van der Vecht, 1968, *rothneyi krombeini* van der Vecht, 1968, *rothneyi sikkimensis* van der Vecht, 1968, *rothneyi vechti* Das and Gupta, 1989 have also been reported from India by Das and Gupta (1989). Here the state Uttarakhand represents only three subspecies which are recognized by the following key.

Key to the subspecies of *rothneyi*

1. Mesoscutum brown with narrow median incomplete black line; vertex with narrow black line across the posterior ocelli .... *rothneyi carletoni* van der Vecht

- Mesoscutum black or without yellow or red lines; vertex with broad black band across the ocelli 2

2. Pronotum partly yellow and partly reddish; thorax predominantly marked with yellow marks. (Legs partly yellow and partly black; mesepisternum with two black marks) .... *rothneyi krombeini* van der Vecht

Pronotum reddish; thorax predominantly marked with red. (Propodeum black with or without narrow yellow lines; first gastral tergite reddish with black base and a median transverse black line; mesepisternum usually with one large reddish mark above dorsal episternal groove .... *rothneyi rothneyi* Cameron

2. ***Polistes (Gyrostoma) rothneyi carletoni*** van der Vecht

1968. *Polistes (Megapollstes) rothneyi carletoni* van der Vecht, *Bijdr. Dierk.*, **38** : 99, 100, F, key, des., fig.

1989. *Polistes (Megapolistes) rothneyi carletoni* van der Vecht : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 59. Loc. Garhwal and Kumaun Hills in Uttarakhand.

1996. *Polistes (Gyrostoma) rothneyi carletoni* van der Vecht : Carpenter, *Nat. Hist. Evol. Paper-Wasps* : 53.

Material examined : India : Uttarakhand : Almora Dist., Almora, 1676 m, 1 F, 24.vii.1911, coll. C. Paiva; Almora Dist., Ranikhet, 1524 m, 1 F, 26.v.1930, coll. H.S. Pruthi (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Himachal Pradesh, Jammu & Kashmir, West Bengal.

Elsewhere : Nepal, Pakistan.

3. ***Polistes (Gyrostoma) rothneyi krombeini*** van der Vecht

1968. *Polistes (Megapolistes) rothneyi krombeini* van der Vecht, *Bijdr. Dierk.*, **38** : 100, F, key, des., fig.

1989. *Polistes (Megapolistes) rothneyi krombeini* van der Vecht : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 59. Loc. Kumaun Hills in Uttarakhand.

1996. *Polistes (Gyrostoma) rothneyi krombeini* van der Vecht : Carpenter, *Amer. Mus. Nov.*, **3188** : 1-39.

Distribution : India : Uttarakhand (Kumaun Hills), Meghalaya, Karnataka, Kerala, Tamil Nadu.

4. *Polistes (Gyrostoma) rothneyi rothneyi* Cameron

1900. *Polistes rothneyi* Cameron, *Ann. Mag. Nat. Hist.*, (7)**6** : 410, M, des.

1989. *Polistes (Megapolistes) rothneyi rothneyi* Cameron : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 56. Loc. Garhwal Hills (Mussoorie) in Uttarakhand.

1996. *Polistes (Gyrostoma) rothneyi rothneyi* Cameron : Carpenter, *Amer. Mus. Nov.*, **3188** : 1-39.

Distribution : India : Uttarakhand (Garhwal Hills), Meghalaya, Delhi, West Bengal.

Elsewhere : Nepal.

5. *Polistes (Gyrostoma) tenebricosus* Lepeletier

1836. *Polistes tenebricosa* Lepeletier, *Hist. Nat. Insect. Hymen.*, 1 : 529.

1989. *Polistes (Nygmopolistes) tenebricosus sulcatus* Smith, 1852 : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 49. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

1996. *Polistes (Gyrostoma) tenebricosus* Lepeletier : Carpenter, *Amer. Mus. Nov.*, **3188** : 1-39.

Distribution : India : Uttarakhand (Garhwal Hills), Jammu & Kashmir, Sikkim, West Bengal, Assam, Meghalaya.

Elsewhere : Nepal, China, Taiwan, Vietnam, Myanmar, Japan, Indonesia.

6. *Polistes (Gyrostoma) wattii* Cameron

1900. *Polistes wattii* Cameron, *Ann. Mag. Nat. Hist.*, (7)**6** : 416, F, des.

1989. *Polistes (Nygmopolistes) wattii* Cameron : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 53. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

1996. *Polistes (Gyrostoma) wattii* Cameron : Carpenter, *Amer. Mus. Nov.*, **3188** : 1-39.

Distribution : India : Uttarakhand (Garhwal Hills), Himachal Pradesh, Punjab, Delhi, Uttar Pradesh, West Bengal, Meghalaya, Gujarat, Orissa.

Elsewhere : Afghanistan, Iran, Iraq, Saudi Arabia, U.A.E., Oman, Mauritius, Pakistan, China.

Subgenus *Polistes (Polistella)* Ashmead

1904. *Polistes (Polistella)* Ashmead, *Proc. U. S. Natl. Mus.*, **28** : 133.

Type-species : *Polistes manilensis* de Saussure, 1853.

Das and Gupta (1989) recorded 12 species/ subspecies from Indian subregion. Subsequently Gusenleitner (2006) described 4 more new species from India. Of these 16, only 5 species/subspecies are represented here from the state of Uttarakhand. These may be identified by the following key. The species *Polistes (Polistella) quadricingulatus* by Gusenleitner (2006) is not included in the key, due to the non-availability of literature.

Key to the species/subspecies of *Polistes (Polistella)*

1. Gaster black with apical margin of first to fifth tergites broad red band; scutellum more or less raised, elevated from the level of mesoscutum; second gastral sternite angular at base, propodeum with sharp lateral edges; legs not completely black. In males, subgenital plate with central tubercle .... *adustus* Bingham

   Gaster coloured other than black 2

2. Fore wing with subapical fuscous cloud; median groove of propodeum shallow, with close fine transverse striations; first gastral sternite without distinct margin at base; first gastral tergite about as long as wide. (Body brown with conspicuous black and yellow markings; ocellar triangle brown; gastral tergites II and III with small black spots; tergites I, III and IV extensively yellow marked; sternites broadly yellow; mesoscutum largely brown without any yellow line; apical and basal margin of pronotum narrowly yellow) ..... *stigma tamula* (Fabricius)

   Fore wing without subapical fuscous cloud; median groove of propodeum deep, with strong transverse striations; first gastral sternite with distinct margin at base..... 3

3. Pronotum ribbed; head narrower than thorax; second gastral tergite almost yellow. In males, subgenital plate with a broad central tubercle. [Thorax black with pronotum, an elongated broad mark on mesoscutum, scutellum, postscutellum and broad marks on propodeum (rarely absent), reddish] .... *strigosus atratus* Das and Gupta

Pronotum not ribbed; head about as wide as thorax; second gastral tergite entirely reddish-brown. In males, subgenital plate with a small central tubercle; other characters variable .. .. *sagittarius* de Saussure

7. ***Polistes (Polistella) adustus*** Bingham

1897. *Polistes adustus* Bingham, *Fauna Brit. India, Hym.*, **1** : 397, F, key, des.

1989. *Polistes (Polistella) adustus* Bingham : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 70. Loc. Garhwal and Kumaun Hills in Uttarakhand.

2003. *Polistes (Polistella) adustus* Bingham : Jonathan and Kundu, *Zool. Surv. India. Fauna of Sikkim, State Fauna Series*, **9**(4) : 380.

Material examined : India : Uttarakhand : Mukteshwar, 1 M, ix.1929, coll. Fletcher; Dehradun Dist. : Mussoorie, 2 F, no data (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Meghalaya, Delhi, Himachal Pradesh, Sikkim, West Bengal.

Elsewhere : Nepal, China.

8. ***Polistes (Polistella) quadricingulatus*** Gusenleitner

2006. *Polistes (Polistella) quadricingulatus* Gusenleitner, *Linz. Biol. Beitr.*, **38**(1) : 677, 683, F. Loc. Kumaun Hills (Bhimtal) in Uttarakhand.

Distribution : India : Uttarakhand (Kumaun Hills), Jammu & Kashmir, Uttar Pradesh.

Elsewhere : Nepal.

9. ***Polistes (Polistella) sagittarius*** de Saussure

1853. *Polistes sagittarius* de Saussure, *Étude Fam. Vesp.*, **2** : 56, F, des.

1989. *Polistes (Polistella) sagittarius* de Saussure : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 82. Loc. Kumaun Hills (Loharkhet) in Uttarakhand.

2003. *Polistes (Polistella) sagittarius* de Saussure : Jonathan and Kundu, *Zool. Surv. India. Fauna of Sikkim, State Fauna Series*, **9**(4) : 381.

Distribution : India : Uttarakhand (Kumaun Hills), Meghalaya, Assam, Sikkim, Manipur, Nagaland, Tripura, Himachal Pradesh, Delhi, Kerala, West Bengal.

Elsewhere : Nepal, China, Hong Kong, Myanmar, Thailand, Malaysia, Singapore, Indonesia, Philippines.

10. ***Polistes (Polistella) stigma tamula*** (Fabricius)

1798. *Vespa tamula* Fabricius, *Ent. Syst. Suppl.* : 263, F, des.

1989. *Polistes (Polistella) stigma tamula* (Fabricius) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 76.

2007. *Polistes stigma tamula* (Fabricius) : Gupta, *Zool. Surv. India, Faunal Diversity Western Doon Shiwaliks, Spl. Publ.* : 36. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

Material examined : India : Uttarakhand : Nainital Dist. : Unchagaon, base of W. Himalayas, 1ex., 13.iv.1910, Indian Museum Collection (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Himachal Pradesh, Delhi, Bihar, West Bengal, Maharashtra, Karnataka, Kerala, Tamil Nadu, Sikkim, Orissa.

Elsewhere : Sri Lanka.

11. ***Polistes (Polistella) strigosus atratus*** Das and Gupta

1989. *Polistes (Polistella) strigosus atratus* Das and Gupta, *Oriental Ins. Monogr.*, **11** : 81. Loc. Kumaun Hills (Tanakpur) in Uttarakhand.

2003. *Polistes (Polistella) strigosus atratus* Das and Gupta : Jonathan and Kundu, *Zool. Surv. India. Fauna of Sikkim, State Fauna Series*, **9**(4) : 381.

Material examined : India : Uttarakhand : Champawat Dist. : Tanakpur, 500 m, 1 F, 9.iv.1977, coll. M.R. Rathore (NZSI).

Distribution : India : Uttarakhand (Kumaun Hills), Delhi, Sikkim, Bihar, West Bengal, Assam, Manipur, Tripura.

Elsewhere : Nepal.

Tribe **Ropalidiini**

Kojima and Carpenter (1997) reported four genera, viz., *Belanogaster* de Saussure, 1853, *Parapolybia* de Saussure, 1853, *Polybioides* du Buysson, 1913 and *Ropalidia* Guérin-Meneville, 1831 from the world, which are also reported from India, except the genus *Polybioides*. The state Uttarakhand is represented by two genera, namely,

Ropalidia Guérin-Meneville and *Parapolybia* de Saussure, which are recognised by the following key.

Key to the genera of Ropalidiini

1. Pronotum without pretegular carina; mesepisternum without scrobal sulcus ..... ***Ropalidia*** Guérin-Meneville

- Pronotum with pretegular carina; mesepisternum with scrobal sulcus. ..... ***Parapolybia*** de Saussure

Genus ***Ropalidia*** Guérin-Meneville

1831. *Ropalidia* Guérin-Meneville, *Voyage Coq., Zool, Atlas, Insectes* : pl. 9, fig. 8.

Type-species : *Ropalidia maculiventris* Guérin-Meneville, 1831.

Around 180 *Ropalidia* species currently recognised, 26 species have been recorded from the Indian subregion (Kojima *et al.*, 2007). Of these, 11 species under this genus have been reported from the state of Uttarakhand. These can be distinguished by the following key.

Key to the species of *Ropalidia*

1. Propodeum at base with a pair of carina 2

- Propodeum without such carina 3

2. Second gastral tergite with a broad apical yellow band. In males, clypeus wider than long ..... *brevita* Das and Gupta

- Second gastral tergite with a narrow yellow apical band. In males, clypeus nearly as wide as long .....*marginata* (Lepeletier)

3. Second gastral tergite and sternite not fused 4

- Second gastral tergite and sternite fused 6

4. Third antennal segment 3x (in male) and more than 3x (in female) as long as wide apically; sides of second gastral tergite marked with yellow at base..... ..... *rufocollaris* (Cameron)

- Third antennal segment less than 3x as long as wide apically; sides of second gastral tergite marked with other colour if present 5

5. Metapleuron smooth ventrally. (Body reddish with black and yellow markings; lateral edge of aedeagus rounded; gastral petiole not predominantly black ..... *stigma* (Smith)

- Metapleuron ventrally with deep punctures. (Gastral petiole more than 2.5x as long as wide, not much narrowed again at apex; temple slightly narrower than eye in profile. ..... *mathematica* (Smith)

6. Gastral petiole abruptly swollen just after the end of basal slit and about as long as wide, apical margin strongly depressed. (Median groove of propodeum deep and wide like a cavity, with sharp edge; postscutellum slightly produced apically in the middle; mesoscutum rugoso-punctate). .... *rufoplagiata* (Cameron)

Gastral petiole gradually swollen apically and longer than wide, apical margin normal ... 7

7. Gastral petiole 2.0 2.2x as long as wide, swollen towards apex and narrowed apically; propodeum with a narrow and uniform median groove; second gastral tergite petiolate basally and obliquely cut off apically .....*fasciata* (Fabricius)

- Gastral petiole 1.5x as long as wide, gradually swollen apically and not narrowed apically; median groove of propodeum wider; second gastral tergite not petiolate basally and vertically cut off apically 8

8. Propodeum with distinct striations; ventral metapleuron with a few superficial large punctures; wings yellowish hyaline except for the apical brownish cloud; radial cell very long ..... *colorata* van der Vecht

- Propodeum almost smooth; ventral metapleuron smooth; wings transparent hyaline, fore wing with apical cloud; radial cell relatively shorter and wider at base .. 9

9. Apical half of radial cell with dark brown cloud; clypeus not shiny; male antenna without tyloids; second gastral tergite with broad apical yellow band; gastral petiole without apical band 10

Apical two-third of radial cell with dark brown apical cloud; clypeus shiny; male antenna with tyloids; second gastral tergite and gastral petiole with narrow apical yellow band ..... *cyathiformis* (Fabricius)

10. Median line of median groove of propodeum not distinct, groove wider in the middle; temple as wide as eye in profile .... *variegata* (Smith)

- Median line of median groove of propodeum distinct; temple narrower than eye in profile ..... *jacobsoni* (du Buysson)

12. ***Ropalidia brevita*** Das and Gupta

1989. *Ropalidia (Anthreneida) brevita* Das and Gupta, *Oriental Ins. Monogr.*, **11** : 121. Loc. Garhwal Hills (Dehradun) and Kumaun Hills (Garjia, Nainital, Haldwani) in Uttarakhand.

2003. *Ropalidia (Anthreneida) brevita* Das and Gupta : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9**(4) : 382.

2007. *Ropalidia brevita* Das and Gupta : Kojima *et al.*, *Entomol. Sci.*, **10** : 380, syns.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Himachal Pradesh, Delhi, Haryana, Rajasthan, Uttar Pradesh, Sikkim, West Bengal, Assam, Orissa, Goa, Karnataka, Kerala.

13. ***Ropalidia colorata*** van der Vecht

1941. *Ropalidia colorata colorata* van der Vecht, *Treubia*, **18**(1) : 111, 151, M, F, des., fig.

1989. *Ropalidia (Anthreneida) colorata colorata* van der Vecht : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 142. Loc. Garhwal Hills (Sahasradhara, Uttar Kashi) in Uttarakhand.

2007. *Ropalidia colorata* van der Vecht : Kojima *et al.*, *Entomol. Sci.*, **10** : 386, syns.

Material examined : India : Uttarakhand : Dehradun Dist. : Sahasradhara; 1 F, 10.ix.1965, coll. R.K. Bhatnagar (NZSI).

Distribution : India : Uttarakhand (Garhwal Hills), Himachal Pradesh.

Elsewhere : Pakistan.

14. ***Ropalidia cyathiformis*** (Fabricius)

1804. *Eumenes cyathiformis* Fabricius, *Syst. Piez.* : 289, F, des.

1989. *Ropalidia (Anthreneida) cyathiformis* (Fabricius) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 143. Loc. Garhwal Hills (Dehradun, Mussoorie) in Uttarakhand.

2007. *Ropalidia cyathiformis* (Fabricius): Kojima *et al.*, *Entomol. Sci.*, **10** : 387, syns.

Distribution : India : Uttarakhand (Garhwal Hills), Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Karnataka, Goa, Kerala.

Elsewhere : Nepal, Sri Lanka, Myanmar, Thailand, Vietnam, Malaysia, Indonesia, Philippines.

15. ***Ropalidia fasciata*** (Fabricius)

1804. *Eumenes fasciata* Fabricius, *Syst. Piez.* : 290, des.

1989. *Ropalidia (Anthreneida) fasciata* (Fabricius) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 140. Loc. Garhwal Hills (Dehradun) and Kumaun Hills (Haldwani, Garjia, Tanakpur) in Uttarakhand.

2007. *Ropalidia fasciata* (Fabricius) : Kojima *et al.*, *Entomol. Sci.*, **10** : 385, syns.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Sikkim, Assam, Tripura, Maharashtra, Uttar Pradesh, Tamil Nadu.

Elsewhere : Nepal, Sri Lanka, Myanmar, Thailand, Vietnam, Malaysia, Indonesia, China, Taiwan, Ryukyu Is., Philippines.

16. ***Ropalidia jacobsoni*** (du Buysson)

1908. *Icaria jacobsoni* du Buysson, *Notes Leiden Mus.*, **30** : 123, F, des.

1989. *Ropalidia (Anthreneida) jacobsoni jacobsoni* (du Buysson) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 146. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

2007. *Ropalidia jacobsoni* (du Buysson) : Kojima *et al.*, *Entomol. Sci.*, **10** : 386, syns.

Distribution : India : Uttarakhand (Garhwal Hills), Delhi, Rajasthan, Assam, Maharashtra, Karnataka, Kerala, Tamil Nadu.

Elsewhere : Myanmar, Indonesia.

17. ***Ropalidia marginata*** (Lepeletier)

1836. *Epipona marginata* Lepeletier, *Hist. Nat. Ins. Hym.*, **1** : 541, M, F, des.

1989. *Ropalidia (Anthreneida) marginata marginata* (Lepeletier) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 118. Loc. Garhwal Hills (Maneri) in Uttarakhand.

2007. *Ropalidia marginata* (Lepeletier) : Kojima *et al.*, *Entomol. Sci.*, **10** : 380, syns.

Distribution : India : Uttarakhand (Garhwal Hills), Punjab, Gujarat, Madhya Pradesh, Orissa,

West Bengal, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu.

Elsewhere : Sri Lanka, Pakistan, Myanmar, Vietnam, Malaysia, Indonesia, Philippines, New Guinea, New Britain, Australia.

18. ***Ropalidia mathematica*** (Smith)

1860. *Polybia mathematica* Smith, *J. Proc. Linn. Soc. London Zool.*, **5** : 90, F, des.

1989. *Ropalidia (Anthreneida) mathematica nigroplagiata* (Cameron), 1900 : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 134. Loc. Kumaun Hills (Garjia, Nainital) in Uttarakhand.

2007. *Ropalidia mathematica* (Smith) : Kojima *et al.*, *Entomol. Sci.*, **10** : 383, syns.

Distribution : India : Uttarakhand (Kumaun Hills), Meghalaya, Tripura.

Elsewhere : Thailand, Vietnam, Indonesia.

Remarks : Kojima *et al.* (2007) mentioned *Ropalidia mathematica nigroplagiata* (Cameron), 1900 as a junior synonym under the species *Ropalidia mathematica* (Smith), 1860.

19. ***Ropalidia rufocollaris*** (Cameron)

1900. *Icaria rufocollaris* Cameron, *Ann. Mag. Nat. Hist.*, (7)**6** : 497, F, des.

1989. *Ropalidia (Anthreneida) rufocollaris rufocollaris* (Cameron) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 125. Loc. Kumaun Hills (Garjia) in Uttarakhand.

2007. *Ropalidia rufocollaris* (Cameron) : Kojima *et al.*, *Entomol. Sci.*, **10** : 383, syns.

Distribution : India : Uttarakhand (Kumaun Hills), Sikkim, West Bengal, Meghalaya, Tripura, Assam, Kerala, Tamil Nadu.

Elsewhere : Thailand, Vietnam, China, Myanmar, Laos.

20. ***Ropalidia rufoplagiata*** (Cameron)

1905. *Icaria rufoplagiata* Cameron, *Tijdschr. v. Ent.*, **48** : 71, M, F.

1989. *Ropalidia (Anthreneida) rufoplagiata gravelyi* Dover and Rao, 1922 : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 138. Loc. Kumaun Hills (Garjia) in Uttarakhand.

2007. *Ropalidia rufoplagiata* (Cameron) : Kojima *et al.*, *Entomol. Sci.*, **10** : 384, syns.

Distribution : India : Uttarakhand (Kumaun Hills), Karnataka, Kerala, Maharashtra, Andaman & Nicobar Is.

Elsewhere : Thailand, Vietnam, Malaysia, Myanmar, Indonesia.

Remarks : Kojima *et al.* (2007) mentioned *Ropalidia rufoplagiata gravelyi* Dover and Rao, 1922 as a junior synonym under the species *Ropalidia rufoplagiata* (Cameron), 1905.

21. ***Ropalidia stigma*** (Smith)

1858. *Polybia stigma* Smith, *J. Proc. Linn. Soc. London Zool.*, **2** : 114, M.

1989. *Ropalidia (Anthreneida) stigma stigma* Smith : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 127. Loc. Garhwal Hills (Dehradun) and Kumaun Hills (Haldwani, Garjia) in Uttarakhand.

2007. *Ropalidia stigma* (Smith) : Kojima *et al.*, *Entomol. Sci.*, **10** : 384, syns.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Sikkim, Bihar, West Bengal, Assam, Meghalaya, Manipur, Tripura, Madhya Pradesh, Orissa, Maharashtra, Goa, Kerala.

Elsewhere : Nepal, Sri Lanka, Thailand, Vietnam, Malaysia, Myanmar, Indonesia, China, Philippines.

22. ***Ropalidia variegata*** (Smith)

1852. *Epipona variegata* Smith, *Ann. Mag. Nat. Hist.*, (2)**9** : 48, F, des.

1989. *Ropalidia (Anthreneida) variegata variegata* (Smith) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 144. Loc. Garhwal Hills (Dehradun) in Uttarakhand

2007. *Ropalidia variegata* (Smith) : Kojima *et al.*, *Entomol Sci.*, **10** : 387, syns.

Distribution : India : Uttarakhand (Garhwal Hills), Jammu & Kashmir, Uttar Pradesh, Madhya Pradesh, Punjab, Delhi, Bihar, West Bengal, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Kerala.

Elsewhere : Nepal, Pakistan, Malaysia, Myanmar, Indonesia, China.

Genus ***Parapolybia*** de Saussure

1853. *Polybia (Parapolybia)* de Saussure, *Etude Famille Vespides*, **2** : 207.

Type-species : *Polybia (Parapolybia) indica* de Saussure, 1853.

1989. *Parapolybia* de Saussure : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 176.

This genus *Parapolybia* is represented by three species, viz., *indica* (de Saussure), 1853, *nodosa* van der Vecht, 1966 and *varia* (Fabricius), 1787. Here only the subspecies *varia* under the species *varia* has been reported from the state of Uttarakhand.

23. ***Parapolybia varia varia*** (Fabricius)

1787. *Vespa varia* Fabricius, *Mant. Insect.*, **1** : 293, des.

1989. *Parapolybia varia* (Fabricius) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 180. Loc. Garhwal Hills (Dehradun, Pipalkoti) and Kumaun Hills (Bhowali, Jeolikot, Garjia, Haldwani, Kathgodam, Kapkot, Loharkhet, Pawalgarh, Sitabanu) in Uttarakhand.

1997. *Parapolybia varia varia* (Fabricius) : Kojima and Carpenter, *Amer. Mus. Nov.*, **3199** : 64, syns., distr.

Diagnostic character : Body with prominent yellow markings; median groove of propodeum shallow; second gastral tergite with yellow mark at base; gastral petiole shorter than head width; occipital carina incomplete; interocular distance at clypeus about as long as or shorter than at vertex level.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Sikkim, Assam, Arunachal Pradesh, Meghalaya, Manipur, Himachal Pradesh, Punjab, Delhi, Uttar Pradesh, West Bengal.

Elsewhere : Nepal, Myanmar, Philippines, Malaysia, China, Japan, Indonesia.

Remarks : Das and Gupta (1989) mentioned that *Parapolybia varia* (Fabricius) is a highly variable species and they (*op. cit.*) identified and described several colour variants from various localities in India.

Subfamily VESPINAE

This is morphologically the most specialized subfamily of the social wasp. They are popularly known as hornets (those nesting above ground) and yellow jackets (those nesting usually subterraneous). This subfamily is represented by four genera, viz., *Dolichovespula* Rohwer, 1916, *Provespa* Ashmead, 1903, *Vespa* Linnaeus, 1758 and *Vespula* Thomson, 1869 from India. They are also represented from the state of Uttarakhand. A key to the genera is provided here.

Key to the genera of Vespinae

1. Ocelli enlarged, posterior ocelli closer to eye than to each other ..... ***Provespa*** Ashmead
   - Ocelli not enlarged, posterior ocelli closer to each other than to eye 2
2. Vertex long, distance between posterior ocelli and occiput greater than distance between posterior ocelli and eye ..... ***Vespa*** Linnaeus
   - Distance between posterior ocelli and occiput shorter than or equal to distance between posterior ocelli and eye 3
3. Pronotal carina present laterally; malar space longer than the last antennal article. ..... ***Dolichovespula*** Rohwer
   - Pronotal carina absent; malar space shorter than the last antennal article ..... ***Vespula*** Thomson

Genus *Vespa* Linnaeus

1758. *Vespa* Linnaeus, *Systema Naturae*, (10th ed.), **1** : 343, 572.

Type-species : *Vespa crabro* Linnaeus, 1758.

23 species are recognised from the world, of which 15 species are known to occur from India. Here the state Uttarakhand represents 8 species. A key is provided here for ready reference.

Key to the species of *Vespa*
(Based on females)

1. Apical margin of clypeus with a broad and deep apical emargination and forming lateral lobes and with a median triangular tooth projecting only half the length of the lateral lobes ..... *analis* Fabricius

   Apical margin of clypeus emarginate without a median tooth 2
2. Head strongly widened and produced behind the eyes; temple in profile view more than 1.8x as wide as eye; posterior ocelli more than 3x further from occiput than from eye; area around ocelli without black markings; last tergite yellowish-brown ..... *mandarinia* Smith

- Head normal; temple in profile view less than 1.8x as wide as eye; posterior ocelli less than 3x further from occiput than from eye 3

3. Clypeus coarsely punctate; thorax black and head black to red, not marked with yellow; gaster brown or black with tergite II yellow 4

- Clypeus subpolished and with scattered punctures; Head, thorax and gaster black to brown, with reddish or yellow areas 5

4. Apical margin of clypeus with a blunty triangular tooth on each side of the median emargination; body covered with strong and stiff hairs ..... *tropica* (Linnaeus)

- Apical margin of clypeus with short broadly rounded lobes on each side of the median emargination; body hairs fine, shorter and comparatively dense; small dense punctures on vertex, temple, mesoscutum, scutellum, postscutellum, metapleuron and propodeum. ..... *affinis* (Linnaeus)

5. Clypeus rather flat and elongate, as wide as long or a little longer, with scattered moderatel sized punctures, its lateral emarginations long and convergent; body dorsally less hairy, hairs short, sparse, stiff and bristle-like on head and thorax; gaster almost hairless dorsally; body brown with clypeus, frons and third and fourth gastral tergite yellow ..... *orientalis* Linnaeus

- Clypeus convex, wider than long, not elongate, its lateral emarginations short, fine punctures on clypeus; head and thorax dorsally covered with dense and long black or yellowish-brown hairs; gaster with hairs; body largely black or yellow 6

6. Second to fifth gastral tergites entirely black; vertex depressed at medially ..... *basalis* Smith

- Second to fifth gastral tergites not entirely black, either yellow or black mixed with brown or yellow; vertex not depressed at medially 7

7. Thorax sulphur yellow with mesoscutum, a mark below tegula, a median line on scutellum, margins of postscutellum, Y-shaped mark at junction of postscutellum and propodeum and line between mesopleuron and metapleuron black; gaster largely yellow; legs usually entirely yellow ..... *bicolor* Fabricius

- Thorax black or black mixed with brown; gaster black mixed with brownish or yellowish bands; legs never entirely yellow 8

8. Head yellow with a ring-like black mark on frons; gastral tergites black with yellow markings apically; yellow band on third tergite broadly emarginate and covering 3/4th portion ..... *vivax* Smith

- Head reddish-brown without black marks on frons and vertex; gastral tergites black with reddish-brown markings ..... *auraria* Smith

24. ***Vespa affinis*** (Linnaeus)

1764. *Apis affinis* Linnaeus, *Mus. Lud. Ulricae Reg.* : 417, F, des.

1989. *Vespa affinis affinis* (Linnaeus) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 205.

1997. *Vespa affinis* (Linnaeus) : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 64, syns.

2007. *Vespa affinis affinis* (Linnaeus) : Gupta, *Zool. Surv. India, Faunal Diversity Western Doon Shiwaliks, Spl. Publ.* : 37. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

Distribution : India : Uttarakhand (Garhwal Hills), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : China, Indonesia, Japan, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, New Zealand.

25. ***Vespa analis*** Fabricius

1775. *Vespa analis* Fabricius, *Syst. Ent.* : 363.

1897. *Vespa analis* Fabricius : Bingham, *Fauna Brit. India, Hym.*, **1** : 405, F, W, des. Loc. Kumaun Hills in Uttarakhand.

1989. *Vespa analis nigrans* du Buysson : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 208. Loc. Kumaun Hills in Uttarakhand.

1997. *Vespa analis* Fabricius : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 65, syns.

Material examined : India : Uttarakhand : Almora Dist. : Katarmal, 1372 m, 1 F, 29.v.1930, coll. H. S. Pruthi; Dehradun Dist. : Mussoorie, Kempty Falls, 1220 m, 1 F, 4.xi.1978, coll. R. K. Varshney (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya, Sikkim, Tamil Nadu, West Bengal.

Elsewhere : China, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Russia, Singapore, Taiwan, Thailand.

26. *Vespa auraria* Smith

1852. *Vespa auraria* Smith, *Trans. Ent. Soc. Lond., (N. S.),* 2(2) : 46.

1897. *Vespa auraria* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 407. F, W, des. Loc. Kumaun Hills in Uttarakhand.

1989. *Vespa velutina auraria* Smith : Das and Gupta, *Oriental Ins. Monogr.*, 11 : 223. Loc. Garhwal and Kumaun Hills in Uttarakhand.

1997. *Vespa auraria* Smith : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 66, syns.

Material examined : India : Uttarakhand : Dehradun Dist. : Dhubri, 1 F, 28.iii.2003, coll. B. G. Kundu & Party; Uttar Kashi Dist. : on the way to Gangotri, 1 F, 5.iv.2003, coll. B. G. Kundu & Party; Pithoragarh Dist. : Charchum, 2 F, 27.ix.2004, coll. B. Mitra & Party; Bageshwar Dist. : Someshwar, 1734 m, 1 F, 29.ix.2004, coll. D. R. Maulik & Party; Bageshwar Dist. : 1 F, 29.ix.2004, coll. M. Ghosh & Party, Bageshwar Dist. : Goaldham, 1 F, 2.x.2004, M. Ghosh & Party; Almora Dist. : Kosi, 1690 m, 1 F, 4.x.2004, coll. D. R. Maulik & Party; Almora Dist.: Brechhina, 1770 m, 2 F, 5.x.2004, coll. D. R. Maulik & Party; Nainital Dist. : Naukuchiya Tal, 1 F, 5.x.2004, coll. M. Ghosh & Party.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Assam, Jammu & Kashmir, Jharkhand, Himachal Pradesh, Madhya Pradesh, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Afghanistan, China, Laos, Malaysia, Myanmar, Nepal, Pakistan, Thailand, Yemen.

*27. *Vespa basalis* Smith

1852. *Vespa basalis* Smith, *Trans. Ent. Soc. Lond., (N. S.),* 2(2) : 46, des.

1997. *Vespa basalis* Smith : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 66, syns.

2006. *Vespa basalis* Smith : Kundu *et al., Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna series,* 13(2) : 437.

Material examined : India : Uttarakhand : Tehri Garhwal Dist. : Chamba, 1 F, 5.ii.1989, coll. S.K. Gupta & Party; Uttar Kashi Dist. : Bhatwari, 1 F, 19.ix.1999, coll. B.C. Das & Party; Almora Dist. : Kherna, 4 F, 22-23.ix.1999, coll. B.C. Das & Party; Dehradun Dist. : Nepali Farm, 5 F, 8.ix.2000, coll. G.C. Sen & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Mizoram, Orissa, Sikkim, Uttar Pradesh, West Bengal.

Elsewhere : China, Indonesia, Laos, Myanmar, Nepal, Pakistan, Taiwan, Thailand, Vietnam.

Remarks : This is the new record of this species from the state of Uttarakhand.

28. *Vespa bicolor* Fabricius

1787. *Vespa bicolor* Fabricius, *Mant. Insect.* 1 : 288, des.

1897. *Vespa bicolor* Fabricius : Bingham, *Fauna Brit. India, Hym.*, 1 : 404, F or W, des. Loc. Kumaun Hills in Uttarakhand.

1989. *Vespa bicolor* Fabricius: Das and Gupta, *Oriental Ins. Monogr.*, 11 : 209. Loc. Kumaun Hills in Uttarakhand.

1997. *Vespa bicolor* Fabricius: Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 67, syns.

2006. *Vespa bicolor* Fabricius : Kundu *et al., Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna series,* 13(2) : 438.

Distribution : India : Uttarakhand (Kumaun Hills), Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, West Bengal.

Elsewhere : Cambodia, China, Laos, Myanmar, Nepal, Thailand, Vietnam.

29. *Vespa mandarinia* Smith

1852. *Vespa mandarinia* Smith, *Trans. Ent. Soc. Lond., (N. S.),* 2(2) : 38, M, W, des.

1989. *Vespa mandarinia magnifica* Smith : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 212, F, W. Loc. Garhwal Hills in Uttarakhand.

1997. *Vespa mandarinia* Smith : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 70, syns.

Material examined : India : Uttarakhand : Tehri Garhwal Dist. : Chamba, 1 F, 6.iv.2003, coll. B.G. Kundu & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal Hills), Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, West Bengal.

Elsewhere : China, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Russia, Sri Lanka, Taiwan, Thailand.

*30. ***Vespa orientalis*** Linnaeus

1771. *Vespa orientalis* Linnaeus, *Mant. Plant.*, (Ed. 2) : 540, F, des.

1989. *Vespa orientalis* Linnaeus: Das and Gupta, Oriental *Ins. Monogr.*, **11** : 215, F. W. des.

1997. *Vespa orientalis* Linnaeus : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 71, syns.

Material examined : India : Uttarakhand : Pauri Garhwal Dist. : Lakshmanjhula, 1 F, 7.ix.2000, coll. G.C. Sen & Party; Dehradun Dist. : Rishikesh, 1 F, 9.x.2001, coll. S.K. Mandal & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal Hills), Andhra Pradesh, Bihar, Delhi, Haryana, Jammu & Kashmir, Maharashtra, Orissa, Punjab, Uttar Pradesh, West Bengal.

Elsewhere : Afghanistan, Albania, Algeria, Bahrein, Bulgaria, China, Cyprus, Egypt, Ethiopia, Greece, Iran, Iraq, Israel, Italy, Jordan, Lebanon, Libya, Madagascar, Malta, Nepal, Oman, Pakistan, Palestine, Romania, Russia, Saudi Arabia, Somalia, Syria, Tajikistan, Turkmenistan, Turkey, U.A.E., Uzbekistan, Yemen.

Remarks : This is the new record of this species from the state of Uttarakhand.

*31. ***Vespa tropica*** (Linnaeus)

1758. *Sphex tropica* Linnaeus, *Syst. Nat.*, (10th ed.), 1 : 571.

1897. *Vespa cincta* Fabricius, 1775 : Bingham, *Fauna Brit. India, Hym.*, **1** : 402, F or W, des., fig.

1997. *Vespa tropica* (Linnaeus) : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 72, syns.

Material examined : India : Uttarakhand : Tehri Garhwal Dist. : Chamba, 1 F, 1676 m, 16.x.2001, coll. G.C. Sen & Party; Dehradun Dist. : Rishikesh, 1 F, 1.ix.2002, coll. S.K. Mandal & Party; Haridwar Dist. : Chilla, 3 F, 12.ix.2002, coll. Animesh Bal & Party; Almora Dist. : Sonari, 1 F, 21.ix.2003, coll. B. Mitra & Party; Bageshwar Dist. : Chanouda, 1 F, 25.ix.2003, coll. B. Mitra & Party; Almora Dist. : Almora, 1 F, 23.viii.2005, coll. S.K. Chatterjee & Party; Bageshwar Dist. : Khirakat, 1 F, 29.viii.2005, coll. S.K. Chatterjee & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Andaman & Nicobar is., Arunachal Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Pondicherry, Sikkim, Tamil Nadu, West Bengal.

Elsewhere : Afghanistan, Cambodia, Bhutan, China, Indonesia, Laos, Malaysia, Hong-kong, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Australia, Vietnam.

Remarks : This is the new record of this species from the state of Uttarakhand.

Das and Gupta (1989) recorded *Vespa cincta* Fabricius, 1775 as a junior synonym under *Vespa tropica tropica* (Linnaeus), 1758.

32. ***Vespa vivax*** Smith

1870. *Vespa vivax* Smith, *in* Horne and Smith, *Trans. Zool. Soc. Lond.* 7(3) : 190.

1897. *Vespa vivax* Smith : Bingham, *Fauna Brit. India, Hym.*, **1** : 406, W, des. Loc. Kumaun Hills (Binsar) in Uttarakhand.

1989. *Vespa vivax* Smith : Das and Gupta, Oriental *Ins. Monogr.*, **11** : 226. Loc. Kumaun Hills (Binsar) in Uttarakhand.

1997. *Vespa vivax* Smith : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 74, syns.

Material examined : India : Uttarakhand : Uttar Kashi Dist. : Syanochati, 1 F, 14.xi.2003, coll. S.K. Chakraborty & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Jammu & Kashmir, Himachal Pradesh, Sikkim.

Elsewhere : China, Myanmar, Nepal, Taiwan, Thailand.

Genus ***Provespa*** Ashmead

1903. *Provespa* Ashmead, *Ent. News*, **14** : 182.

Type-species : *Vespa dorylloides* de Saussure, 1853 (= *Vespa anomala* de Saussure, 1853).

Provespa is known by three species, viz., *P. anomala* (de Saussure), 1853, *P. barthelemyi* (du Buysson), 1905 and *P. nocturna* van der Vecht, 1936. Das and Gupta (1989) reported first two species, *anomala* and *barthelemyi* from Indian subregion. Of these only *P. anomala* is recorded here from the state of Uttarakhand, which is detailed below.

33. ***Provespa anomala*** (de Saussure)

1853. *Vespa anomala* de Saussure, *Étude Fam. Vesp.*, **2** : 112, F, des., fig.

1897. *Vespa dorylloides* de Saussure, 1853 : Bingham, *Fauna Brit. India, Hym.*, **1** : 400, F, W, des., syns. Loc. Garhwal Hills (Dehradun) in Uttarakhand.

1989. *Provespa anomala* (de Saussure) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 227.

2006. *Provespa anomala* (de Saussure) : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 440.

Diagnostic characters : *Female* : Body 14-15 mm in length. Head, thorax and gaster impunctate, largely smooth and shiny; head and thorax somewhat densely and gaster sparsely pubescent. Head as broad as thorax; clypeus slightly longer than wide; vertex narrow; eyes touching the base of mandible and on vertex almost close to lateral ocelli. Scutellum and metascutellum raised; gaster long and narrow.

Body colour brownish-yellow (honey colour). Inner emarginate area of eye, area around ocellar triangle, apical tarsal segment, hind margin of first two-third gastral tergites, yellowish-brown. Wings clear hyaline, colour largely variable.

Worker : Body 10-12 mm in length. Similar to the female, but body slightly smaller.

Distribution : India : Uttarakhand (Garhwal Hills), Arunachal Pradesh, Meghalaya, Sikkim, West Bengal, Uttar Pradesh.

Elsewhere : Myanmar, Thailand, Malaysia, Singapore, Indonesia.

Genus ***Dolichovespula*** Rohwer

1916. *Dolichovespula* Rohwer, *Conn. State Geol. Nat. Hist. Surv. Bull.*, **22** : 642.

Type-species : *Vespa maculata* Linnaeus, 1763.

19 species are recognised from the world (Carpenter and Kojima, 1997). Of these, 3 species are known to occur in India. They are *D. asiatica* Archer, 1981, *D. lama* (du Buysson), 1903 and *D. sylvestris* (Scopoli), 1763. Here the state Uttarakhand represents only 1 species, which is detailed below.

34. ***Dolichovespula lama*** (du Buysson)

1903. *Vespa lama* du Buysson, *Bull. Soc. Ent. France* : 175, F, des.

1989. *Dolichovespula lama* (du Buysson) : Das and Gupta, *Oriental Ins. Monogr.*, **11** : 231. Loc. Garhwal Hills in Uttarakhand.

2003. *Dolichovespula lama* (du Buysson) : Jonathan and Kundu, *Zool. Surv. India, Fauna of Sikkim, State Fauna series*, **9**(4) : 389.

Diagnostic characters : Dorsal yellow stripe on pronotum; lateral yellow spot on scutellum and metanotum; gastral tergites and sternites I - III with yellow bands; clypeus without punctures.

Distribution : India : Uttarakhand (Garhwal Hills), Sikkim.

Elsewhere : China.

Genus ***Vespula*** Thomson

1869. *Vespula* Thomson, *Opusc. Ent.*, **1** : 79.

Type-species : *Vespa austriaca* Panzer, 1799.

Members of this genus are commonly known as yellow jackets. They make their nests in the ground or in cavities. The genus is represented by 22 species from the world, of which 8 species are known to occur in India. The state Uttarakhand represents only 3 species, which are recognised by the following key.

Key to the species of *Vespula*
(Based on workers)

1. Occipital carina always strong and reaching base of mandible; prebasal depression on first tergite distinct; propodeum with punctures intermixed with rugosities or striations; scape relatively long ..... *orbata* (du Buysson)

- Occipital carina weak or absent near base of mandible; prebasal depression on first tergite weak; propodeum smooth; scape relatively short 2

2. Occipital carina visible only laterally, not extending to the base of mandible; third mandibular tooth straight or nearly straight along its mesal margin ..... *flaviceps* (Smith)

- Occipital carina usually reaching the base of mandible, but sometimes weak or absent below; third mandibular tooth may be straight, or at most slightly concave along its mesal margin ..... *structor* (Smith)

35. ***Vespula flaviceps*** (Smith)

1870. *Vespa flaviceps* Smith, in Horne and Smith, *Trans. Zool. Soc. Lond.*, 7(3) : 174, 191, F, des., fig.

1897. *Vespa flaviceps* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 406, F, W, des. Loc. Kumaun Hills (Binsar) in Uttarakhand.

1980. *Vespula flaviceps flaviceps* (Smith) : Yamane, Wagner and Yamane, *Insecta Mat.*, 19 : 9, M, F, W, key, syn., des., fig. Loc. : Garhwal Hills (Mussoorie) in Uttarakhand.

1997. *Vespula flaviceps* (Smith) : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 76, syns.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Jammu & Kashmir, Himachal Pradesh, Punjab, Sikkim, Assam, Manipur, Meghalaya.

Elsewhere : Nepal, Myanmar, China, Thailand, Taiwan, Russia, Korea, Japan.

36. ***Vespula orbata*** (du Buysson)

1902. *Vespula orbata* du Buysson, *Bull. Soc. Ent. France* : 140, F, des.

1980. *Vespula minuta minuta* Dover, 1925 : Yamane, Wagner and Yamane, *Insecta Mat.*, 19 : 31. Loc. : Garhwal Hills (Mussoorie) in Uttarakhand.

1997. *Vespula orbata* (du Buysson) : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 78, syns.

Distribution : India : Uttarakhand (Garhwal Hills), West Bengal, Assam.

Elsewhere : Nepal, Myanmar.

37. ***Vespula structor*** (Smith)

1870. *Vespa structor* Smith, *in* Horne and Smith, *Trans. Zool. Soc. Lond.*, 7(3) : 191, fig.

1897. *Vespa structor* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 404, F, M, W, des. Loc. Kumaun Hills (Binsar) in Uttarakhand.

1983. *Vespula structor* (Smith) : Das and Gupta, *Oriental Ins.*, 17 : 451, syn. Loc. Kumaun Hills (Binsar) in Uttarakhand.

1997. *Vespula structor* (Smith) : Carpenter and Kojima, *Nat. Hist. Bull. Ibaraki Univ.*, 1 : 80, syns.

Distribution : India : Uttarakhand (Kumaun Hills), Jammu & Kashmir, Himachal Pradesh, West Bengal, Sikkim, Assam.

Elsewhere : Nepal, China, Myanmar.

Family APIDAE

The family Apidae contains the highly social insects honey bees, stingless honey bees and bumble bees. Most of the bees are polylectic, i.e., they gather pollen or nectar from wide variety of flowers, and some are oligolectic, which gather pollen from only a few species of related flowers (Michener, 1965). They collect nectar for honey which is widely used for medical purpose. They also help in pollination while moving from flower to flower. The sting of bees is fierce and painful, when it bites someone.

The family Apidae is recognised by the following characters : Labrum wider than long; subantennal suture usually directed towards inner margin of antennal sockets; eyes small; labial palpus with segments 1 and 2 long, flattened and sheath-like; glossa or tongue elongated and pointed (long tongued bees); fore wing generally with three submarginal cells (except in *Trigona* Jurine); hind tibial spurs absent (except in *Bombus* Latreille); inner apical margin of hind tibia (except in some queens) provided with comb of stiff setae; scopa of female (absent in most queens) consists of fringe of long hairs surrounding large smooth

shining area, thus forming a corbicula on hind tibia; pygidial plate completely absent (Michener, 1965; Goulet and Huber, 1993).

Key to the subfamilies of Apidae

1. Hind tibial spurs absent; small and moderate sized bees ..... APINAE

   Hind tibial spurs present; large and robust bees ..... BOMBINAE

Subfamily APINAE

The subfamily Apinae represents the true honey bees and the stingless honey bees. They are mostly common in south-east Asia. Queens and workers differ greatly in morphology. The colonies are perennial, which contain thousands of individuals (Goulet and Huber, 1993).

Two tribes, viz., Apini and Meliponini, under the subfamily Apinae are known from the state of Uttarakhand. These can be recognised by the following key.

Key to the tribes of Apinae

1. Apex of marginal cell closed; veins forming submarginal cells strong; sting of female functional ..... **Apini**
- Apex of marginal cell open; veins forming submarginal cells weak or absent; sting not functional, never exserted ..... **Meliponini**

Tribe **Apini**

The tribe Apini includes here the true honey bee, the genus *Apis* Linnaeus, 1758, from the state of Uttarakhand, which is given below.

Genus ***Apis*** Linnaeus

1758. *Apis* Linnaeus, *Systema Naturae*, (10th ed.), **1** : 343, 574.

Type-species : *Apis mellifera* Linnaeus, 1758 (= *Apis mellifica* Linnaeus, 1761).

The genus *Apis*, especially its type-species, *Apis mellifera* Linnaeus, 1758, is familiar and distributed throughout the world. Some other species are also found in both south and east Asia. Four species, viz., *cerana* Fabricius, *dorsata* Fabricius, under this genus *andreniformis* Smith and *florea* Fabricius are known to occur in India (Engel, 2002). The *dorsata* is the largest species which belongs to subgenus *Apis (Megapis)* and the *florea* is the smallest species which belongs to subgenus *Apis (Micrapis)*. Both the species are found in Uttarakhand.

The above two subgenera are restricted to Oriental region, specially in southern Asia, the Philippine Islands and Indonesia, which was reported by Michener (1965). Prior to this, Maa (1953) characterized these subgenera and reported *A. (Megapis) dorsata* Fabricius, 1793 from Kai Island. Here the state Uttarakhand is represented by two species, which are recognized by the following key.

Key to the subgenera and species of *Apis*

1. Body large size, worker 16-18 mm in length; fore wing 12-15 mm in length; distal abscissa of median vein in hind wing present .... ***(Megapis) dorsata*** Fabricius
- Body very small in size, length of worker 8-9 mm; fore wing 6-7 mm in length; distal abscissa of median vein in hind wing absent ..... ***(Micrapis) florea*** Fabricius

1. ***Apis (Megapis) dorsata*** Fabricius

1793. *Apis dorsata* Fabricius : *Ent. Syst.*, **2** : 328.

1904. *Apis (Megapis) dorsata* Fabricius : Ashmead, *Proc. Ent. Soc. Wash.*, **6** : 120.

2002. *Apis (Megapis) dorsata dorsata* Fabricius : Engel, *J. Bombay Nat. Hist. Soc.*, **99**(1) : 5.

2006. *Apis (Megapis) dorsata* Fabricius : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 442.

Material examined : India : Uttarakhand : Dehradun Dist. : Bodali, 2 exs, 30.iii.2003, coll. B.G. Kundu & Party; Udham Singh Nagar Dist. : Rudrapur, Dineshpur, 2 exs, 11.xii.2003, coll. B.G. Kundu & Party; Nainital Dist. : Ramnagar, Bijrani, 3 exs, 19.xii.2003, coll. B.G. Kundu & Party (NZSI).

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Andaman & Nicobar Islands, and almost throughout the country.

Elsewhere : Myanmar, Sri Lanka, China, Indonesia, Malaysia.

2. ***Apis (Micrapis) florea*** Fabricius

1787. *Apis florea* Fabricius, *Mant. Insect.*, **1** : 305.

1897. *Apis florea* Fabricius : Bingham, *Fauna Brit. India, Hym.*, **1** : 559, F, W, M, des., syns. Loc. Kumaun Hills in Uttarakhand.

1904. *Apis (Micrapis) florea* Fabricius : Ashmead, *Proc. Ent. Soc. Wash.*, **6** : 122.

2006. *Apis (Micrapis) florea* Fabricius : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, **13**(2) : 442.

Distribution : India : Uttarakhand (Kumaun Hills), Arunachal Pradesh, Andaman & Nicobar Islands, Assam, Sikkim, West Bengal, Karnataka, Kerala, Tamil Nadu, and almost throughout the country.

Elsewhere : Myanmar, Sri Lanka, Indonesia, Malaysia and also in Europe.

Tribe **Meliponini**

The tribe Meliponini is represented here only by the single genus *Trigona* Jurine, 1807, the stingless honey bee. Here the material collected from the state of Uttarakhand is identified up to generic level.

Genus ***Trigona*** Jurine

1807. *Trigona* Jurine, *Nouv. Méth. Class. Hym.* : 245.

Type-species : *Apis amalthea* Olivier, 1789.

The genus *Trigona* consists of small, dark, stingless honey bees which live in large colonies; only the workers are commonly seen on flowers. The reduced wing venation is very distinctive (Michener, 1965).

3. ***Trigona*** sp.

Material examined : India : Uttarakhand : Udham Singh Nagar Dist. : Rudrapur, Shimla Bhadur, 1 ex, 12.xii.2003, coll. B.G. Kundu & Party.

Distribution : India : Uttarakhand (Kumaun Hills).

Remarks : Due to insufficient literature and less number of examples, the specimen was identified up to generic level.

Subfamily BOMBINAE

The subfamily Bombinae is primarily Holarctic and abundant in cool temperate regions, but it ranges south to southern corner of south America and in the Orient, to Java (Indonesia). Colonies are annual. Each colony consists of a large queen and a few hundreds of morphologically similar but smaller workers (Goulet and Huber, 1993).

The subfamily is represented by two tribes, viz., Bombini and Neotropical Euglossini. The tribe Bombini is being reported here from the state of Uttarakhand.

Tribe **Bombini**

The members of the tribe Bombini are commonly known as Bumble bees. This tribe includes here only the genus *Bombus* Latreille, 1802 from this state, which is detailed below.

Genus ***Bombus*** Latreille

1802. *Bombus* Latreille, *Hist. Nat. Ins.* : 437.

Type-species : *Apis terrestris* Linnaeus, 1758.

The genus *Bombus* contains the large, robust, hairy, black-and-red, black-and-white or black-and-yellow bumble bees. Females can be easily recognized by the combination of corbiculae on the hind tibiae and hind tibial spurs (Michener, 1965). The genus is represented by five species from Uttarakhand and can be recognised by the following key.

Key to the species of slight *Bombus*

1. Mesonotum above with a transverse band of pubescence, differently coloured to rest of pubescence on thorax. (Pubescence on second gastral segment hoary-white; third gastral segment with black, fourth and fifth segment with orange-red pubescence) .... *tunicatus* Smith

   Mesonotum above without a transverse band of pubescence, differently coloured to rest of pubescence on thorax 2

2. Apical two or more gastral segments with grey or hoary-white pubescence 3

   Apical two or more gastral segments with yellow or red pubescence of some shade.... 4

3. Pubescence on second gastral segment bright fawn-colour ..... *atrocinctus* Smith

- Pubescence on second gastral segment black. (Pubescence on thorax above hoary-white; pubescence of first gastral segment black) ..... *festivus* Smith

4. Pubescence on third gastral segment bright rufo-fulvous ..... *haemorrhoidalis* Smith

- Pubescence on third gastral segment black. (Basal two gastral segments with yellow pubescence) ..... *orientalis* Smith

4. *Bombus atrocinctus* Smith

1870. *Bombus atrocinctus* Smith, *Trans. Zool. Soc.*, 7 : 193, M, fig.

1897. *Bombus atrocinctus* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 551, F or W, M, des. Loc. Kumaun Hills in Uttarakhand.

Distribution : India : Uttarakhand (Kumaun Hills), Sikkim.

5. *Bombus festivus* Smith

1861. *Bombus festivus* Smith, *J. Ent.*, 1 : 152, F.

1897. *Bombus festivus* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 553, F, des., syn. Loc. Kumaun Hills in Uttarakhand.

Distribution : India : Uttarakhand (Kumaun Hills), Sikkim.

6. *Bombus haemorrhoidalis* Smith

1852. *Bombus haemorrhoidalis* Smith, *Trans. Ent. Soc., London, (N.S.)*, 2(2) : 43, M, F, W.

1897. *Bombus haemorrhoidalis* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 554, F, W, M, des. Loc. Garhwal (Mussoorie) and Kumaun Hills in Uttarakhand.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), and Northern India.

Elsewhere : China.

7. *Bombus orientalis* Smith

1854. *Bombus orientalis* Smith, *Cat. Hym. Brit. Mus.*, 2 : 402, F.

1897. *Bombus orientalis* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 555, F, W, M, des., syn.

2006. *Bombus orientalis* Smith : Kundu *et al.*, *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series*, 13(2) : 444.

Material examined : India : Uttarakhand : Tehri Garhwal Dist. : Narendranagar, 1 ex, 10.iv.2003, coll. B.G. Kundu & Party; Nainital Dist. : Ramnagar, Dhangarhi, 1 ex, 17.xii.2003, coll. B.G. Kundu & Party.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills), Arunachal Pradesh, Sikkim, West Bengal and almost throughout the country except in hot and dry area.

8. *Bombus tunicatus* Smith

1852. *Bombus tunicatus* Smith, *Trans. Ent. Soc. London, (N.S.)*, 2(2) : 43, fig.

1897. *Bombus tunicatus* Smith : Bingham, *Fauna Brit. India, Hym.*, 1 : 549, F, W, M, des. Loc. Garhwal (Mussoorie) and Kumaun Hills in Uttarakhand.

Distribution : India : Uttarakhand (Garhwal and Kumaun Hills).

Elsewhere : China.

SUMMARY

The present paper includes the systematic account of families Vespidae and Apidae from the state of Uttarakhand. It incorporates 37 species/ subspecies belonging to 7 genera and 2 subfamilies under the family Vespidae and 8 species belonging to 3 genera and 2 subfamily under the family Apidae. Out of these, 3 species of Vespidae are newly recorded here from this state. The keys to the families, subfamilies, tribes, genera, subgenera, species and subspecies are also provided.

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REFERENCES

AIYAR, T.V. RAMAKRISHNA. 1916-17. A catalogue of wasps and bees (Fossores, Diploptera and Anthophila) described from Indian region since 1897. *J. Bombay Nat. Hist. Soc.*, **24** : 539- 560, 711- 721; **25**(1917) : 92-103.

ARCHER, M.E. 1991. The number of species that can be recognised within the genus *Vespa* (Hym., Vespinae). *Entomol. Monthly Mag.*, **127** : 161- 164.

ASHMEAD, W.H. 1902. Classification of the fossorial, predaceous and parasitic wasps, or the superfamily Vespoidea, parts 6-8. *Canad. Ent.*, **34** : 163-166, 203-210, 219-221.

ASHMEAD, W.H. 1904. Remarks on honey bees (Hymenoptera). *Proc. Ent. Soc. Washington*, **6** : 120-123.

BEQUERT, J.C. 1930. On the generic and subgeneric divisions of the Vespinae (Hymenoptera). *Bull. Brooklyn Ent. Soc.*, **25** : 59-70.

BINGHAM, C.T. 1897. *The Fauna of British India, including Ceylon and Burma, Hymenoptera*, I. Wasps and Bees. : 579 + i- xxix. Taylor and Francis, London.

BINGHAM, C.T. 1908. Notes of Aculeate Hymenoptera in the Indian Museum. *Rec. Indian Mus.*, **2** : 347-368 (Vespidae : 359-360).

CARPENTER, J.M. 1982. The Phylogenetic relationships and natural classification of the Vespoidea (Hymenoptera). *Syst. Ent.*, **7** : 11-38.

CARPENTER, J.M. 1987. The Phylogenetic relationships and classification of the Vespinae (Hymenoptera : Vespidae). *Syst. Ent.*, **12** : 413-431.

CARPENTER, J.M. 1996a. Phylogeny and Biogeography of *Polistes*. In : Turillazzi S, West-Eberhard M.J. (eds), *Nat. Hist. Evolv. Paper-Wasps* : 18-57. Oxford Univ. Press, Oxford.

CARPENTER, J.M. 1996b. Distributional checklist of the species of the genus *Polistes* (Hymenoptera : Vespidae : Polistinae, Polistini). *Amer. Mus. Nov.*, **3188** : 1-39.

CARPENTER, J.M. and KOJIMA, J. 1997. Checklist of the species in the subfamily Vespinae (Insecta : Hymenoptera : Vespidae). *Nat. Hist. Bull. Ibaraki Univ.*, **1** : 51-92.

CARPENTER, J.M. and NGUYEN, L.P.T. 2003. Keys to the genera of social wasps of South-East Asia (Hymenoptera : Vespidae). *Ent. Sci.*, **6** : 183-192.

CHHOTANI, O.B. and RAY, K.K. 1975. Fauna of Rajasthan, India (Hymenoptera). *Rec. zool. Surv. India*, **71** : 13-49.

DALLA TORRE, K.W. von 1894. Catalogus Hymenopterorum 9, Vespidae (Diploptera) : 1-81. Leipzig.

DALLA TORRE, K.W. von 1904. Hymenoptera, Family Vespidae. In : P. Wytsman (Ed.). *Genera Insect.*, **19** : 1-108.

DAS, B.P. and GUPTA, V.K. 1983. A catalogue of the families Stenogastridae and Vespidae from the Indian Subregion (Hymenoptera : Vespoidea). *Oriental Ins.*, **17** : 395-464.

DAS, B.P. and GUPTA, V.K. 1989. The social wasps of India and the Adjacent countries (Hymenoptera : Vespidae). *Oriental Ins. Monogr.* **11** : 1- 292.

DAY, M.C. 1979. The species of Hymenoptera described by Linnaeus in the genera *Sphex, Chrysis, Vespa, Apis* and *Mutilla. Biol. J. Linn. Soc.*, **12** : 45-84.

DIXIT, K.K. 1956. Differential response to form and pattern in two species of Indian honey bees. *J. Bombay Nat. Hist. Soc.*, **54** : 107.

DOVER, C. and RAO, H.S. 1922. A note on the Diplopterous wasps in the collection of the Indian Museum. *J. Proc. Asiat. Soc. Bengal (N.S.),* **18** : 235-249.

ENGEL, M.S. 2002. The honey bees of India, Hymenoptera : Apidae. *J. Bombay Nat. Hist. Soc.,* **99**(1) : 3-7.

GADAGKAR, R. and JOSHI, N.V. 1984. Social Organisation in the Indian wasp, *Ropalidia cyathiformis* (Fabr.) (Hymenoptera : Vespidae). *Zeitschr. Tier.,* **64** : 15-32.

GOULET, H. and HUBER J. 1993. Hymenoptera of the world, an identification guide to families. Centre for Land and Biological Resources Research, Ottawa, Ontario.

GUPTA, S.K. 2007. Insecta : Hymenoptera : Aculeata. *Zool. Surv. India, Faunal Diversity Western Doon Shiwaliks, Spl. Publ.* : 35-39.

GUPTA, V.K. and DAS, B.P. 1977. Distributional patterns of Indian Vespidae (Hymenoptera) with reference to altitude. *Entomon.,* **2**(2) : 209-213.

GUSENLEITNER, J. 2004. Beschreibung einer neuen Art der Gattung *Ropalidia* Guérin-Meneville aus Indien (Hymenoptera : Vespidae). *Linzer Biologische Beitrage,* **36** : 1089-1092.

GUSENLEITNER, J. 2006. Über Aufsammlungen von Faltenwespen in Indien (Hymenoptera : Vespidae) *Linzer Biol. Beitr.,* **38**(1) : 677-695.

JACOBSON, R.E. 1986. A field key to the hornets (*Vespa*) of India. *Ann. Ent.,* **4**(1) : 51-52.

JOBIRAJ, T. 2004. A new species, a new subspecies and a new record of *Braunsapis* Michener (Hymenoptera : Apidae) from India. *Perspectives on Biosystematics and Biodiversity T.C.N. Com. Vol.* March, **2004** : 527-538.

JONATHAN, J.K. and KUNDU, B.G. 2003. Insecta : Hymenoptera : Vespidae. *Zool. Surv. India, Fauna of Sikkim, State Fauna Series,* **9**(4) : 369-392.

JONATHAN, J.K., ROY, S.B. and KUNDU, B.G. 1999. Insecta : Hymenoptera : Vespidae. *Zool. Surv. India, Fauna of West Bengal, State Fauna Series,* **3**(8) : 149-182.

JONATHAN, J.K., ROY, S.B. and KUNDU, B.G. 2000. Insecta : Hymenoptera : Vespidae. *Zool. Surv. India, Fauna of Meghalaya, State Fauna Series,* **4**(7) : 117-160.

KOJIMA, J. and CARPENTER, J.M. 1997. Catalog of species in the Polistine tribe Ropalidiini (Hymenoptera : Vespidae). *Amer. Mus. Nov.,* **3199** : 1-96.

KOJIMA, J., LAMBERT, K., NGUYEN, L.P.T. and SAITO, F. 2007. Taxonomic notes on the paper wasps of the genus *Ropalidia* in Indian subcontinent (Hymenoptera : Vespidae). *Entmol. Sci.,* **10** : 373-393.

KUNDU, B.G., GHOSH, S.N. and ROYCHOWDHURY, S. 2006. Insecta : Hymenoptera : Aculeata (Vespidae and Apidae). *Zool. Surv. India, Fauna of Arunachal Pradesh, State Fauna Series,* **13**(2) : 427-448.

LAMBERT, K. 2004. Two new species and a new subspecies of *Antepipona* Saussure (Hymenoptera : Vespidae) from India with key to species. *Perspectives on Biosystematics and Biodiversity T.C.N. Com. Vol.* March, **2004** : 553-566.

LAMBERT, K., GIRISH KUMAR, P. and NARENDRAN, T.C. 2008. A new species of *Antepipona* Saussure (Hymenoptera : Vespidae). *Uttar Pradesh J. Zool.,* **28**(1) : 121-123.

LAMBERT, K. and NARENDRAN, T.C. 2002. A new species of *Antepipona* Saussure (Hymenoptera : Vespidae) from India. *J. Zool. Soc. Kerala,* **10**(1&2) : 2-4.

LAMBERT, K., NARENDRAN, T.C. and GIRISH KUMAR, P. 2005a. Taxonomic study of three new species of *Ropalidia* Guérin (Hymenoptera : Vespidae) from Kerala, India. *J. Current Sci.*, **7**(1) : 267- 276.

LAMBERT, K., NARENDRAN, T.C. and GIRISH KUMAR, P. 2005b. Three new species of *Ropalidia* Guerin (Hymenoptera : Vespidae) from South India. *Zoos' Print J.*, **20**(7) : 1920-1923.

LAMBERT, K., NARENDRAN, T.C. and GIRISH KUMAR, P. 2007. A new record of *Ancystrocerus tinctipennis* (Walker) (Hymenoptera : Vespidae) from India. *J. Entomol. Res.*, **31**(2) : 169-171.

MAA, T.C. 1953. An enquiry into the systematics of the tribus Apidini or honey bees (Hym.). *Treubia*, **21**(3) : 525-640.

MICHENER, C.D. 1944. Comparative external morphology, phylogeny and a classification of the bees (Hymenoptera). *Bull. Amer. Mus. Nat. Hist.*, **82**(6) : 151-326.

MICHENER, C.D. 1965. A classification of bees of the Australian and South Pacific region. *Bull. Amer. Mus. Nat. Hist.*, **130** : 1-362, 15 pls.

MICHENER, C.D. 1986. Family group name among bees. *J. Kansas Ent. Soc.*, **59**(2) : 219-234.

MICHENER, C.D. 1990. Classification of Apidae. *Univ. Kansas Sci. Bull.*, **54** : 75-164.

MICHENER, C.D. 2000. The bees of the world. *Johns Hopkins Univ. Press, Baltimore, Lond.* : 1-913.

MICHENER, C.D., BORGES, R.M., ZACHARIAS, M. and SHENOY, M. 2003. A new parasitic bee of the genus *Braunsapis* from India (Hymenoptera : Apidae : Allodapini). *J. Kansas Ent. Soc.*, **76**(3) : 518-522.

NURSE, C.G. 1914. Zoological results of the Abor expedition 1911-1912, Hymenoptera 5 : Fossores, Diploptera, Chrysididae. *Rec. Indian Mus.*, **8**(34) : 443-447 (446-447 list of 12 Vespidae).

PETERSEN, B. 1987. Subspecies of the Indo-Australian *Polistes stigma* (Fabricius) (Hymenoptera : Vespidae). *Ent. Scandinavica*, **18** : 227-259.

RAY, K.K. 2003. Insecta : Hymenoptera : Aculeata. *Zool. Surv. India, Fauna of Sikkim, State Fauna Series*, **9**(4) : 507-517.

RICHARDS, O.W. 1956. Hymenoptera. Introduction and keys to families. Handbooks for the identification of British insects. *Roy. Ent. Soc. Lond.*, **6**(1) : 1-94.

RICHARDS, O.W. 1968. The subgeneric divisions of the genus *Bombus* Latreille (Hymenoptera : Apidae). *Bull. Brit. Mus. Nat. Hist. Ent.*, **22**(5) : 209-276.

RICHARDS, O.W. 1973. The subgenera *Polistes* Latreille (Hymenoptera : Vespidae). *Rec. Bras. Ent.*, **17**(13) : 85-104.

ROY, S.B. and KUNDU, B.G. 1985. Fauna of Namdhapa, Arunachal Pradesh, India (Insecta : Hymenoptera). *Rec. zool. Surv. India*, **82**(1-4) : 221-229.

SCHWARZ, H.F. 1939. The Indo-Malayan species of *Trigona*. *Bull. Amer. Mus. Nat. Hist.*, **76** : 83-141.

SMITH, F. 1871. A catalogue of the Aculeate Hymenoptera and Ichneumonidae of India and Eastern Archipelago, with introductory remarks by A.R. Wallace. *J. Proc. Linn. Soc. London Zool.*, **11** : 285-415.

SMITH, F. 1875. Descriptions of new species of Indian Aculeate Hymenoptera, collected by Mr. G.R. James Rothney, Members of the Entomological Society. *Trans. Ent. Soc. Lond.* : 33-50, pl. 1.

VAN DER VECHT, J. 1941. The Indo-Australian species of the genus *Ropalidia* (= *Icaria*) (Hymenoptera : Vespoidea) (First Part). *Treubia*, **18**(1) : 103-190.

VAN DER VECHT, J. 1957. The Vespinae of the Indo-Malayan and Papuan areas (Hymenoptera : Vespidae). *Zool. Verh.*, **34** : 1-83.

VAN DER VECHT, J. 1959. On some Fabricius types of Indo-Australian Vespidae (Hymenoptera). *Arch. Neerl. Zool.*, **13** (1 suppl. 1858) : 234-247.

VAN DER VECHT, J. 1962. The Indo-Australian species of the genus *Ropalidia* (= *Icaria*) (Hymenoptera : Vespoidea) (Second Part). *Zool. Verh.*, **57** : 1-72.

VAN DER VECHT, J. 1966. The East Asiatic and Indo-Australian species of *Polybioides* Buysson and *Parapolybia* Saussure (Hymenoptera : Vespidae). *Zool. Verh.*, **82** : 1-42.

van der VECHT, J. 1981. Studies in Indo-Australian Solitary wasps. *Proc. Icon. Ic. Ned. Akad. Wetensch.*, 5, 84, **4** : 443.

WILLIAMS, P.H. 1983. Social wasps (Hym., Vespidae) from North West India. *Ent. Monthly Mag.*, **119** : 193-197.

WILLIAMS, P.H. 1988. Social wasps (Hym., Vespidae) from the Kashmir Himalaya. *Ent. Monthly Mag.*, **124** : 149-152.

YAMANE, Sk., WAGNER, R.E. and YAMANE, S. 1980. A tentative revision of the subgenus *Paravespula* of eastern Asia (Hymenoptera : Vespidae). *Insecta Mats., (N.S.)*, **19** : 1-46.