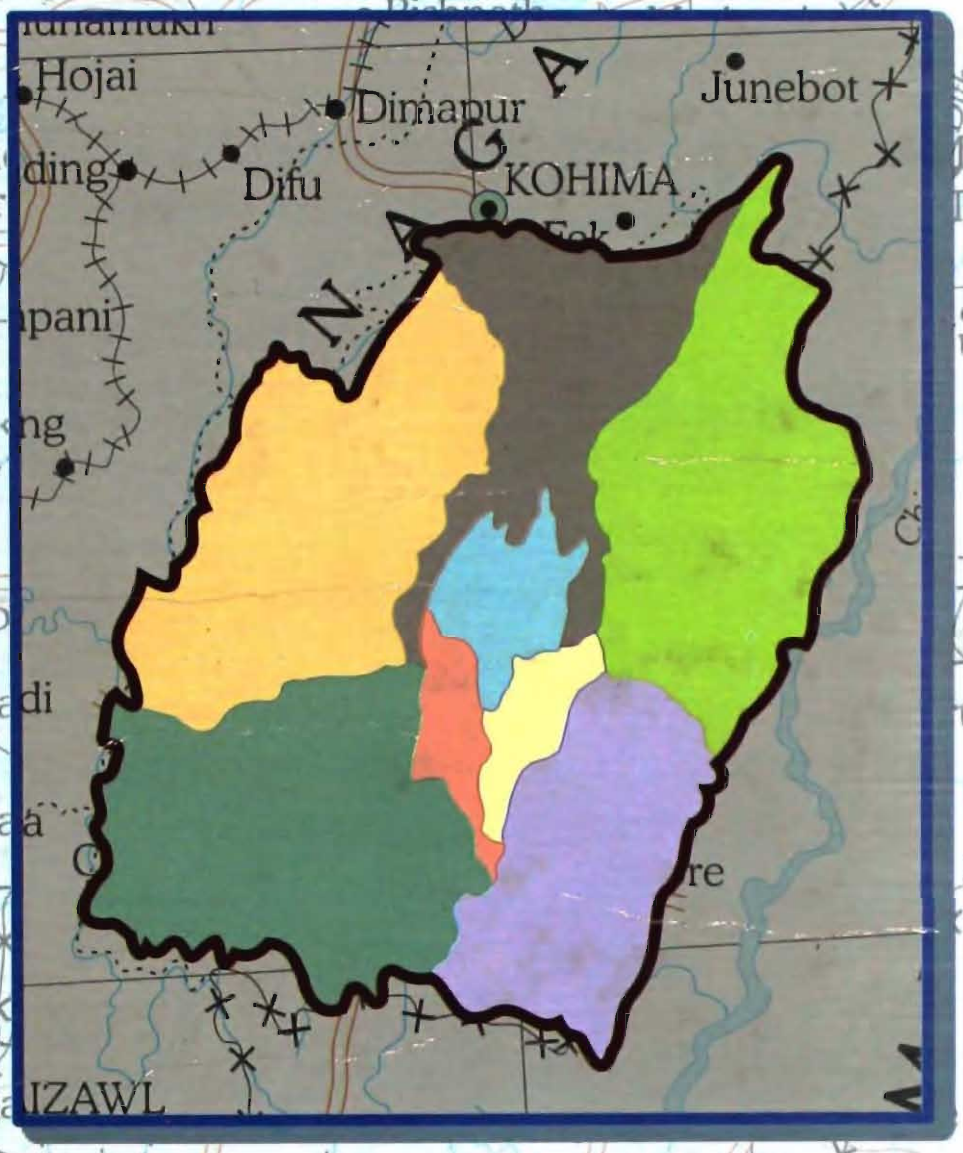
STATE FAUNA SERIES 10

FAUNA OF MANIPUR

PART – 2

(Insects)



ZOOLOGICAL SURVEY OF INDIA

State Fauna Series 10

FAUNA OF MANIPUR

(PART–2)

Insects

Edited by
The Director, Zoological Survey of India, Kolkata

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Dr. J. R. B. Alfred
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FAUNA OF MANIPUR

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ORIBATID MITES (ACARI)

A. K. SANYAL
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Oribatid mites are the most commonly found and numerically dominant group of acarina. These 'beetle' or 'moss' mites inhabit soil, litter, humus, compost heaps, lichens, moss, leaves, bark of trees, bird nests, house-dust, nests of small mammals and various other habitats like pasture soils, coniferous taiga forest, arctic tundra and even in antarctica.

Oribatid mites have direct and indirect effect on human beings and other animals. They are known to promote soil fertility through humification of organic matter. They also act as an agent for biological control of pests. Few oribated species are known to feed on different parts of higher plants. They also carry fungal spores and transmit various helminth diseases to domestic animals. Oribatid mites have also been reported to cause injury to crop plants and economically important plants. The saprophytic oribatids play an important role in regulating soil nematode populations. There are many house-dust mites of oribatid group which are causative agents of respiratory allergic diseases in human beings.

Information on oribatid mites

The study of oribatid mites of Manipur was done by Misra, Bhaduri and Raychaudhuri (1982). This publication was the only record of oribatid mites from the state before the present work was initiated. They described *Atropacarus (Hoplophorella) manipurensis* as new to science and recorded three other species *viz.*, *Atropacarus (Hoplophorella) scapellatus, Atropacarus (Hoplophorella) singularis* and *Hoplophthiracarus kugohi siamensis* from Manipur.

BRIEF ACCOUNT OF THE COLLECTION AND SURVEY DONE

The present work is based on a series of collection of oribatid mites made from Manipur by the author and his associates. The work also includes the species which were studied and published by the earlier worker.

A brief account of the survey undertaken for the study is given below :

1. Manipur survey - Dr. A.K. Sanyal and party (1992).

The most important habitats like litter, soil, humus, etc. were thoroughly surveyed for collection of oribatid mites.

The contents of the present paper

The paper deals with the oribatid fauna collected from Manipur. Altogether 28 species belonging to 20 genera and 17 families have been incorporated in the paper. It records 24 species under 18 genera and 16 families for the first time from the state of Manipur. The original and most recent references, diagnostic features where needed, distribution of each species and keys to the identification of families, genera and species known from the state have also been provided. The brief information on the studies so far made on oribatid mites from Manipur with relevant

reference has also been dealt with. The species studied by the present author are deposited in the National Zoological Collection, Zoological Survey of India.

For details of the morphological features of oribatid mite, various terminologies and materials and methodology, Sanyal (1992) may be consulted.

The measurements have been given in micron (mm). The keys for identification prepared by Balogh (1972), Balogh and Mahunka (1993), Niedbala (1986), Balogh and Balogh (1988), Subias and Balogh (1989) and balogh and Balogh (1990) have been followed.

LIST OF TAXA

1. Family PHTHIRACARIDAE

1. Genus ***Atropacarus (Hoplophorella)*** Niedbala

1. *A. (H) manipurensis* (Misra, Bhaduri and Raychaudhuri)
2. *A. (H) scapellatus* (Aoki)
3. *A. (H) singularis* (Sellnick)

2. Genus ***Hoplophthiracarus*** Jacot

4. *H. kugohi siamensis* Aoki

2. Family EUPHTHIRACARIDAE

3. Genus ***Rhysotritia*** Markel and Meyer

5. *R. ardua* (Koch) var. *otaheitensis* Hammer

3. Family NOTHRIDAE

4. Genus ***Nothrus*** Koch

6. *Nothrus* sp.

4. Family TRHYPOCHTHONIIDAE

5. Genus ***Allonothrus*** Hammen

7. *A. indicus* Bhaduri and Raychaudhuri
8. *A. russeolus* Wallwork

5. Family EREMULIDAE

6. Genus ***Eremulus*** Berlese

9. *E. avenifer* Berlese

6. Family EREMOBELBIDAE

7. Genus ***Eremobelba*** Berlese

10. *E. himalayensis* Mondal and Kundu

7. Family ZETORCHESTIDAE

8. Genus ***Zetorchestes*** Berlese

11. *Z. saltator* Oudemans

8. Family METRIOPPIIDAE

9. Genus ***Ceratoppia*** Berlese

12. *C. bipilis* Hermann

9. Family TECTOCEPHEIDAE

10. Genus ***Tectocepheus*** Berlese

13. *T. velatus* (Michael)

10. Family OTOCEPHEIDAE

11. Genus ***Dolicheremaeus*** Jacot

14. *D. geminus* Mondal and Kundu
15. *D. himalayensis* Chakrabarti, Bhaduri and Kundu

11. Family OPPIIDAE

12. Genus ***Oppia*** Koch

16. *O. yodai* Aoki

12. Family CHAUNOPROCTIDAE

13. Genus ***Chaunoproctus*** Pearce

17. *C. abalai* Bhaduri, Bhattacharya and Chakrabarti

13. Family ORIBATULIDAE

14. Genus ***Incabates*** Hammer

18. *Incabates* sp.

14. Family SCHELORIBATIDAE

15. Genus ***Scheloribates*** Berlese

19. *S. indicus* Sanyal
20. *S. thermophilus* Hammer
21. *Scheloribates* sp.

15. Family HAPLOZETIDAE

16. Genus ***Phalacrozetes*** Aoki

22. *Phalacrozetes* sp.

17. Genus ***Rostrozetes*** Sellnick

23. *R. foveolatus* Sellnick

16. Family XYLOBATIDAE

18. Genus ***Xylobates*** Jacot

24. *X. seminudus* Hammer

17. Family GALUMNIDAE

19. Genus ***Galumna*** von Heyden

25. *G. crenata* Deb and Raychaudhuri
26. *G. flabellifera orientalis* Aoki
27. *Galumna* sp.

20. Genus ***Pergalumna*** Grandjean

28. *Pergalumna* sp.

SYSTEMATIC ACCOUNT

Key to the families of oribatid mites from Manipur

1 (4) Body ptychoid, propodosoma can be shut back against hysterosoma and ventral region like blade of penknife; generally laterally compressed body

2 (3) Anogenital region wide, almost 'V'-shaped, body only slightly compressed laterally ..... Phthiracaridae Perty, 1841

3 (2) Anogenital region narrow, 'V'-shaped; body considerably compressed laterally ..... Euphthiracaridae Jacot, 1930

4 (1) Body not ptychoid; propodosoma can not be shut back against the hysterosoma and ventral region; body never laterally compressed

5 (8) Anogenital region macropyline type

6 (7) Epimeral neotrichy strong; epimeres II with 3-6 pairs of setae .... Nothridae Berlese, 1885

7 (6) Epimeral neotrichy absent; epimerees II with 0 or 1 pair of setae..... ..... Trhypochthoniidae Willmann, 1931

8 (5) Anogenital region of brachypyline type

9 (24) Notogaster pycnonotic i.e. areae porosae, sacculi or pori absent; usually without pteromorphae

10 (13) Prodorsum having lamellae with cuspides

11(12) Dorsosejugal suture absent; lamellar-interlamellar complex 'H'-shaped; notogastral setae hardly visible .... Tectocepheidae Grandjean, 1958

12 (11) Dorsosejugal suture incomplete in the middle; lamellar-interlamellar complex not 'H'-shaped, notogastral setae long .... Chaunoproctidae Pearce, 1906

13 (10) Prodorsum without true lamellae; either thin crest-shaped lamellae or thin costulae present or both lamellae and costulae absent

14 (17) Ventral neotrichy present, more than four pairs of aggenital + adanal setae

15 (16) Pedotecta II present; notogaster usually with polygonally arranged granulation; two pairs of anal setae ....Eremobelbidae Balogh, 1961

16 (15) Pedotecta II absent, notogaster usually without polygonal reticulation; some of the epimeral and aggenital setae 3 to 6 branched; prodorsum with two distinct longitudinal costulae..... ..... Eremulidae Grandjean, 1966

17 (14) Ventral neotrichy absent

18 (19) Rostral setae bifurcate; legs IV longer than I-III..Zetorchestidae Michael, 1898

19 (18) Rostral setae never bifurcate; legs IV never adapted for jumping

20 (21) Anterior and central part of notogaster without setae; only 2-4 pairs of postero-marginal setae present; thin lamellae present ..... Metrioppidae Balogh, 1943

21 (20) Anterior and central part of notogaster with setae; notogasteral setae 10-14 pairs; lamellae absent

22 (23) Body elongate, mostly atleast twice longer than wide; prodorsal and notogastral condyles present .... Otocepheidae Balogh, 1961

23 (22) Body not elongate, never twice as long as wide; costulae when present almost parallel; anal and genital plates small, placed far from each other .... Oppiidae Grandjean, 1954

24 (9) Notogaster poronotic i.e. areae porosae, sacculi or pori present; pteromorphae usually present

25 (26) Pteromorphae movable, auriculate or semicircular; prodorsum without true projecting lamellae; some chitinous lines present on the prodorsum .... Galumnidae Jacot, 1925

26 (25) Pteromorphae movable or not movable but never auriculate, sometimes absent

27 (30) Notogaster with true areae porosae

28 (29) Sensillus long, reclinate, setiform, often slightly lanceolate at its tip ..... Xylobatidae J. Balogh and P.Balogh, 1984

29 (28) Sensillus either capitate, with short stalk or fusiform; exceptionally fusiform; three to four pairs of genital setae (exceptionally five pairs) ..... Oribatulidae Thor 1929

30 (27) True areae porosae absent, notogaster with sacculi or pori

31 (32) Pteromorphae movable, hinged..... ..... Haplozetidae Grandjean, 1936

32 (31) Pteromorphae immovable or absent .... Scheloribatidae Grandjean, 1953

1. Family PHTHIRACARIDAE Perty, 1841

Key to the genera of PHTHIRACARIDAE

1 (2) Interlamellar setae erect, usually much longer and thicker than lamellar setae; two pairs of anal setae..... .....***Hoplophthiracarus*** Jacot, 1933

2 (1) Interlamellar setae decumbent and not so different in shape from lamellar setae; three pairs of anal setae..... .....***Atropacarus (Hoplophorella)*** Niedbala, 1986

1. Genus ***Atropacarus (Hoplophorella)*** Niedbala

1986. *Atropacarus (Hoplophorella)* Niedbala, *Acarologia*, **27**(1) : 80.

Key to the species of *Atropacarus (Hoplophorella)*

1 (4) Spine-like interlamellar and notogastral setae; ad_2 spine-like or bristle-like

2 (3) Distally barbed interlamellar and notogastral setae; ad_2 very long; longer than anal ones; ad_3 moderately long, straight and minutely barbed distally..... .....*singularis* (Sellnick, 1959)

3 (2) Smooth interlamellar and notogastral setae; ad_2 as long as anal setae; ad_3 very short, backwardly curved and smooth.... ..... *manipurensis* (Misra, Bhaduri and Raychaudhuri, 1982)

4 (1) Interlamellar and notogastral setae and ad_2 spatulate; aspis with two furrows dorsally, laterally with two fold carinae; sensillus hyaline distally; 3 median setae on each adano-anal plate with pointed tips ..... *scapellatus* (Aoki, 1965)

1. ***Atropacarus (Hoplophorella) manipurensis*** (Misra, Bhaduri and Raychaudhuri)

1982. *Hoplophorella manipurenis* Misra, Bhaduri and Raychaudhuri, *Indian J. Acar.*, **7** : 73.

Diagnosis : Aspis anterioly pitted; carina absent; rostral setae incurved, smooth, stiff and spine-like; lamellar setae very minute, fine; interlamellar setae longer than rostral setae, straight, sensillus long, slightly wavy and equally thick throughout with a knob-like head; notogaster with shallow pits; 15 pairs of notogastral setae, stiff, spine-like, smooth with sharp points; 4 short fine setae on each of the aggenito-genital plates; 3 median setae on each of the adano-anal plates; ad_2 as long as median ones; ad_3 almost as long as genital setae; legs monodactylous.

Distribution : India : Manipur (Ukhrul).

Remark : The species was described by Misra, Bhaduri and Raychaudhuri (1982) from the state.

2. *Atropacarus (Hoplophorella) scapellatus* (Aoki)

1965. *Hoplophorella scapellata* Aoki, *Nat. Life southeast Asia*, **4** : 131.

1967. *Hoplophorella africana* Wallwork, *Rev. Zool. Bot. Afr.*, **75** : 36.

1982. *Hoplophorella scapellata*, Misra, Bhaduri and Raychaudhuri, *Indian J. Acar.*, **7** : 73.

1992. *Atropacarus (Hoplophorella) scapellatus*, Niedbala, In : *Phthiracaroidea (Acari, oribatida) Systematic Studies*, Amsterdam, 226.

Diagnosis : Integument minutely pitted; rostral setae well developed, strong; lamellar setae minute, fine; long interlamellar setae, directed upward; sensillus almost equally thick throughout its length except distal half which is hyaline and uneven; notogastral hood absent; 15 pairs of notogastral setae, broad, spatulate; ad_1 similar to notogastral setae; ad_2 minute.

Material examined : Imphal district : 1 ♀, Mahabali temple campus, Imphal town, 29.iii.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Imphal, Moirang, Loktak, Bishenpur, Uripok, Moreh), Bihar, Meghalaya, Sikkim, Tripura, West Bengal.

Remark : The species was recorded earlier by Misra, Bhaduri and Raychaudhuri (1982) from Manipur.

3. *Atropacarus (Hoplophorella) singularis* (Sellnick)

1959. *Hoplophorella singularis* Sellnick, *Occas. Pap. Bishop Mus.*, **22** (9) : 149.

1982. *Hoplophorella singularis*, Misra, Bhaduri and Raychaudhuri, *Indian J. Acar.*, **7** : 73.

1992. *Atropacarus (Hoplophorella) singularis*. Niedbala, In : *Phthiracaroidea (Acari, oribatida) Systematic Studies*, Amsterdam, 226.

Diagnosis : Integument with shallow pits; aspis truncated behind; no carina; rostral setae bent down, smooth; lamellar setae very short, smooth; interlamellar setae long, distally barbed, directed outward; sensillus projects outwards, thickens gradually to rounded knob-like head; notogastral setae fifteen pairs, moderately long, stout, barbed.

Material examined : Ukhrul district : 1 ♀, Shiroy hill, Ukhrul, 9.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Chingmei Awangkhunou, Imphal), Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

2. Genus ***Hoplophthiracarus*** Jacot

1933. *Hoplophthiracarus* Jacot, *J. Elisha Mitchell Sci. Soc.*, **48** : 239.

4. *Hoplophthiracarus kughoi siamensis* Aoki

1965. *Hoplophthiracarus siamensis* Aoki, *Nat. Life southeast Asia*, **4** : 133.

1980. *Hoplophthiracarus kugohi siamensis* Aoki, *Bull. Inst. En. Sci. Tech. Yokohama*, **6** (7) : 35.

1982. *Hoplophthiracarus kugohi siamensis*, Misra, Bhaduri and Raychaudhuri, *Indian J. Acar.*, **7** : 77.

Diagnosis : Lateral carina extraordinarily long, arising from above bothridium, running almost parallel with lateral margin of aspis on the distal half, reaching the tip of aspis; rostral setae longer than lamellar setae, smooth; lamellar setae short, smooth; interlamellar setae long, thick, barbed on distal half; sensillus slender with an elongate irregular-shaped hyaline head; notogaster foveolate; 9 pairs of genital setae; ano-adanal plates with 5 pairs of setae; ad_2 only slightly longer than h_1.

Distribution : India : Manipur (Bishenpur).

Remark : The species was first recorded from Manipur by Misra, Bhaduri and Raychaudhuri (1982).

2. Family EUPHTHIRACARIDAE Jacot, 1930

3. Genus ***Rhysotritia*** Markel and Meyer

1959. *Rhysotritia* Markel and Meyer, *Zool. Anz.*, **163** : 329.

5. *Rhysotritia ardua* (Koch) var. *otaheitensis* Hammer

1972. *Rhysotritia ardua* (Koch) var. *otaheitensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **19** (3) : 12.

Diagnosis : The variety differ from the main form by the shape of pseudostigmatic organ and number of claws. Here the pseudostigmatic organ is dilated distally into a flat head set with coarse bristles on its surface. This variety possesses one or three claws.

Material examined: Churachandpur district : 1 ♀, Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal. Ukhrul district : 1 ♀, Shiroy hill, 9.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur, Ukhrul), Meghalaya, Sikkim, Tripura, West Bengal.

Remark : This is the first record of species from the state.

3. Family NOTHRIDAE Berlese, 1896

4. Genus *Nothrus* Koch

1836. *Nothrus* Koch, *Deutschlands Crustaceen, Myriapoden und Arachniden*, **2** : 17.

6. *Nothrus* sp.

Material examined: Ukhrul district : 1 ♀, Shiroy hill., 9.iv.1992, from humus, coll. A. K. Sanyal.

Remark: The genus is reported for the first time from the state.

4. Family TRHYPOCHTHONIIDAE Willmann, 1931

5. Genus *Allonothrus* Hammen

1953. *Allonothrus* Hammen, *Proc. Acad. Sci. Amst.*, **56c**, 244.

Key to the species of *Allonothrus*

1 (2) Genital setae 13 pairs; legs tridactylous ..... *russeolus* Wallwork, 1960

2 (1) Genital setae 10 pairs; legs monodactylous *indicus* Bhaduri and Raychaudhuri, 1968

7. *Allonothrus indicus* Bhaduri and Raychaudhuri

1968. *Allonothrus indicus* Bhaduri and Raychaudhuri, *Oriental Ins.*, **2** (2) : 195.

Diagnosis : Prodorsum irregularly punctate; strongly curved lateral ridges on prodorsum; rostral setae simple, barbed; lamellar, interlamellar and notogastral setae fan-shaped; sensillus long, narrow, thickened towards the end, distal part with fine setae; setae *1a, 1b, 1c, 2a, 3a, 3b, 4a* and *4b* smooth; genital setae 10 pairs, setose, legs monodactylous.

Material examined: Chandel district : 2 ♀♀, Bank of Lairo river, Moreh, 12.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Chandel), West Bengal.

Remark: The species is reported for the first time from the state.

8. *Allonothrus russeolus* Wallwork

1960. *Allonothrus russeolus* Wallwork, *Acarologia*, **2**(4) : 571.

Diagnosis : Minute punctations on prodorsum; lateral prodorsal ridges strongly curved, central ridges fused anteriorly; rostral setae pointed, barbed, an interrupted transverse ridge behind the interlamellar setae; other dorsal setae fan-shaped; notogaster with circular or polygonal areolae surrounded by reddish-brown ridges genital setae 13 pairs; legs tridactylous.

Material examined : Churachandpur district : 1 ♀, Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur), Assam, Sikkim, West Bengal.

Remark : The species is recorded for the first time from Manipur.

5. Family EREMULIDAE Grandjean, 1965

6. Genus *Eremulus* Berlese

1908. *Eremulus* Berlese, *Redia*, **5** : 10.

9. *Eremulus avenifer* Berlese

1913. *Eremulus avenifer* Berlese, *Redia*, **9** : 96.

Diagnosis : Four longitudinal ridges on prodorsum, lamellae connected at anterior end by

translamella; sensillus bristle like with minute setae throughout; two or three rows of many distinct pores arranged transversely on the anterior margin of notogaster; notogastral setae 11 pairs, unilaterally barbed; genital setae 6 pairs.

Material examined : Churachandpur district : 1 ♀, Chajang village, Churachandpur, 6.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur), Nagaland, West Bengal.

Remark : The species is reported for the first time from the state.

6. Family EREMOBELBIDAE Balogh, 1961

7. Genus ***Eremobelba*** Berlese

1908. *Eremobelba* Berlese, *Redia,* **5** (1) : 9.

10. ***Eremobeloba himalayensis*** Mondal and Kundu

1984. *Eremobeloba himalayensis* Mondal and Kundu, *Bull. zool. Surv. India,* **61** (1-3) : 231.

Diagnosis : Rostral setae barbed unilaterally on the outer side; interlamellar setae sparsely barbed bilaterally; sensillus long, filiform, barbed sparsely and unilaterally; two semilunar structures in the interpseudostigmatic region; notogastral setae 11 pairs, curved at the distal end; right half of ventral plate with 19 and left half with 16 setae; genital setae 6 pairs; epimeral setae *1a, 2a, 3a* and *4a* simple, others penta-or hexaradiate.

Material examined : Imphal district: 1 ♀, Mahabali temple campus, Imphal town, 29.iii.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Imphal), West Bengal.

Remark : The species is reported for the first time from Manipur.

7. Family ZETORCHESTIDAE Michael, 1898

8. Genus ***Zetorchestes*** Berlese

1888. *Zetorchestes* Berlese, *Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Padova.*

11. ***Zetorchestea saltator*** Oudemans

1915. *Zetorchestes saltator* Oudemans, *Ber. Ned. Ent. Ver.,* **4** : 194.

Diagnosis : Body with irregularly scattered granules; rostrum with nasiform apex; rostral setae thick, long, bifurcated distally, placed on two small tubercles; setae phylliform, medium length, directed medially, sensillus long, head flattened in lateral view, distinctly barbed; notogastral setae 10 pairs, all notogastral setae phylliform; notogaster postero-medially with high elevation; genital setae 6 pairs.

Material examined : Churachandpur district : 1 ♀, Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur), Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

8. Family METRIOPPIDAE Balogh, 1943

6. Genus ***Ceratoppia*** Berlese

1908. *Ceratoppia* Berlese, *Redia,* **5** (1) : 7.

12. ***Ceratoppia bipilis*** Hermann

1804. *Ceratoppia bipilis* Hermann, *Memore Apterologique.*

Diagnosis : Rostrum pointed with one incision; 5-6 lateral teeth on each side of rostrum; all prodorsal setae barbed; rostral setae relatively short; lamella almost straight, weakly converging toward the anterior part; lamellar cusp shorter than whole lamella, far below the rostral tip, lamellar cusp provided with a distinct outer teeth; lamellar setae as long as rostral setae; interlamellar setae as long as prodorsum; sensillus filiform, finely barbed; two pairs of notogastral setae (p_1 and p_2) situated on the posterior part of notogaster; two pairs of hypostomal setae.

Material examined : Churachandpur district : 1 ♀, Chajang village, Churachandpur, 6.iv.1992, from litter, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur), Himachal Pradesh, Meghalaya, Sikkim, West Bengal.

Remark : This is the first record of the species from Manipur.

9. Family TECTOCEPHEIDAE Grandjean, 1954

10. Genus ***Tectocepheus*** Berlese

1913. *Tectocepheus* Berlese, *Redia*, **9** : 91.

13. ***Tectocepheus velatus*** (Michael)

1888. *Tectocepheus velatus* (Michael), *Ray. Soc.*, **65.**

Diagnosis : Body rough with irregularly raised dots; rostrum trifid; lamellae large detouched blades lying nearly horizontal, extend beyond the lateral margin of the cephalothorax, median portion broad, cusps narrow or thick, almost reaching the tip of rostrum; translamella distinct, rostral and lamellar setae curved inward and barbed unilaterally; interlamellar setae minute, smooth, inserted near the base of lamellae; sensillus long with slender stalk, head licheniform; dorsosejugal suture interrupted; paired *iad* large, placed parallel to the anterior part of the lateral side of anal field.

Material examined : Churachandpur district : 1 ♀, Loktak village, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur), Himachal Pradesh, Meghalaya, Orissa, Sikkim, Tripura, West Bengal.

Remark : This is the first record of the species from the state.

10. Family OTOCEPHEIDAE Balogh, 1961

11. Genus ***Dolicheremaeus*** Jacot

1938. *Dolicheremaeus* Jacot, *Florida Ent.*, **21** (4) : 51.

Key to the species of *Dolicheremaeus*

1 (2) Median prodorsal condyle semilunar-shaped; sensillus lanceolate .... *himalayensis* Chakrabarti, Bhaduri and Kundu, 1981

2 (1) Median prodorsal condyle absent; sensillus spoon-shaped .... *geminus* Mondal and Kundu, 1986

14. ***Dolicheremaeus geminus*** Mondal and Kundu

1986. *Dolicheremaeus geminus* Mondal and Kundu, *Rec. zool. Surv. India*, **83** (1&2) : 91.

Diagnosis : Rostral and lamellar setae uniseriate; interlamellar setae with blunt tips; sensillus with thin long stalk, spoon-shaped head; median prodorsal condyle absent; lateral notogastral condyles tooth-like; notogastral setae 10 pairs, barbed, tips blunt; genital setae 4 pairs.

Material examined : Ukhrul district : 1 ♀, Shiroy hill, 9.iv.1992, from litter, coll. A.K. Sanyal.

Distribution : India : Manipur (Ukhrul), West Bengal.

Remark : This is the first record of the species from the state.

15. ***Dolicheremaeus himalayensis*** Chakrabarti, Bhaduri and Kundu

1981. *Dolicheremaeus himalayensis* Chakrabarti, Bhaduri and Kundu, *Mitt. Zool. Mus. Berlin*, **57** (1) : 15.

Diagnosis : Rostral and lamellar setae unilaterally barbed on outerside; interlamellar setae bilaterally barbed; sensillus slender, lanceolate; notogastral setae 10 pairs, bilaterally finely barbed; genital setae 4 pairs.

Material examined : Imphal district : 1 ♀, Mahabali temple campus, Imphal town, 29.iii.1992, from soil, coll. A.K. Sanyal. Ukhral district : 3 ♀♀, Shiroy hill, 9.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Imphal, Ukhrul), Sikkim, West Bengal.

Remark : The species is reported for the first time from the state.

11. Family OPPIIDAE Grandjean, 1954

12. Genus ***Oppia*** Koch

1836. *Oppia* Koch, *Deutschlands Crustaceen, Myriapoden und Arachniden*, 1-9.

16. ***Oppia yodai*** Aoki

1965. *Oppia yodai* Aoki, *Nat. Life Southeast Asia*, **4** : 169.

Diagnosis : Prodorsal setae finely feathered; lamellar setae twice as long as their mutual distance; interlamellar setae directed backwards; sensillus spindle-shaped, beset with fine bristles; one pointed protrusion behind the bothridium; notogastral setae 10 pairs, finely serrated; genital setae 5 pairs.

Material examined : Chandel district : 1 ♀, Lairo river bed, Moreh, 12.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Chandel), Sikkim, Tripura, West Bengal.

Remark : This is the first record of the species from the state.

12. Family CHAUNOPROCTIDAE Balogh, 1961

13. Genus ***Chaunoproctus*** Pearce

1906. *Chaunoproctus* Pearce, *Journ. Roy. Micr. Soc.*, 271.

17. ***Chaunoproctus abalai*** Bhaduri, Bhattacharya and Chakrabarti

1975. *Chaunoproctus abalai* Bhaduri, Bhattacharya and Chakrabarti, *Mitt. Zool. Mus. Berlin*, **5** (1) : 59.

Diagnosis : Prodorsal setae minutely barbed; sensillus short with round head; notogastral setae 10 pairs, setose, genital plates round with 6 pairs of setae.

Material examined : Chandel district : 1 ♀, Western bank of Lairo river, Moreh, 13.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Chandel), Tripura, West Bengal.

Remark : The species is reported for the first time from the state.

13. Family ORIBATULIDAE Thor, 1929

14. Genus ***Incabates*** Hammer

1961. *Incabates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 108.

18. ***Incabates*** sp.

Material examined : Churachandpur district : 1 ♀, Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal.

Remark : The genus is reported here for the first time from the state.

14. Family SCHELORIBATIDAE Grandjean, 1953

15. Genus ***Seheloribates*** Berlese

1908. *Scheloribates* Berlese, *Redia*, **5** : 2.

Key to the species of *Scheloribates*

1 (2) Lamellar and interlamellar setae almost equal in length; prodorsal setae smooth .. .. *indicus* Sanyal, 1992

2 (1) Lamellar setae much smaller than interlamellar setae; prodorsal setae barbed ..... *thermophilus* Hammer, 1961

19. ***Scheloribates indicus*** Sanyal

1992. *Scheloribates indicus* Sanyal, *State Fauna Series 3 : Fauna of West Bengal*, part 3 : 315.

Diagnosis : All prodorsal setae thin, smooth; sensillus with club-shaped head, directed outward and forward; notogastral setae 10 pairs, smooth, minute; faint pockmarks on ventral surface; genital setae 4 pairs; epimeral setae minute; all tarsi tridactylous :

Material examined : Churachandpur district : 8 ♀♀, Tuiningkhal, Churachandpur, 1.iv.1992, from soil, coll. A.K. Sanyal; 3 ♀♀, Loktak village, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 2 ♀♀, Kaibul Lamjao National Park, 2.iv.1992, from soil, coll. A.K. Sanyal. Chandel district : 1 ♀, western bank of Lairo river, Moreh, 13.iv.1992, from soil, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur, Chandel), West Bengal.

Remark : The species is reported for the first time from Manipur.

20. ***Scheloribates thermophilus*** Hammer

1961. *Scheloribates thermophilus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 95.

Diagnosis : All prodorsal setae barbed; rostral setae about twice as long as their mutual distance; lamellar setae thick, unusually short, slightly longer than their mutual distance; interlamellar setae thick; sensillus slender with lanceolate head; notogastral setae minute; all tarsi tridactylous.

Material examined : Imphal district : 15♀♀, Mahabali temple, Imphal town, 29.iii.1992, from soil, coll. A.K. Sanyal; 6♀♀, Golabati basti, Imphal town, 30.iii.1992, from litter, coll. A.K. Sanyal. Churachandpur district : 2♀♀, Muolai village, Churachandpur, 1.iv.1992, from litter, coll. A.K. Sanyal; 55♀♀, Khowpuibung village. Churachandpur, 1.iv.1992, from litter, coll. A.K. Sanyal; 28♀♀, Loktak village, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 5♀♀, Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 2♀♀, Lamjang village, Churachandpur, 3.iv.1992, from soil, coll. A.K. Sanyal; 6♀♀, T. Nagaloimur village, Churachandpur, 4.iv.1992, from litter, coll. A.K. Sanyal; 2♀♀, Chaldongkon village, Churachandpur, 4.iv.1992, from soil, coll. A.K. Sanyal; 9♀♀, Chajang village, Kongpopi, Churachandpur, 6.iv.1992, from soil, coll. A.K. Sanyal. Ukhrul district : 3♀♀, Upper Hungdung, Ukhrul, 8.iv.1992, from soil, coll. A.K. Sanyal; 16♀♀, lower Hungdung, near culvert no. C_2^2, Ukhrul, 8.iv.1992, from soil, coll. A.K. Sanyal; 2♀♀, Lower Hungdung near culvert no. C_3^1, Ukhrul, 8.iv.1992, from litter, coll. A.K. Sanyal; 20♀♀, Wino bazar, Ukhrul, 9.iv.1992, from soil, coll. A.K. Sanyal. Chandel district : 8♀♀, bank of Lairo river, Moreh, 12.iv.1992, from humus, coll. A.K. Sanyal; 12♀♀, Chiron village, northwest of Moreh, 13.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Imphal, Churachandpur, Ukhrul, Chandel), Sikkim, West Bengal.

Remark : The species is recorded for the first time from the state.

21. ***Scheloribates*** sp.

Material examined : Churachandpur district : 4♀♀, Sunusipha village, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 1♀, Chaldongkon village, Churachandpur, 4.iv.1992, from soil, coll. A.K. Sanyal. Ukhrul district : 4♀♀, Lower Hungdung, near culvert no. C_2^2, Ukhrul, 8.iv.1992, from soil and litter, coll. A.K. Sanyal; 1♀, Hungdung, St. Thomas School campus, Ukhrul 8.iv.1992, from soil, coll. A.K. Sanyal.

Remark : The species could not be identified as the specimens were not in good condition.

15. Family HAPLOZETIDAE Grandjean, 1936

Key to the genera of Haplozetidae

1 (2) Legs monodactylous; all prodorsal and notogastral setae present; dorsosejugal suture with three arches .... *Rostrozetes* Sellnick, 1925

2 (1) Legs tridactylous; interlamellar and notogastral setae absent; dorsosejugal suture with a single arc .... *Phalacrozetes* Aoki, 1965

16. Genus ***Phalacrozetes*** Aoki

1965. *Phalacrozetes* Aoki, *Nat. Life Southeast Asia,* **4** : 188.

22. ***Phalacrozetes*** sp.

Material examined : Ukhrul district : 1♀, Lower Hungdung, near culvert no. C_3^1, Ukhrul, 8.iv.1992, from litter, coll. A.K. Sanyal.

Remark : The genus is recorded for the first time from the state.

17. Genus ***Rostrozetes*** Sellnick

1925. *Rostrozetes* Sellnick, *Suppl. Ent. Berlin,* **11** : 84.

23. ***Rostrozetes foveolatus*** Sellnick

1925. *Rostrozetes foveolatus* Sellnick, *Suppl. Ent. Berlin,* **11** : 84.

Diagnosis : Body distinctly foveolated; prodorsal setae long, thin, unilaterally finely barbed; sensillus with swollen brush-like head; notogastral setae 10 pairs, short, fine; distance between t_1- *ms* and *ms*-h_3 almost same; genital setae 5 pairs, minute, fine.

Material examined : Churachandpur district : 3♀♀, Muolai village, Churachandpur, 1.iv.1992, from litter, coll. A.K. Sanyal. Ukhrul district : 1♀, Lower Hungdung, near culvert no. $C\frac{2}{2}$, Ukhrul, 8.iv.1992, from soil, coll. A.K. Sanyal; 1♀, Shiroy hill, 9.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Churachandpur, Ukhrul), Bihar, Meghalaya, Sikkim, Tripura, West Bengal.

Remark : This is the first record of the species from the state.

16. Family XYLOBATIDAE J. Balogh and P. Balogh, 1984

18. Genus *Xylobates* Jacot

1929. *Xylobates* Jacot, *Trans. Amer. Micr. Soc. Menasha,* **48** : 429.

24. *Xylobates seminudus* Hammer

1971. *Xylobates seminudus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** (6) : 38.

Diagnosis : Rostral setae unilaterally barbed; lamellar and inter-lamellar setae also barbed; sensillus with long stalk and lanceolate head, both of which beset with long bristles on outer border; notogastral setae 10 pairs represented by pores on the dorsum; ventral setae present; genital setae 5 pairs.

Material examined : Ukhrul district : 2♀♀, Shiroy hill, 9.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Ukhrul), Meghalaya, Sikkim, Tripura, West Bengal.

Remark : The species is recorded for the first time from the state.

17. Family GALUMNIDAE Jacot, 1925

19. Genus *Galumna* von Heyden

1826. *Galumna* von Heyden, *Isis Oken,* **18** : 611.

Key to the species of *Galumna*

1 (2) Sensillus with club-shaped head; *im* curved and directed antero-posteriorly; a crenate line runs accross the hypostome, gen_1 and gen_2 placed on the anterior border of genital plate..*crenata* Deb and Raychaudhuri, 1975

2 (1) Sensillus with long broad head; *im* straight and placed obliquely, no crenate line; gen_1 and gen_2 placed on the anterior border of left part of genital plates ....*flabellifera orientalis* Aoki, 1965

25. *Galumna crenata* Deb and Raychaudhuri

1975. *Galumna crenata* Deb and Raychaudhuri, *Annot. zool. Japan,* **48** (3) : 167.

Diagnosis : Rostral setae not found; lamellar and inter-lamellar setae represented by pits; sensillus club-shaped with short but stout bristles; *Ad* guttiform, provided with comma-like slit on the inner end; *hy* leaf-like; *Aa* placed obliquely; *im* slightly curved, directed antero-posteriorly; notogastral setae represented by 10 pairs of pits; a crenate line runs across the hypostome; genital setae 6 pairs.

Material examined : Imphal district : 1♀, Golabati basti; Imphal town, 30.iii.1992, from litter, coll. A.K. Sanyal. Churachandpur district : 2♀♀, Muolai village, Churachandpur, 1.iv.1992, from litter, coll. A.K. Sanyal. Chandel district : 3♀♀, bank of Lairo river, Moreh, 12.iv.1992, from humus, coll. A.K. Sanyal; 1♀, Chiron village, northeast of Moreh, 13.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Imphal, Churachandpur, Chandel), Meghalaya, Sikkim, West Bengal.

Remark : The species is reported for the first time from the state.

26. *Galumna flabellifera orientalis* Aoki

1965. *Galumna flabellifera orientalis* Aoki, *Nat. Life Southeast Asia,* **4** : 187.

Diagnosis : Rostral and interlamellar setae thin, short; lamellar setae very minute; sensillus with long broad head, anterior margin round and beset with spur-like bristles, posterior margin flat, without bristles; *ia* placed obliquely to the longitudinal axis of the body; areae porosae large;

gen_1-gen_3 placed on the anterior border of left genital plate.

Material examined : Chandel district : 1 ♀, Chiron village, northwest of Moreh, 13.iv.1992, from humus, coll. A.K. Sanyal.

Distribution : India : Manipur (Chandel), Kerala, Sikkim, Tripura, West Bengal.

Remark : This is the first record of the species from the state.

27. ***Galumna*** sp.

Material examined: Churachandpur district : 2 ♀♀, Sunusipha village, Churachandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 16 ♀♀, Loktak village, Churchandpur, 2.iv.1992, from soil, coll. A.K. Sanyal; 4 ♀♀, Checklaphai Reserve Forest, Churachandpur, 3.iv.1992, from soil and litter, coll. A.K. Sanyal; 5 ♀♀, Lamjang village, Churachandpur, 3.iv.1992, from soil, coll. A.K. Sanyal; 6 ♀♀, T. Nagaloimur village, Churachandpur, 4.iv.1992, from litter, coll. A.K. Sanyal; 2 ♀♀, Chaldongkon, Churachandpur, 4.iv.1992, from soil, coll. A.K. Sanyal; 7 ♀♀, Chajang village, Churachandpur, 6.iv.1992, from litter, coll. A.K. Sanyal. Ukhrul district; 3 ♀♀, Lower Hungdung, near culvert No. C_3^1, Ukhrul, 8.iv.1992, from litter, coll. A.K. Sanyal; 4 ♀♀, Lower Hungdung, near culvert No. C_2^2 , Ukhrul, 8.iv.1992, from soil and litter, coll. A.K. Sanyal; 10 ♀♀, Shiroy hill, 9.iv.1992, from litter, coll. A.K. Sanyal; 1 ♀, Wino bazar, Ukhrul, 9.iv.1992, from soil, coll. A.K. Sanyal. Chandel district : 4 ♀♀, western bank of Lairo river, Moreh, 13.iv.1992, from soil, coll. A.K. Sanyal.

20. Genus ***Pergalumna*** Grandjean

1936. *Pergalumna* Grandjean, *Ann. Soc. ent. Fr.*, **105** : 106.

28. ***Pergalumna*** sp.

Material examined : Chandel district : 8 ♂♂, Chiron village, northwest of Moreh, 13.iv.1992, from humus, coll. A.K. Sanyal.

Remark : The genus is reported for the first time from the state.

DISCUSSION

The first and the lone study on the oribatid fauna of Manipur was done by Misra, Bhaduri and Raychaudhuri (1982). Since then no further work on this group of mite from the state was done. The present work is an overall assessment of oribatid fauna of Manipur which shows that a total of 28 species, 20 genera and 17 families are known from the state. Of these, 24 species, 18 genera and 16 families are reported in this paper for the first time from Manipur. The analysis of the present account shows that 7.0% of Indian oribatid fauna are known from the state. It is also noted that two species *viz., Atropacarus (Hoplophorella) manipurensis* and *Hoplophthirocarus kugohi siamensis* are known only from Manipur in India.

SUMMARY

The paper deals with the oribatid fauna collected from different districts of Manipur. A total of 28 species pertaining to 20 genera and 17 families have been recorded. The present work added 24 species, 18 genera and 16 families to the list. Before undertaking the present work only 4 species under 2 genera and one family were known from the state. Keys to identification of families, genera and species are dealt in the paper. The important references, diagnostic features and distribution in India for each species have also been incorporated.

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IXODID TICKS (ACARI : METASTIGMATA)

A. K. SANYAL AND S. K. DE
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

The ticks belonging to the family Ixodidae are commonly known as hard ticks with a dorsal scutum covering the entire dorsum in the male but only the anterior portion in larva, nymph and female. These ticks live as host on the bodies of domestic and wild animals and in vegetation. Many serious diseases of man and animals involving protozoa, rickettsiae, spirochaetea, bacteria and viruses are transmitted by ticks.

The Indian Ixodid ticks were first taken up for study by Linnaeus (1758) and described ***Acarus elephantius*** from India. Later in 1767 he described another Indian species ***Acarus indus***. Neumann (1897-1911), Stiles and Hassall (1901), Nuttall and Warburton (1908, 1911, 1905), Nuttall (1912, 1913, 1916) and Robinson (1926) described and reported many species from India. Later Sharif (1928) made an extensive and comprehensive study of Indian Ixodids and recorded 45 species, 4 subspecies and 6 varieties. This group of ticks in India was also studied by Trapido, Varma, Macarthy, Kohls, Rebello, Elkammah, Mitchell and others (1962-1971), Advani and Vazirani (1981), De and Sanyal (1984, 1985), Nandi and De (1984), Sanyal *et al.* (1987), Sanyal and De (1991, 1992, 1995) and many others studied the ixodid tick fauna of different states of India.

The review of works so far done on Indian Ixodid ticks reveals that many of the states of India have not yet been thoroughly surveyed and the consolidated reports on faunal make-up and their prevalence are not available as ready reference. Manipur is one of such states where uptill now very little work on ixodids have been done. In 1948, Kohls described *Ixodes radfordi*, a new species from Manipur. After a long gap of two decades the second species *Haemaphysalis darjeeling* was reported by Hoogstraal and Dhanda (1970) from Manipur near Imphal. Later in 1987 Geevergheesh and Dhanda reported *Hyalomma brevipunctata*. Since then no other attempt to study the ticks of Manipur was made.

The present work is based on collection of ixodid ticks made from Manipur by the first author and the specimens collected by other scientists of the Zoological Survey of India, which are available in National Zoological Collection. The work also includes the species described from the state by the earlier workers.

A brief account of the surveys undertaken for the study and collection from other surveys is given below :

1. Imphal Survey, 1945 — Dr. M. L. Roonwal.
2. Manipur Survey, 1975— Dr. M. S. Shishodia and party.
3. Manipur Survey, 1992— Dr. A. K. Sanyal and party.

A complete list of 13 species under 7 genera of ixodid ticks hitherto known from Manipur has been incorporated in the paper. The original and most important references of the taxa, diagnostic features wherever needed, host of tick species in

India, distribution of the species in India and key to identification of genera and species known from the state have also been incorporated. The collection and preservation methods for the tick specimens and general morphology of ixodid ticks have also been dealt here in brief. The specimens studied by the present authors are deposited in the National Zoological Collection.

MATERIAL AND METHODS

A. Collection

The ixodid ticks are collected using the following methods.

1. *Hand picking* : The ticks in the free living stages are collected by this method from their natural habitats. Most of ticks are recovered from the various body parts of their hosts with fine forcep or sometimes with a brush.

2. *Flag dragging* : A flag made of 1 sq. m. white lint cloth attached to a wooden stick on one side and tying two light stones at its two opposite corners was dragged on forest vegetation, humus and grassland areas frequently visited by the hosts for collecting questing ticks. Flags were examined at frequent intervals and thus ticks were collected by fine forcep or brush.

B. Preservation

The different stages of ticks collected were preserved in 70% alcohol in small vials plugged tightly with cotton and placed in a jar containing 90% alcohol.

GENERAL MORPHOLOGY AND TERMINOLOGY

The external morphological characters which are of immense taxonomic importance are described here.

The body of tick is divided into idiosoma and gnathosoma or capitulum.

A. Idiosoma

The flat, oval or subcircular idiosoma of unfed tick consists of following structures.

1. Dorsum

i. *Scutum* : It is a sclerotized shield covering the entire dorsal surface in the male. In the female, larva and nymph it covers only the anterior portion. Thus the scutum provides a ready clue of differentiating the two sexes. In some species of ***Amblyomma***, it is attractively ornamented with various designes of iridescent colouring and, in such cases, the species is called ornate.

ii. *Pseudoscutum* : Present on the anterior part of scutum.

iii. *Scapulae* : On both sides of the emargination of the scutum there are shoulder-like projections called scapulae. They may be pointed, rounded or reduced.

iv. *Cervical grooves* : These are paired groove which runs posteriorly from the corners of scutal emergination.

v. *Lateral grooves* : These grooves run inside and parallel to the lateral margins of the scutum in both the sexes.

vi. *Marginal grooves* : These are present along the sides of the body in females.

vii. *Punctations* : These are pits of various sizes, depth and number present on the scutal surface.

viii. *Eyes* : All the tick species do not possess eye. When present there are two small protuberances situated on the anterolateral margins of the scutum.

ix. *The dorsal porose areas of foveae* : These are two small depressions or pits above the centre of the scutum.

x. *Fields* : There are four areas of fields.

xi. *Spots and stripes* : Spots are smaller and stripes are longer patches of pigments over the scutum.

xii. *Festoons* : The posterior margin of dorsum is divided into a number of rectangular areas called festoons. Generally these are 11 in number.

xiii. *Caudal process* : It is a postero-median spur-like projection of the idiosoma. Males in some species possess two such processes.

2. **Venter** : The ventral surface of the body of ticks shows the following structures :

i. *Ventral plates* : The ventral plates cover almost the entire body or the posterior side or present just anterior to the festoons.

ii. *Genital aperture* : Placed immediately posterior to the basis capituli. A chitinous flap, the post genital plate, encloses the aperture anteriorly and it is bounded posteriorly by a ridge like integument.

iii. *Anus* : It is placed medially at about the posterior third of the body behind the legs. The anal orifice is enclosed by a small ring or annulus and guarded on each side by a valve.

iv. *Grooves* : There are genital, anal and medial postanal grooves.

v. *Shields and plaques* : The larger and smaller chitinous plates situated near anus in males of certain species are called shields and plaques respectively.

vi. *Spiracle* : It consists of two parts, macula and goblets. The latter consists of a number of circular structures which surround the macula.

B. Ganathosoma or Capitulum

The body of ticks anteriorly terminates in a 'false head' or 'capitulum' It is situated in a depression known as the camerostome. It consists of the following parts :

i. *Basis capituli* : It is the basal part of the capitulum and is joined to the body by means of a neck. It varies in shape. It may be hexagonal as in *Rhipicephalus* and *Boophilus*, subtriangular as in *Ixodes*, subrectangular as in *Aponomma* or rectangular as in *Hyalomma*. Its dorsal and ventral surfaces have dorsal and ventral ridges respectively. In some species it projects backward beyond the dorsal-posterior margin or dorsal ridge called cornua. The basis capitulum also contains lateral saliences. In female specimens, on the dorsal surface of basis capitulum there is a pair of porose areas.

ii. *Palps* : There are two palps placed on each side of the mouth parts. They are sometimes designated as pedipalps. They arise antero-laterally and vary in form and size.

iii. *Chelicerae or mandibles* : This structure projects forward dorsally from the basis capituli, each consisting of a chitinous cylindrical leaf or shaft. These are enclosed in single sheath. Each shaft is provided with toothed digit consisting of sharp processes called internal and external articles and a dorsal process.

iv. *Hypostome* : It is lying ventrally in close association to the cheliceral sheath. It is provided on its ventral surface with rows of backwardly directed curved teeth.

v. *Setae on capitulum* : Paried setae present on the basis capitulum.

C. Legs

The legs are attached to the idiosoma ventrally by immovable coxae. Each leg has six segments *viz.*, coxa, torchanter, femur, tibia, protarsus and tarsus. The tarsus ends in a pair of claws and a median pad or pulvillus. The terminal part of each of the first pair of tarsi bears on its dorsal surface a small ellipsoidal vesicle called 'Haller's organ'

LIST OF TAXA

Family IXODIDAE

1. Genus ***Aponomma*** Neumann

1. *A. varanensis* (Supino)

2. Genus ***Boophilus*** Curtice

2. *B. microplus* (Canestrini)

3. Genus ***Dermacentor*** Koch

3. *D. auratus* (Supino)

4. Genus ***Haemaphysalis*** Koch

4. *H. aborensis* Warburton
5. *H. bispinosa* Neumann
6. *H. canestrini* (Supino)
7. *H. darjeeling* Hoogstraal and Dhanda

5. Genus ***Hyalomma*** Koch

8. *H. brevipunctata* Sharif

6. Genus ***Ixodes*** Latreille

9. *I. acutitarsus* (Karsch)
10. *I. kashmiricus* Pomerantzev
11. *I. radfordi* Kohls
12. *I. ovatus* Neumann

7. Genus ***Rhipicephalus*** Koch

13. *R. haemaphysaloides* (Supino)

SYSTEMATIC ACCOUNT

A key to the genera of Ixodid Ticks

Males

1. Anal groove curving anus anteriorly ; eyes absent ..... ***Ixodes***
- Anal groove curving anus posteriorly or absent ; eyes present or absent 2
2. Eyes present 3
- Eyes absent 6
3. Capitulum long ; palps long and narrow ..... ***Hyalomma***
- Capitulum short ; palps short and broad 4
4. Basis capitulum rectangular dorsally ..... ***Dermacentor***
- Basis capitulum hexagonal dorsally 5
5. Spiracular plate round or oval ; anal groove and festoons absent ..... ***Boophilus***
- Spiracular plate comma-shaped or sub-triangular ; anal groove and festoons present ..... ***Rhipicephalus***
6. Palps long, slender ; palpal segment 2 without lateral salience ..... ***Aponomma***
- Palps short, conical ; palpal segment 2 salient laterally beyond width of basis capitulum .... ***Haemaphysalis***

Females

1. Anal groove curving anus anteriorly ; eyes absent ..... ***Ixodes***
- Anal groove curving anus posteriorly or absent ; eyes present 2
2. Anal groove absent ; festoons absent ..... ***Boophilus***
- Anal groove curving anus posteriorly ; festoons present 3
3. Eyes present 4
- Eyes absent 6
4. Basis capitulum hexagonal or subrectangular ; inornate species 5
- Basis capitulum rectangular ; ornate species ..... ***Dermacentor***
5. Basis capitulum hexagonal ; capitulum short, palps broad ..... ***Rhipicephalus***
- Basis capitulum subrectangular ; capitulum long, palps narrow ..... ***Hyalomma***
6. Capitulum short, with lateral salience on palpal article II ; blade-like dorsal retroverted spur on trochanter I ..... ***Haemaphysalis***
- Capitulum long, no lateral salience on palpal article II ; dorsal retroverted spur absent on trochanter I, coxa I usually bifid ..... ***Aponomma***

1. Genus *Aponomma* Neumann

1831. *Ixodes* (en partim) Muller, *Nova. Acta Physico-medica.* **XV**(part 2) : 235.

1928. *Aponomma* Neumann, *Mem. Soc. Zool. France*, **XII** : 180.

1928. *Aponomma*, Sharif, *Rec. Indian Mus.*, **30**(3) : 333.

1. *Aponomma varanensis* (Supino)

1897. *Ixodes varanensis* Supino, *Atti. Soc. Veneto-Trent Sci. nat.*, **3** (1) : 238.

1910. *Aponomma gervaisi* var. *lucasi* Warburton, *Parasitology*, **3** : 395-407.

1933. *Aponomma lucasi* Schulze, *Arch. Hydrobiol. Suppl.*, **12** : 409-502.

1950. *Aponomma barbouri* Anastos, *Entomol. Amer.*, **30** : 1-144.

1958. *Aponomma varanensis* Santos Dias, *Mem. Estud. Mus. Zool. Univ. Coimbra*, (249) : 1-9.

1989. *Aponomma* varanensis, Frazler and Keirans, *Journ. Bombay Nat. Hist. Soc.*, **87** : 248.

Diagnosis : Male—Scutum ornamented and extensive in brown areas due to enlargement of various stripes and spots ; punctations are small, unequal ; palpi longer and hairy coxa I with two subequal short spurs.

Female—Scutum cordiform with sinuous outline, broader than long ; brown stripes occupy considerable portion, metallic green reduced to three separated blotches ; cervical grooves short and convex externally ; punctations small and few ; coxal armature as in male.

Material examined : 1 (♂), 20(♀♀), 1 nymph, Kaylatonglu, Imphal, from varanid lizard, 28. x. 1945, coll. *M. L. Roonwal.*

Host : Lizard.

Distribution : India : Manipur (Imphal), Bihar, Orissa, Uttar Pradesh, West Bengal.

Remarks : The species was first described from *Varanus salvator* collected at Monticatein, Myanmar by Supino in 1897. This is the first report of the species from Manipur.

2. Genus ***Boophilus*** Curtice

1891. *Boophilus* Curtice, *Journ. Compar. Med. Veter. Arch.*, **12** : 313.

2. ***Boophilus microplus*** (Canestrini)

1887. *Haemaphysalis micropla* Canestrini, *Atti. Soc. Veneto-Trent. Sci. nat. Padova*, **11** : 104.

1901. *Boophilus australis* Stiles and Hassall, Bur. A Ind. U. S. Dept. Argic, Washington, D. C. Circ. No. **34** : 2-3.

1928. *Boophilus australis* : Sharif, *Rec. Indian Mus.*, **30** (3) : 284.

1943. *Boophilus microplus* : Fairchild, *Am. J. Trop. Med.*, **23** (6) 586.

Diagnosis : Male—Quite hirsute scutum ; short caudal appendage tapering ; inner margin of basal segment ventrally concave ; dentition 4/4.

Female—Coxa I with deep, inverted 'V'-shaped cleft, inner margin of basal palpal segment ventrally short, deeply concave ; dentition 4/4.

Material examined : 15(♀♀), Loktak Lake, from cow, 20. ix. 1975, coll. *M. S. Shishodia* ; 45(♀♀), 15(♂♂), More, from cow, 25. ix. 1975, coll. *M. S. Shishodia* ; 25 (♀♀), 12 (♂♂), Santipur village, near forest range office, Churachandpur, from Cow, 3. iv. 1992, coll. *A. K. Sanyal* ; 11(♀♀), T. Phizol village, Churachandpur, from cow, 1. iv. 1992, coll. *A. K. Sanyal* ; 12(♀♀), 4(♂♂), 12(NN), Moulai village, 18 km southeast of Churachandpur, from cow, 1. iv. 1992, coll. *A. K. Sanyal* ; 2(♀♀), 2(♂♂), Sunusuphi village, Moirang, Churachandpur, from cow, 2. iv. 1992, coll. *A. K. Sanyal.*

Host : Cattle.

Distribution : India : Manipur (Loktak, Churachandpur), Arunachal Pradesh, Andaman and Nicobar Islands, Assam, Bihar, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Remarks : *B. microplus* is a very common cattle infesting tick species in India. The species is recorded for the first time from Manipur.

3. Genus ***Dermacentor*** Koch

1844. *Dermacentor*, Koch, *Arch. Naturgesh.*, **10** (1) : 235.

3. ***Dermacentor auratus*** Supino

1897. *Dermacentor auratus* Supino, *Atti. Soc. Veneto-Trent Sci. Nat.*, **3** (2) : 235.

1928. *Dermacentor auratus*, Sharif, *Rec. Indian Mus.*, **30** (3) : 292.

Diagnosis : Male—Capitulum rectangular, dorsally ornate, palpi large, longer than basis ; ventral ridge distinct ; cervical grooves deep, short ; lateral grooves commence just behind the eye ; festoons ornate, legs large, thick, ornate ; coxa IV much enlarged in length ; dentition 3/3.

Female—Capitulum rectangular, dorsally weakly ornate ; palpi longer in comparison to male ; palpal article I bears three long curved palpal setae ; scutum with brown markings ; cervical grooves deep ; dentition 3/3.

Material examined : 1 (N), Imphal Valley, from *Rattus* sp., 20. xi. 1945, coll. *M. L. Roonwal.*

Distribution : India : Manipur (Imphal Valley), Andaman, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Uttar Pradesh, West Bengal.

Remarks : The species is reported for the first from the State of Manipur.

4. Genus ***Haemaphysalis*** Koch

1844. *Haemaphysalis* Koch., *Arch. Naturgesh.*, **10** (1) : 217.

Key to the species of *Haemaphysalis*

Males

1(3) Palpal segment 3 with distinct dorsal spur.

2(4) Palpal segment 3 without distinct dorsal spur.

3(1) Ventral spur of trochanter lacking ; lateral grooves long ; ventral spur on palpal segment 3 small ..... *bispinosa* Neumann

4(2) Lateral groove present ; hypostome 5/5 or 4/4

5(4) Lateral groove absent ; hypostome 5/5 .... *darjeeling* Hoogstraal and Dhanda

6(7) Ventral spur on trochanter small ; hypostome 5/5 ..... *aborensis* Warburton

7(6) Ventral spur on trochanter absent ; hypostome 4/4 ..... *canenstrini* Supino

Females

1(2) Palpal segment 3 with dorsal spur ; lateral grooves long ..... *bispinosa* Neumann

2(1) Palpal segment 3 without dorsal spur ; lateral grooves narrow or deep .....

3(4) Length and breadth of palpal segment 2 subequal ; palpal segment 3 three fifth as long as 2 ..... *aborensis* Warburton

4(3) Palpal segment broader than long

5(6) Palpal segment 2.2 times as broad as long ..... *canestrini* Supino

6(5) Palpal segment 1.2 times as broad as long ..... *darjeeling* Hoogstraal and Dhanda

4. ***Haamaphysalis aborensis*** Warburton

1913. *Haemaphysalis aborensis* Warburton, *Parasitology*, **6** : 121-123.

Diagnosis : Male—colour reddish-yellow ; punctations shallow but distinct ; basis capituli dorsally 1.9 times as broad as long ; palpi compact, segment 2 subequal in length and breadth ; posterodorsal and posteroventral margin at an acute angle ; coxal spur 1 peg-like, II to IV spurs elongately triangular ; dentition 5/5.

Female—Basis capituli 2.7 times as broad as long ; scutum 1.2 times as broad as long ; genital operculum 'V' or 'U'-shaped ; coxal spur peg-like or triangular ; spurs II to IV broadly triangular ; other features same as in male.

Material examined : 5(♀♀), 1(♂), 1 (N), Imphal, from Porcupine, 29. xi. 1945, coll. *M. L. Roonwal.*

Host : Porcupine.

Distribution : India : Manipur (Imphal), Arunachal Pradesh, Assam, Meghalaya, West Bengal.

Remarks : This species was originally described by a single female from Arunachal Pradesh by Warburton (1913). Hoogstraal *et al.* (1971) studied the topotypes and redescribed the female, male, nymph and larva. The species is reported for the first time from Manipur.

5. ***Haemaphysalis bispinosa*** Neumann

1897. *Haemaphysalis bispinosa* Neumann, *Mem. Soc. Zool. France*, **10** : 341.

1915. *Haemaphysalis bispinosa*, Nuttall & Warburton, *Ticks*, part **3** : 426.

1928. *Haemaphysalis bispinosa*, Sharif, *Rec. Indian Mus.*, **30** (3) : 255.

Diagnosis : Male—Elongate-oval-shaped scutum ; cervical grooves with convergent depressions ; lateral grooves long, well marked, ending behind spiracles ; festoons twice as long as broad ; palps slightly salient ; dentition 4/4 ; coxa I with sharp spur, a minute protuburance on coxae II and IV.

Female : Subcordiform scutum ; punctations little longer than male ; basis capituli broad ; cornua short ; porose areas oval.

Material examined : 6(♀♀), 1 (N), Imphal, from jackle, 14. xi. 1945. coll. *M. L. Roonwal* ; 1(♂), Imphal, from cat, 14. xi. 1945, coll. *M. L. Roonwal* ; 1(♂), 1 (♀), Imphal, from *Felis chaus*, 14. xi. 1945, coll. *M. L. Roonwal* ; 1(♀), 2 (NN), Santipur village, Churachandpur, Singhal, from goat, 3. iv. 1992, coll. *A. K. Sanyal.*

Hosts : Jackle, cat, *Felis chaus,* goat.

Distribution : India : Manipur (Imphal), Andhra Pradesh, Arunachal Pradesh, Andaman and Nicobar Islands, Assam, Bihar, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Remarks : *H. bispinosa* is a very common species in India. The species is reported for the first time from Manipur.

6. ***Haemaphysalis canestrini*** Supino

1897. *Haemaphysalis canestrini* Supino, *Atti. Soc. Veneto-Trent Sci. Nat.,* **3** (1) : 230-238.

Diagnosis : Male—Basis capituli dorsally nearly 1.4 times as broad as long ; cornua elongately triangular, sharply pointed, palpi broadly salient ; ventral spur elongately triangular, sharply pointed, slightly curving or straight, extending to or slightly beyond midlength of segment 2 ; hypostome as long as or slightly longer than palpi, dentition 4/4 ; scutum 2.0 to 2.2 times as long as broad ; scapulae pointed ; lateral grooves deep.

Female—Basis capituli approximately 1.9 times as broad as long, cornua broadly triangular ; palpi broadly salient ; segment 2 spur from posteroventral margin slightly shorter and broader, segment 3 slightly longer ; scutum 1.25 times as long as broad ; cervical grooves narrow, converging ; punctations moderately numerous ; dentition 4/4 ; coxae each with spur, short, small broadly triangular.

Material examined : 1(♂), Imphal, from *Felis chaus*, 10. xi, 1945, coll. *M. L. Roonwal* ; 1(♀), 7(♂♂), Imphal, from Lesser cat, 28. xi. 1945, coll. *M. L. Roonwal.*

Hosts : *Felis chaus*, Lesser cat.

Distribution : India : Manipur (Imphal), Assam, Madhya Pradesh.

Remark : The species is reported for the first time from Manipur.

7. ***Haemaphysalis darjeeling*** Hoogstraal and Dhanda

1970. *Haemaphysalis (Haemaphysalis) darjeeling* Hoogstraal and Dhanda, *J. Parasit.,* **56** (1) : 169.

Diagnosis : Male—Faint cervical grooves ; lateral grooves obsolete ; punctations small, rare ; palpi moderately salient, segment 2 with posterodorsal margin forming a short broad triangle, posteroventral margin similar, segment 3 with a ventral spur ; dentition 5/5 ; coxa I with a long lanceolate spur, 2 to 4 spur broadly triangular.

Female—Shallow cervical grooves ; punctations small, distributed in external fields ; 'U'-shaped genital operculum ; palpal segment 2 with posteroventral margin short, broadly rounded projection ; segment 3 with ventral spur slightly narrower and more pointed than in male.

Host : Barking deer.

Distribution : India : Manipur (nr. Imphal), Assam, West Bengal.

Remarks : The species was recorded as parasite of hill and mountain forest-dwelling "game animals"

5. Genus ***Hyalomma*** Koch

1884. *Hyalomma* Koch, *Arch. Naturgesh,* **10** (1) : 220.

8. ***Hyalomma brevipunctata*** Sharif

1928. *Hyalomma hussaini* var. *brevipunctata* Sharif, *Rec. Indian Mus.,* **30** (3) : 318.

1963. *Hyalomma brevipunctata*, Kaiser and Hoogstraal, *J. Parasit.,* **49** : 130.

Diagnosis : Male—Basis capituli broader than long ; adanal shields broad, subanal shield absent,

scutum light brown with deep and distinct punctations in the central area and bordering the lateral grooves.

Female—Operculum elongate-oval in outline ; critical grooves shallow, wide ; punctations fine, numerous ; other characters more or less same as in male.

Host : Unknown.

Distribution : India : Manipur, Andhra Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Punjab, Uttar Pradesh, Tamil Nadu, West Bengal.

Remarks : Geeverghese and Dhanda (1987) reported the species from Manipur.

6. Genus ***Ixodes*** Latreille

1795. *Ixodes* Latreille, *Mag. Encyl. J. Sci. Lett. Arts.*, **4** : 15-20.

9. ***Ixodes acutitarsus*** (Karsch)

1880. *Haemalastor acutitarsus* Karsch, *Mittcheil. Munchener Entomol. Vereine*, 4 : 142.

1899. *Ixodes laevis* Neumann, *Mem. Soc. Zool. France*, **12** : 148.

1901. *Ixodes acuitarsus*, Neumann, *Mem. Soc. Zool. France*, **14** : 285.

1910. *Ixodes gigas*, Warburton, *Parasitology*, **3** : 397.

1928. *Ixodes acutitarsus*, Sharif, *Rec. Indian Mus.*, **30** (3) : 234.

Diagnosis : Male—Scutum smooth ; fine punctations ; continuous lateral grooves ; capitulum 1.5 mm long ; dentition 2/2 rows of ten teeth.

Female—Capitulum 1.66-1.95 mm long ; palps four times as long as broad ; article II twice as long as article III, coxa I bidentate ; internal spur thick, overlapping coxa II ; other characters as in male.

Material examined : 1(♀), Imphal, from porcupine, 29. xi. 1945, coll. *M. L. Roonwal.*

Host : Porcupine.

Distribution : India : Manipur (Imphal), Arunachal Pradesh, Assam, Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal.

Remarks : The species is reported here for the first time from Manipur.

10. ***Ixodes kashmiricus*** Pomerantzev

1948. *Ixodes persulcatus kashmiricus* Pomerantzev, *Parasit. bron. Zool. Inst. Nauk. SSR.*, **10** : 20.

Diagnosis : Male—Scutum equally convex at both ends ; scapulae long and round ; cervial grooves faint ; punctations fine, numerous ; palpi short, broad, rounded apically ; cornua absent ; dentition 4/4.

Female—Scutum broadly rounded ; scapulae well developed, pointed ; palpi long ; other characters as in male.

Nymph : Scutum circular, broadly rounded behind ; scapulae short, rounded ; cervical grooves shallow ; dentition 3/3 distally, 2/2 proximally ; coxae I-IV with small pointed external spurs.

Material examined : 3 (NN), Imphal, from tree shrew, 27. xi. 1945, coll. *M. L. Roonwal.*

Host : Tree shrew.

Distribution : India : Manipur (Imphal), Himachal Pradesh, Kashmir, Uttar Pradesh.

Remarks : The species was originally described as a subspecies of *I. persulcatus* Schulze, 1930. This is the first report of the species from Manipur.

11. ***Ixodes radfordi*** Kohls

1948. *Ixodes radfordi* Kohls, *J. Parasit.*, **33** (6) : 437.

Diagnosis : Female—Auriculae large, colour yellow brown, basis long, triangular ; cornua absent or very short, porose areas large ; hypostome 3/3 near tip and 2/2 at the base ; cervical grooves shallow, punctations distinct, large in posterior and lateral areas ; coxa I-IV each with very short external spur, coxae, I, II, III with posterior salient ridges.

Host : *Rattus rattus rufescens.*

Distribution : India : Manipur (Kanglatongbi).

Remark : The species was described by Kohls (1948) from rat in eastern India.

12. ***Ixodes ovatus*** Neumann

1899. *Ixodes ovatus* Neumann, *Mem. Soc. Zool. France,* **12** : 116.

1904. *Ixodes japonensis* Neumann, *Arch. Parasit.,* **8** (3) : 458-459.

1911. *Ixodes ricinus* var. *ovatus* Nuttall and Warburton, *Cambr. Univ. Press* : 158.

1963. *Ixodes ovatus* Morel, *Ann. Parasit. hum. comp.,* **38** (6) : 925.

1973. *Ixodes ovatus* Hoogstraal *et al., J. Med. Ent.,* **10** (2) : 157.

Diagnosis : Male—Auriculae absent, dentition 4/4, palpi pointed apically, coxa I with slight internal spur, III and IV each with internal spur, syncoxae present on I and II.

Female—Basis capituli with well developed cornua, porose areas round ; coxa I with short, blunt internal spur, spur absent on coxa II.

Material examined : 1(♀), Hundung, Ukhrul, from cow, 2. x. 1975, coll. *M. S. Shishodia.*

Host : Cow.

Distribution : India : Manipur (Ukhrul), Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal.

Remark : This species is reported here for the first time from Manipur.

13. ***Rhipicephalus haemaphysaloides*** Supino

1897. *Rhipicephalus haemaphysaloides* Supino, *Atti. Soc. Veneto-Trent. Sci. Nat.,* 2s, **3** (1) : 234.

1971. *Rhipicephalus haemaphysaloides,* Hoogstraal, Saito, Dhanda and Bhat, *J. Parasit.,* **57** (1) 182.

Diagnosis : Male—Cervical grooves short and deep ; lateral grooves well marked with deep punctations ; postero-median groove well represented ; paramedian groove small ; punctations numerous, small ; ventrally the adanal shield sickle-shaped ; accessory adanal shield present ; festoons distinct ; median festoon large ; spiracle comma-shaped ; dentition 3/3.

Female—Cervical grooves deep and shallow ; punctations few ; spiracle subtriangular with a large mecula ; cornua short ; palpi blunt, twice as long as broad ; other characters as in male.

Host : Buffalo.

Material examined : 2(♀♀), 4 (♂♂), Santipur village, near forest range office, Churachandpur, Singhat, from dog, 3. iv. 1992, coll. *A. K. Sanyal.*

Distribution : India : Manipur (Churachandpur), Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Sikkim, Uttar Pradesh, Tamil Nadu, Punjab, Rajasthan, West Bengal.

Remark : Sharif (1938) suspected that this species plays some role in transmission of tick typhus fever in India.

SUMMARY

The paper deals with the ixodid fauna of Manipur. A total of 13 species distributed over 7 genera hitherto known from the state have been recorded. Out of these 13 species 10 species under 6 genera have been reported here for the first time from the state. The first and important references, diagnostic features, distribution and hosts of the tick species in Manipur and key to the identification of genera and species have also been incorporated in the paper.

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ARANEAE : SPIDERS

BIJAN KUMAR BISWAS and KAJAL BISWAS
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

The spider fauna of Manipur has not yet been studied in a comprehensive manner. The present work was taken up to give an up-to-date information regarding the families : Salticidae, Pholcidae, Ctenidae, Thomisidae, Heteropodidae, Clubinoidae, Oxyopidae, Agelenidae, Lycosidae, Tetragnathidae and Araneidae from Manipur in the light of modern taxonomic concept. It is hoped that the comprehensive account of the spider fauna of Manipur will prove quite useful to the future worker also. The work is based upon the speciemens collected from different parts of Manipur as well as these present in the National collection of the Zoological Survey of India.

Altogether, a total 52 species belonging to 30 genera under 11 families are dealt with here of those, all the families, genera and species form new records for the state and also one species recorded for the first time from the Sub-continent. Out of these, 1 species belonging to 1 genus and 1 family is described here as new to science. The entire material is deposited in the National Zoological Collection of the Zoological Survey of India, Kolkata.

LIST OF TAXA

Family I SALTICIDAE Sundevall

Genus 1 ***Euophrys*** Koch

1 *E. Chiriatapuensis* Tikader

Genus 2 ***Marpissa*** Koch

2. *M. manipuriensis* sp. nov.

Genus 3 ***Myrmarachne*** Mac Leay

3. *M. calcuttaensis* Biswas

Genus 4 ***Phidippus*** Koch

4. *P. punjabensis* Tikader

Genus 5 ***Plexippus*** Koch

5. *P. paykullii* (Audouin)

Genus 6 ***Salticus*** Latreille

6. *S. ranjitus* Tikader

Genus 7 ***Zygoballus*** Peckham

7. *Z. pashanensis* Tikader

Family II PHOLCIDAE C. L. Koch

Genus 8 ***Crossopriza*** Simon

8. *C. lyoni* (Blackwall)

Family III CTENIDAE Keyserling

Genus 9 ***Ctenus*** Walckenaer

9. *C. meghalayaensis* Tikader

Family IV THOMISIDAE Sundevall

Genus 10 ***Thomisus*** Walckenaer

10. *T. projectus* Tikader

Genus 11 ***Camaricus*** Thorell

11. *C. formosus* Thorell

Genus 12 ***Diaea*** Thorell

12 *D. bengalensis* Biswas & Majumder

Family V HETEROPODIDAE Thorell

Genus 13 ***Spariolenus*** Simon

13. *S. tigris* Simon

Genus 14 ***Heteropoda*** Latreille

14. *H. kandiana* Pocock
15. *H. sikkimensis* Gravely
16. *H. phasma* Simon

Genus 15 ***Olios*** Walckenaer

17. *O. hampsoni* (Pocock)
18. ***O. wroughtoni*** (Somon)

Family VI CLUBIONIDAE Wagner

Genus 16 ***Clubiona*** Latreille

19. *C. analis* Thorell
20. *C. filicata* Cambridge

Genus 17 ***Cheiracanthium*** Koch C. L.

21. *C. trivialis* (Thorell)

Family VII OXYOPIDAE Latreille

Genus 18 ***Oxyopes*** Latreille

22. *O. shweta* Tikader
23. *O. pondae* Tikader

Family VIII AGELENIDAE C. L. Koch

Genus 19 ***Agelena*** Walckenaer

24. *A. satmila* Tikader

Family IX LYCOSIDAE Sundevall

Genus 20 ***Hipassa*** Simon

25. *H. pisaurina* Pocock
26. *H. greenalae* (Blackwall)
27. *H. partita* (Cambridge)

Genus 21 ***Pardosa*** Koch

28. *P. atropalpis* Gravely
29. *P. sumatrana* Thorell
30. *P. birmanica* Simon
31. *P. minutus* Tikader & Malhotra
32. *P. timida* (Simon)

Genus 22 ***Lycosa*** Latreille

33. *L. tista* Tikader
34. *L. himalayaensis* Gravely
35. *L. shillongensis* Tikader & Malhotra
36. *L. iranii* Pocoçk
37. *L. burnesy* Gravely
38. *L. madani* Pocock
39. ***L. kempi*** Gravely

Genus 23 ***Venonia*** Thorell

40. *V. himalayaensis* Gravely

Family X TETRAGNATHIDAE Menge

Genus 24 ***Tetragnatha*** Latreille

41. *T. andamanensis* Tikader

Family XI ARANEIDAE Latreille

Genus 25 ***Araneus*** Clerck

42. *A. mitifica* (Simon)

Genus 26 ***Argiope*** Audouin

43. *A. pulchella* Thorell
44. *A shillongensis* Sinha

Genus 27 ***Cyrtophora*** Simon

45. *C. citricola* (Forskall)

Genus 28 ***Zygeilla*** F.O.P. Cambridge

46. *Z. indica* Tikader & Bal
47. *Z. melanocrania* Tikader & Bal

Genus 29 ***Leucauge*** White

48. *L. tessellata* (Thorell)

Genus 30 ***Neoscona*** Simon

49. *N. mukerjei* Tikader
50. *N. theis* (Walckenaer)
51. *N. nautica* (L. Koch)
52. ***N. bengalensis*** Tikader & Bal

Family I SALTICIDAE Sundevall

Key to the genera of the family SALTICIDAE Sundevall

1. Labium semicircular in shape ..... ***Euophrys***

   Labium not semicircular in shave 2

2. Cephalothorax rectangular in shape not pointed behind ..... ***Marpissa***

   Cephalothorax elongated and pointed behind 3

3. Chelicerae robust and prominent ; nearly as long as cephalothorax ..... ***Myrmarachne***

Chelicerae not robust and prominent; not longer as cephalothorax 4

4. Eyes are small in proportion to the spiders ..... ***Phidippus***

Eyes are not small in proportion to the spiders 5

5. Labium little longer than wide; coxae of the I leg separated by less than the width of the labium ..... ***Plexippus***

Labium not longer than wide; coxae of the I leg not separated by less than the width of the labium 6

6. The ocular trapezium is not about one-third boarder than long ..... ***Salticus***

The ocular trapezium is one-third boarder than long 7

7. The first legs are heaviest than the rest ..... ***Zygoballus***

1. Genus ***Euophrys*** Koch

1834. *Euophrys* Koch, *Schae-fler.*, **8** : 123.

1981. *Euophrys* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30**(1) : 101.

1992. *Euophrys* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 388.

Type-species : *Euophrys frontalis* Walckenaer

Distribution : Cosmopolitan.

1. ***Euophrys chiriatapuensis*** Tikader

1977. *Euophrys chiriatapuensis* Tikader, *Rec. zool. Surv. India,* **72** : 206.

1992. *Euophrys chiriatapuensis* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, Part III, Araneae : Spiders, State Fauna Series No. 3 : 388.

Diagnosis : Cephalothorax longer than wide, not very high, clothed with black hair and short white spatulate hair, anterior portion slightly wider than posterior region. Centre of cephalothorax provided with conspicuous fovea. Behind the posterior eyes a conspicuous crescent shaped white hairy patch, covered the whole cephalothorax. Eyes are pearly white, anterior median eyes nearly half of the middle eyes, Sternum oval, clothed with fine hair. Chelicerae not very strong, inner margin provided with two teeth and outer also with two small teeth. First pair of legs are robust and longer than others. Abdomen longer than wide, narrowing behind, middle portion decorated with golden patches.

Material examined : 3♀, 2♂, West bank of Lacro river, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Moreh), New record; West Bengal; South Andaman (Type-locality).

2. Genus ***Marpissa*** Koch

1845. *Marpissa* Koch, *Die, Arachn.*, **13** : 56.

1981. *Marpissa* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 93.

1992. *Marpissa* : Biswas & Biswas, *Fauna of West Bengal,* Part III. Araneae : Spiders, State Fauna Series No. **3** : 388.

Type-species : *Marpissa muscosa* Clerck

Distribution : Cosmopolitan.

2. ***Marpissa manipuriensis*** sp. nov.

General : Cephalothorax, abdomen and legs are light to deep brown in colour. Total length 13.00 mm. Carapace 6.00 mm. long, 5.00 mm. wide; abdomen 8.00 mm. long and 6.00 mm. wide.

Cephalothorax : Longer than wide, cephalic region flat and deep brown, middle of cephalothorax light in colour and provided with a small deep fovea; one-third of the posterior portion of cephalothorax abruptly slope behind. Eyes of anterior median milky white and others pearly white, anterior row slightly recurved and anterior median eyes are nearly four times larger than the lateral eyes. Middle row of eyes are very small and situated nearly equidistant from anterior lateral and posterior rows. Ocular trapezium broader than long and slightly high like platform. Posterior eyes and anterior lateral eyes are nearly

same size. Cephalothorax clothed with thick hair and few spines. Chelicerae with one tooth on inner margin and two dissimilar size of teeth on outer margin. Sternum ovoid in shape, clothed with hair and few spines. Legs are strong, stout and clothed with hair and spines. Legs formula is 1243. Tibia and metatarsi of I and II provided with four and two pairs of ventral spines respectively.

Abdomen : Longer than wide, narrowing in behind, clothed with black and white hair. There is a spindle shaped mid-white band extending from anterior portion to the end of the dorsum and with white dots over the dorsum. Ventral side also provided with white dots and longitudinally blackish hand extending from epigastric furrow to spinnerets as in figs. 1-3.

Holotype : One female, paratype six females, allotype two males in spirit, deposited in National collection of Zoological Survey of India, Kolkata, Redg. Nos. 5488-90/18.

Type-locality : Wino bazar, Ukhrul, Dist. Ukhrul, Manipur, India, 9. iv. 1992, coll. *A. K. Sanyal & party.*

This species nearly resembles *Marpissa calcuttaensis* Tikader but it is separated as follows (1) Colour pattern of abdomen is different (2) There is a longitudinal white mid band on the dorsum but in *M. calcuttaensis* no such band (3) Epigyne and internal genitalia are also structuraly different.

3. Genus ***Myrmarachne*** Mac Leay

1839. *Myrmarachne* Mac Leay, *Ann. Mag. Nat. Hist.*, **2** : 10.

1981. *Myrmarachne* : Tikader & Biswas, *Rec. zool. Surv. India.* Occ. pap. No. **30** (1) : 104.

1992. *Myrmtarachne* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 393.

Type-species : *Myrmarachne melanocephalus* Mac Leay.

Distribution : Oriental and sub-tropical regions of the world.

3. ***Myrmarachne calcuttaensis*** Biswas

1984. *Myrmarachne calcuttaensis* Biswas, *Bull. zool. Surv. India,* **6** : (1-3) : 126.

1992. *Myrmarachne calcuttaensis* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 394.

Diagnosis : Cephalothorax deep brown to light brown in colour, legs and abdomen blackish grey, clothed with fine grey hair. Cephalic region is high and flat. Cephalic and thoracic junction is very much constricted and thoracic region sloping behind. Ocular trapezium wider than long. Legs are thin and long, clothed with find hair. Legs formula is 4312. Abdomen longer than wide ; posterior end wider than anterior end and clothed with fine pubescene.

Material examined : 1 ♀ Moulaei village 18 K. M. south of Churachandpur, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur) New record ; West Bengal.

4. Genus ***Phidippus*** Koch

1846. *Phidippus* Koch, *Die. Arachn.*, **73** : 125.

1981. *Phidippus* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 90.

1992. *Phidippus* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 395.

Type-species : *Phidippus variegatus* (Lucas)

Distribution : All tropical and sub-tropical countries of the world.

4. ***Phidippus punjabensis*** Tikader

1974. *Phidippus punjabensis* Tikader, *Proc. Acad. Sci.*, **59** (2) : 121.

Diagnosis : Cephalothorax, abdomen and legs are light to deep greenish brown ; posterior and lateral sides very sloping. Eyes are comparatively small according to the size of the spider. Anterior row of eyes are recurved, middle eyes are pearly white and others black. Middle of cephalothorax

provided with small fovea. Chelicerae with one small tooth on inner and two small teeth on outer margin. Legs are short and robust, clothed with hair and spines. Abdomen longer than wide and pointed behind, clothed with fine and course hair ; dorsally with a black ornamented patch. Male known.

Material examined : 1 ♀, Mahabali Temple, Bank of river Impha Thang, Dist. Imphal, Manipur, 29. iii. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Imphal), New record ; Maharashtra ; Punjab (Type-locality).

5. Genus ***Plexippus*** Koch

1846 *Plexippus* Koch, *Die. Arachn.*, **13** : 107.

1967. *Plexippus* Tikader, *Proc. Acad. Sci.*, **66** (4) : 118.

1981. *Plexippus* Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 99.

Type-species : *Plexippus paykullii* (Audouin)

Distribution : Cosmopolitan.

5. ***Plexippus paykullii*** (Audouin)

1825. *Attus paykullii* Audouin, *Dscr. Egypte, 2nd Ed.*, **22** : 172.

1995. *Plexippus paykullii* : Biswas & Majumder, *Fauna of Meghalaya,* Part-II, Araneae : Spiders, State Fauna Series No. **4** : 124.

1997. *Plexippus paykullii* : Biswas & Biswas, *Fauna of Delhi,* Araneae : Spiders, State Fauna Series No. **6** : 478.

Diagnosis : Cephalothorax longer than wide. Anterior row of eyes are recurved ; second row of eyes small and nearer to the first row. The third row situated of the broadest part of the cephalothorax. Legs I are robust and strongest of all the legs. Abdomen longer than broad, narrowing behind, clothed with fine hair.

Material examined : 1 ♀, Sunusuphi village on the way of Imphal, Dist. Churachandpur, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Meghalaya ; Madhya Pradesh.

Elsewhere : Africa, Burma, Europe, Sri Lanka and in all of the warmer regions of the world.

6. Genus ***Salticus*** Latreille

1804. *Salticus* Latreille, *Nouv. Dict. H. N.*, **24** : 135.

1981. *Salticus* Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 89.

1992. *Salticus* Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 400.

Type-species : *Salticus scenicus* Clerck

Distribution : Cosmopolitan except Australia.

6. ***Salticus ranjitus*** Tikader

1967. *Salticus ranjitus* Tikader, *Proc. Indian Acad. Sci.*, **66** (4) : 117.

1992. *Salticus ranjitus* Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 400.

Diagnosis : Cephalothorax longer than wide, somewhat rectangular, clothed with fine black hair, cephalic and anterior thoracic regions high and flat, posterior thoracic region abruptly bend behind. Eyes are pearly white. Chelicerae provided with one larger tooth on inner and two smaller teeth on outer margin. Abdomen nearly eggshaped, dorsum provided with irregular minute white dots ; posterior end with transverse conspicuous white band.

Material examined : 5 ♀, 3 ♂, West bank of Laero river, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Moreh), New record ; West Bengal ; Maharashtra ; Punjab ; West Sikkim.

7. Genus ***Zygoballus*** Peckham

1885. *Zygoballus* Peckham, *Proc. Nat. Hist. Soc. Wis.*, **1** : 82.

1948. *Zygoballus* : Kaston, *Spiders of Connecticut,* : 496.

1995. *Zygoballus* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 125.

7. *Zygoballus pashanensis* Tikader

1975. *Zygoballus pashanensis* Tikader, *Proc. Indian Acad. Sci.*, **81** (4) : 151.

Diagnosis : Cephalothorax, legs and abdomen are deep-brown in colour ; high and flat on the top, a little longer than wide, behind with a very steep thoracic region. Anterior row of eyes are close together in a slightly recurved. Second row of eyes are small and much nearer to the first row than the third row. Chelicerae is short, deep brown in colour with a single tooth on inner margin. First legs conspicuously robust and dorsal side of femur very much bulging. Legs formula is 1432. Abdomen longer than wide, nearly elliptical in shape, narrowing behind, clothed with grey and some black hair. Dorsum of posterior half provided with grey chevron and posterior lateral sides also provided with two small grey spots.

Material examined : 1 ♀, Gola bathi basti, Dist. Imphal, Manipur, 30. iii. 1992, coll. *S. C. Majumder* ; 1 ♀, River Imphal Thang near Mahabali temple, Dist. Imphal, Manipur, 29. iii. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Imphal), New record ; Maharashtra.

II. Family PHOLCIDAE C. L. Koch

8. Genus *Crossopriza* Simon

1893. *Crossopriza* Simon, *Hist. Nat. Arign.*, **1** : 476.

1935. *Crossopriza* : Dyal, *Bull. Zool. Punjab Univ.*, **1** : 168.

1981. *Crossopriza* : Tikader & Biswas, *Rec. Zool. Surv. India*, Occ. pap. No. **30** (1) : 18.

Type-species : *Crossopriza pristina* Simon

Diagnosis : Anterior eyes recurved, narrowly spaced ; chelicerae depressed at the inner margin and each provided with an oblique apical tooth. Sternum broadly truncate posteriorly. Abdomen slightly ovate, abruptly declined posteriorly raised much above the spinnerets.

Distribution : India, Arabia and Egypt.

8. *Crossopriza lyoni* (Blackwall)

1867. *Pholcus lyoni* Blackwall, *Ann. Mag. Nat. Hist.*, **19** (3) : 302.

1992. *Crossopriza lyoni* Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders State Fauna Series No. **3** : 383.

1997. *Crossopriza lyoni* Biswas & Biswas, *Fauna of Delhi*, Araneae : Spiders, State Fauna Series No. **6** : 477.

Diagnosis : *Crossopriza lyoni* is a common house spider. It spins an extremely fine irregular cob-web, from which it hangs upside down. It prefers old dark and abandoned houses. No cocoon is made but the eggs are glued together and carried by the chelicerae of the mother and hatching. They are nocturnal.

Material examined : 1 ♀, River Impha Thang near Mahabali temple, Dist. Imphal, Manipur, 29. iii. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Imphal), New record ; West Bengal ; Uttar Pradesh ; Maharashtra ; Punjab ; Chennai ; Tamil Nadu ; Rajasthan.

Elsewhere : Burma.

III. Family CTENIDAE Keyserling

9. Genus *Ctenus* Walckenaer

1805. *Ctenus* Walckenaer, *Tab. Aran.*, **18**—Arachn.

1897. *Ctenus* : Simon, *Mem. Soc. zool. Fr.*, **10** : 252.

1931. *Ctenus* : Gravely, *Rec. Indian Mus.*, **33** (3) : 211.

Type-species : *Ctenus dubius* Walckenaer

Diagnosis : Both the rows of eyes are recurved but anterior row strongly recurved. Anterior lateral eyes are smaller than anterior medians. Tarsi bears two claws. Retromargin of chelicerae armed with four or sometimes with five teeth. Labium longer than broad. Trochanter of legs show a notch ventrally.

Distribution : Cosmotropical and cosmosubtropical.

9. *Ctenus meghalayaensis* Tikader

1976. *Ctenus meghalayaensis* Tikader, *J. Bombay nat. Hist. Soc.*, **72** (3) : 791.

1981. *Ctenus meghalayaensis* Tikader & Malhotra, *Rec. zool. Surv. India*, **79** : 105.

Diagnosis : Cephalothorax and legs are light reddish-brown, abdomen brown in colour ; posterior part with a very steep thoracic declivity, clothed with pubescence and spine like hair. A fovea and longitudinal broad light in three rows, anterior lateral eyes smaller than the anterior medians. Retromargin of chelicera with four teeth. Legs are robust and strong, clothed with hair and spines. Abdomen is longer than wide, clothed with fine hair.

Material examined : 1 ♀, Checklaphai reserve forest, Singpey, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Meghalaya.

IV. Family THOMISIDAE Sundevall

Key to the genera of the family THOMISIDAE Sundevall

1. Abdomen widened and truncated behind ..... ***Thomisus***

   Abdomen long and not truncated behind 2

2. Cephalic region as wide as thoracic region .. ***Camaricus***

   Cephalic region not wide as thoracic region 3

3. Body covered with conspicuous spines ..... ***Diaea***

10. Genus *Thomisus* walckenaer

1805. *Thomisus* Walckenaer, *Tabl. Aron.*, : 28

1971. *Thomisus* : Tikader, *Mem. zool. Surv. India*, **15** (3) : 13.

1992. *Thomisus* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. **3** : 406.

Type species : *Thomisus albus* (Gmelin)

Distribution : Asia, Africa, America, Australia, Europe.

10. *Thomisus projectus* Tikader

1960. *Thomisus projectus* Tikader, *J. Bombay nat. Hist. Soc.*, **57** : 182.

1992. *Thomisus projectus* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. **3** : 409.

Diagnosis : Cephalothorax pentagonal in shape with a transverse yellow band on the ocular area ; narrowing slightly in front, maximum width slightly less than length. Clypeus is long and subrectangular. Legs are long and stout, I and II longer than III and IV. I pair of legs with three spines above on femur ; II legs with small black spot on patella. Metatarsi I and II with six pairs of ventral spines, III and IV pairs without spines. Abdomen is pentagonal slightly overlapping the posterior half, broadest at the middle. Posterior half of abdomen with prominent transverse muscular corrugation.

Material examined : 1 ♀, Golabathi Basti, Dist. Imphal, Manipur, 30. iii. 1992, coll. *S. C. Majumder.*

Distribution : India—Manipur (Dist. Imphal), New record ; West Bengal.

11. Genus *Camaricus* Thorell

1887. *Camaricus* Thorell, *Ann. Mus. civ. Gen.*, : 261.

1977. *Camaricus* : Tikader, *Rec. zool. Surv. India*, **72** (1-4) : 192.

1992. *Camaricus* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. **3** : 403.

Type species : *Camaricus maugei* (Walckenaer)

Distribution : India : Manipur, Tropical Africa and Malaysia.

11. *Camaricus formosus* Thorell

1887. *Camaricus formousus* Thorell, *Ann. Mus. civ. Gen.*, : 261.

1992. *Camaricus formosus* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. **3** : 404.

Diagnosis : Cephalothorax red, legs light greenish, abdomen dark brown in colour, Cephalothorax is high, clothed with black hair. Centre of cephalothorax provided with deep brown patch but in male no such patch. Posterior row of eyes situated adjacent to lateral eyes. Legs are robust clothed with hair and spines and ornamented with black patches. Tibial metatarsi of I and II provided with three pairs of ventral spines. Abdomen longer than wide, widest behind the middle, clothed with black hair.

Material examined : 1 ♀, Golabathi Basti, Dist. Imphal, Manipur, 30. iii. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Imphal), New record ; West Bengal ; Karnataka ; Maharashtra ; Andaman Islands.

12. Genus ***Diaea*** Thorell

1869. *Diaea* Thorell, *Eur. Spid. Etc.*, : 184.

1935. *Diaea* : Dyal, *Bull. Deptt. Zool. Punjab Univ.* **1** : 199.

1992. *Diaea* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. **3** : 404.

Type-species : *Diaea dorsata* (Fabricius)

Distribution : Cosmopolitan except Australia.

12. ***Diaea bengalensis*** Biswas & Majumder

1981. *Diaea bengalensis* Biswas & Majumder, *Rec. zool. Surv. India*, **4** (3) : 271.

Diagnosis : Cephalothorax and abdomen are light to deep brown, legs light brown in colour Lateral side of cephalothorax provided with conspicuous longitudinal light brown patches extending from ocular area to base of thorax. Eyes are black, lateral eyes situated on shallow tubercle. Ocular quad wider than long and narrowing in front. Legs of I and II clothed with hair and spines. Metatarsi of I and II pair of legs provided with four pairs of ventral spines. Abdomen is oval and broader behind, clothed with spine like hair. On dorsum there present two longitudinal white patches on the anterolateral sides. Three pairs of sigilae are present on the dorsum.

Material examined : 1 ♀, Chajing village, Dist. Imphal, Manipur, 6. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Imphal), New record ; West Bengal.

V. Family HETEROPODIDAE Thorell

Key to the genera of the family HETEROPODIDAE Thorell

1. Maxillae with distinct median longitudinal crest ; inner margin of fang furrow armed with 5-6 teeth ..... ***Spariolenus***

   Maxillae without median longitudinal crest ; inner fang furrow not armed with 5-6 teeth. 2

2. Epigynum provided with a pair of lobes, usually separated by a median septum .... ***Heteropoda***

   Epigynum not provided with a pair of lobes no median septum.....3

3. Thoracic groove may be absent, posterior laterals are sessile and posterior ocular quad square..... ***Olios***

13. Genus ***Spariolenus*** Simon

1880. *Spariolenus* Simon, *Act. Soc. Linn. Bord.*, **34** : 227.

1931. *Spariolenus* : Gravely, *Rec. Indian Mus.*, **33** (3) : 257.

1935. *Spariolenus* : Dyal, *Bull. Zool. Punjab Univ.*, **1** : 211.

Type-species : *Spariolenus tigris* Simon

Distribution : India, Sri lanka, Malacca.

13. ***Spariolenus tigris*** Simon

1880. *Spariolenus tigris* Simon, *Act. Soc. Linn. Bord.*, **24** : 281.

1954. *Spariolenus tigris* : Roewer, *Kat. der Araneae*, **2** (A) : 722.

1988. *Spariolenus tigris* : Sethi & Tikader, *Rec. zool. Surv. India*, Occ. pap. No. **93** : 7.

Diagnosis : Cephalothorax brownish yellow, legs and abdomen yellowish with brown patches ; cephalic part moderately higher than thoracic part. Lateral eyes nearly twice larger than anterior medians ; posterior laterals largest of all and placed on prominent stalks. Abdomen pentagonal, covered with darty yellow hair and pubescence. Dorsum of abdomen provided with two pairs of sigilla. Epigynum provided with a pair of rounded pits bounded by semi-circular rings and lateral lobes.

Material examined : 1 ♀, Khowpuibung village, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Bihar Punjab ; Maharashtra.

Elsewhere : Pakistan.

14. Genus ***Heteropoda*** Latreille

1804. *Heteropoda* Latreille, *N. Dic. hist. nat.*, **24** : 135.

1977. *Heteropoda* : Tikader, *Rec. zool. Surv. India,* **72** : 189.

Type-species : *Heteropoda venatoria* (Linn.)

Distribution : From India eastwards to Australia, U. S. A., Chin, Japan, Hong-Kong, Sri Lanka, Burma, Sumatra, Java.

Key to the species of the genus *Heteropoda* Latreille

1. Abdomen rounded with no markings on the dorsum ; median piece of epigynum almost straight at its poximal end, lateral lobes parallel to each other ..... *kandiana*

   Dorsum without markings ; median piece of epigynum not straight, lateral lobes not parallel to each other 2

2. Epigynum provided with a horizontal plate over the anterior of the lateral lobes, lateral lobes are in contact throughout their length and bent ..... *sikkimensis*

   Epigynum not having such horizontal plate, lateral lobes otherwise 3

3. Abdomen elongated and oval, paired lateral lobes of epigynum narrowly divergent, median piece constricted at the middle ..... *phasma*

14. ***Heteropoda kandiana*** Pocock

1899. *Heteropoda kandiana* Pocock, *J. Bombay nat. Hist. Soc.*, **12** : 752.

1988. *Heteropoda kandiana* : Sethi & Tikader, *Rec. Zool. Surv. India,* Occ. pap. No. **93** : 26.

Material examined : 1 ♀, T. Phizol, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Orissa, Assam.

Elsewhere : Sri Lanka.

15. ***Heteropoda sikkimensis*** Gravely

1931. *Heteropoda sikkimensis* Gravely, *Rec. India Mus.*, **33** (3) : 255.

1988. *Heteropoda sikkimensis* : Sethi & Tikader, *Rec. zool. Sruv., India,* Occ. pap. No. **93** : 27.

Material examined : 1 ♀, T. Phizol, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Meghalaya ; Sikkim.

16. ***Heteropoda phasma*** Simon

1897. *Heteropoda phasma* Simon, *Mem. Soc. Zool. France,* **10** (2) : 258.

1988. *Heteropoda phasma* : Sethi & Tikader, *Rec. zool. Surv. India,* Occ. pap. No. **93** : 12.

Material examined : 1 ♀, Winobazar, Dist. Ukhrul, Manipur, 9. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Ukhrul), New record ; Uttar Pradesh ; Assam ; South India.

15. Genus ***Olios*** Walckenaer

1837. *Olios* Walckenaer, *Hist. Nat. Ins. Apt.* **1** : 202.

1973. *Olios* : Platnick & Levi, *Bull. Brit. Arach. Soc.*, **2** (8) : 166.

Type-species : *Olios argelasius* (Walckenaer)

Distribution : Tropical countries of the world.

Key to the species of the genus *Olios* Walckenaer

1. Dorsum of the abdomen provided with dark brown and yellow patches to form a definite pattern ; inner margin of chelicerae with 4 teeth ; lateral lobes convergent at the posterior end ..... *hampsoni*

   Dorsum of the abdomen provided with some dark brown patches, no definite pattern ; inner without 4 teeth, lateral lobes parallel 2

2. Abdomen oval, few dark horizontal markings on the mid dorsum (male) .... *wroughtoni*

17. *Olios hampsoni* (Pocock)

1901. *Sparassus hampsoni* Pocock, *J. Bombay nat. Hist. Soc.* **13** : 491.

1988. *Olios hampsoni* : Sethi & Tikader, *Rec. zool. Surv. India*, Occ. pap. No. **93** : 41.

Material examined : 1 ♀, Lairo river bed, Dist. Moreh, Manipur, Chandal, 12. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dist. Moreh), New record ; Tamil Nadu (Nilgiri Hills).

18. *Olios wroughtoni* (Simon)

1897. *Sparassus wroughtoni* Simon, *Mem. Soc. Zool. France*, **10** (2) : 257.

1988. *Olios wroughtoni* : Sethi & Tikader, *Rec. zool. Surv. India*, Occ. pap. No. **93** : 45.

Material examined : 1 ♀, Khowpuibung village, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Bihar ; Maharashtra ; Gujarat ; North Konkan.

VI. Family CLUBIONIDAE Wagner

Key to the genera of the family CLUBIONIDAE Wagner

1. Cephalothorax with fovea. Anterior legs shorter than posterior legs ; lateral eyes both anterior and posterior not close to each other .... ***Clubiona***

   Cephalothorax without fovea ; if present very inconspicuous. Anterior legs longer than posterior legs. Lateral eyes both anterior and posterior very close to each other 2

2. Retro-lateral apophysis of the male palp with single hooked structure and the cymbium with long spur at its base ..... ***Cheiracanthium***

16. Genus *Clubiona* Latreille

1804. *Clubiona* Latreille, *Nauv. Dic. hist. nat.*, **24** : 154.

1981. *Clubiona* : Tikader & Biswas, *Rec. zool. Surv. India*, Occ. pap. No. **30** (1) : 68.

Type-species : *Clubiona pallidula* (Clerck)

Distribution : All tropical parts of the world.

Key to the species of the genus *Clubiona* Latreille

1. Cleft of vulva with longitudinal marking ; no "V"-shaped structure present in front .... *analis*

   Cleft of vulva with transverse marking ; more or less "V"-shaped structure present in front ..... *filicata*

19. *Clubiona analis* Thorell

1895. *Clubiona analis* Thorell, *Spider of Burma* : 42.

1992. *Clubiona analis* : Biswas & Biswas, *Fauna of West Bengal*, Part-III, Araneae : Spiders, State Fauna Series No. **3** : 416.

Material examined : 1 ♀, Khoupuibung village, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal.

Elsewhere : Myanmar.

20. *Clubiona filicata* Cambridge

1874. *Clubiona filicata* Cambridge, *Proc. Zool. Soc. London,* : 143.

1992. *Clubiona filicata* : Biswas & Biswas, *Fauna of West Bengal,* Part-III, Araneae : Spiders, State Fauna Series No. **3** : 417.

Material examined: 1 ♀, Sunusuphi village, Dist. Churachandpur, Manipur, on the way of Imphal, 2. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Madhya Pradesh ; Maharashtra ; Rajasthan ; Tamil Nadu.

17. Genus *Cheiracanthium* Koch, C. L.

1939. *Cheiracanthium* Koch., C. L. *Die. Arach. Sechster Band.*, : 9.

1981. *Cheiracanthium* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 69.

Type-species : *Cheiracanthium punctorium* Villers

Distribution : All parts of the world.

21. *Cheirachanthium trivialis* (Thorell)

1895. *Eutitha trivialis* Thorell, *Spiders of Burma,* : 49.

1992. *Cheiracanthium trivialis* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 421.

1995. *Cheiracanthium trivialis* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. 4 : 103.

Diagnosis : Cephalothorax, legs and abdomen are light brown in colour. Cephalothorax longer than wide, clothed with fine hair, centre of cephalic region slightly high and provided with fine fovea. Eyes are silvery white except anterior medians. Both laterals very close to each other. Chelicerae strong and stout, inner and outer margin provided with two teeth. Maxillae and labium longer than wide, provided with scopulae. Legs formula is 1423. Abdomen oval, tapering in both ends. Dorsum provided with large number of chalk-white dots.

Material examined : 1 ♀, Golabathi Basti, Dist. Imphal, Manipur, 30. iii. 1992. coll., *S. C. Majumder.*

Distribution : India : Manipur (Dist. Imphal), New record ; West Bengal ; Madhya Pradesh ; Maharashtra ; Goa ; Tamil Nadu.

Elsewhere : Myanmar.

VII. Family OXYOPIDAE Thorell

18. Genus *Oxyopes* Latreille

1804. *Oxyopes* Latreille, *Hist. Nat. Arach. France,* **14** (7) : 144.

1970. *Oxyopes* : Tikader, *Rec. zool. Surv. India,* **64** (1-4) : 70.

1981. *Oxyopes* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 60.

Type-species : *Oxyopes hetrophathalmus* Latreille

Diagnosis : Posterior row of eyes strong, procurved and equidistant from each other. Ocular quadrangle longer than wide and limited by the posterior median eyes and the anterior lateral eyes.

Distribution : Europe, Africa, Asia, Australia and America.

Key to the species of the genus *Oxyopes* Latreille

1. Lower side of the femora of all legs provided with only one longitudinal black line .... *shweta*

   Lower side of the femora of all the legs not provided with longitudinal black line 2

2. Middle of ocular quad with a pair of long spines directed forward ..... *pandae*

22. *Oxyopes shweta* Tikader

1970. *Oxyopes shweta* Tikader, *Rec. zool. Surv. India,* **64** (1-4) : 78.

1995. *Oxyopes shweta* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 121.

Material examined : 1 ♀, West bank of Laero river, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Hazra & party* ; 2 ♀, Sunusuphi village, on the way of Imphal, Dist. Churachandpur, Manipur, 2. iv. 1992, coll *A. K. Sanyal & party* ; 2 ♀, Mahabali Temple, bank of river Impha Thang, Dist. Imphal, Manipur, 29. iii. 1992, coll. *S. C. Majumder* ; 1 ♀, Chison village, West of Moreh, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dists. Churachandpur, Imphal, Moreh), New record ; West Bengal ; Meghalaya.

23. ***Oxyopes pandae*** Tikader

1969. *Oxypes pandae* Tikader, *Oriental Insects*, **3** (1) : 33.

Material examined : 1 ♂, Napan, Dist. Senapati, Manipur, 15. iv. 1992, coll. *S. K. Saha.*

Distribution : India : Manipur (Dist. Senapati), New record ; Uttar Pradesh (Type-locality).

VIII. Family AGELENIDAE C. L. Koch

19. Genus ***Agelena*** Walckenaer

1805. *Agelena* Walckenaer, *Tab. Aran.*, 351.

1940. *Agelena* : Comstock, *The Spider Book, New York,* : 600.

Type-species : *Agelena labyrinthica* Clerk

Diagnosis : Cephalothorax rather longer, the cephalic region narrowed. Eyes are nearly equal in size, both rows strongly procurved ; so that the posterior lateral and the anterior median form a nearly straight line. Anterior spinnerets clearly separated, posterior much longer and provided with two segments ; the apical segment longer than the basal and tapering.

Distribution : Europe, Africa, Asia and America.

24. ***Agelena satmila*** Tikader

1970. *Agelena satmila* Tikader, *Rec. zool. Surv. India,* **64** (1-4) : 53.

Diagnosis : Cephalothorax long, clothed with hair, cephalic region narrow and conspicuously high, thoracic region convex, with a sharp fovea and radiating striae. Anterior median eyes smaller and posterior median eyes are larger than the both laterals. Legs are long and stout, moderately densely clothed with long hair and spines. Abdomen nearly egg-shaped, dorsum provided with deep brown patches and they from like chevrons.

Material examined : 2 ♀, Moulaei village, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S.C. Majumder* ; 1 ♀, Sunusuphi village, Dist. Churachandpur, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; East-Sikkim (Type-locality).

IX. Family LYCOSIDAE Sundevall

Key to the genera of the family LYCOSIDAE Sundevall

1. Posterior spinnerets distinctly longer than the anterior spinnerets ; sternum generally provided with mid-longitudinal dark markings ..... ***Hippasa***

   Posterior spinnerets not distinctly longer than the anterior spinnerets ; sternum not provided with mid-longitudinal dark markings 2

2. Head at the top is under than at clypeus and the metatarsi IV usually longer than tibia plus patella IV together ..... ***Pardosa***

   Head at the top narrower than at clypeus ; metatarsi IV shorther than tibia plus patella IV together 3

3. Anterior row of eyes strongly procurved ; anterior median eyes never smaller than anterior laterals ..... ***Lycosa***

   Anterior row of eyes not procurved ; anterior median eyes smaller than the anterior laterals 4

4. Superior tarsal claws heavily pectinated ; third pair of legs not longer than the first pair ..... ***Venonia***

20. Genus ***Hippasa*** Simon

1885. *Hippasa* Simon, *Bull. Soc. Zool. Fr.*, **10** : 31.

1980. *Hippasa* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders **1** (2) : 272.

1995. *Hippasa* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 108.

Type-species : *Hippasa agelenoides* (Simon)

Distribution : India : Manipur, Madagascar, Africa, Arabia, Malaysia.

Key to the species of the genus *Hippasa* Simon

1. Posterior projection of the plate of vulva without any notch ..... *pisaurina*

   Posterior projection of the plate of vulva provided with notch 2

2. Chitinous plate covering the pit of vulva bifurcated posteriorly, producting a pair of large elevated triangular plate .... *greenallinae*

   Chitinous plate covering the pit of vulva, deeply invaginated mid-anteriorly and with unelevated small side convexities 3

3. Plate of vulva slightly invaginated anteriorly and hence without distinct truncated processes .....*partita*

25. ***Hippasa pisaurina*** Pocock

1900. *Hippassa pisaurina* Pocock, *Fauna of Brit., India, Arachn.*, : 250.

1980. *Hippasa pisaurina* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 300.

Material examined: 2♀, 1♂, Checklaphai reserve forest, Singhal, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal; Maharastha.

26. ***Hippasa greenallinae*** (Balackwall)

1867. *Lycosa greenallinae* Blackwall, *Ann. Mag. Nat. Hist.*, **19** (3) : 387.

1992. *Hippasa greenallinae* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 439.

Material examined : 1♀, Cheaklaphai reserve forest, Singhal, Dist. Churachandpur, Manipur, 3. iv.1992 coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Orissa ; Maharashtra ; Karnataka ; Sikkim ; Tamil Nadu.

Elsewhere : Sri Lanka.

27. ***Hippasa partita*** (Cambridge)

1876. *Trochosa partita* Cambridge, *Proc. Zool Sac.*, : 541.

1980. *Hippasa partita* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2 : 291.

1992. *Hippasa partita* : Biswas & Biswas, *Fanua of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 439.

Material examined : 1♀, Cheaklaphai reserve forest, Singhal, Dist. Churachadpur, Manipur, 3.iv.1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal.

Elsewhere : Egypt, Arabia, Central Asia, Pakistan.

21. Genus ***Pardosa*** Koch

1848. *Pardosa* Koch, *Die. Arachnide,* **14** : 100.

1980. *Pardosa* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 315.

Type-species : *Pardosa striatipes* Koch

Distribution : Europe, America, Asia.

Key to the species of the genus *Pardosa* Koch

1. Dorsal side of abdomen pale with few small dark brown spots ..... *atropalpis*

   Dorsal side of abdomen without small dark brown spots 2

2. Ocular area not black (except bases of posterior eyes) and maxillae provided with conspicuous scopulae ..... *sumatrana*

Ocular area black and maxillae provided with distinct scopulae 3

3. No longitudinal black streak present on the dorsal side of patella ; chelicerae not uniform in colour ..... *birmanica*

Longitudinal black streak present on the dorsal side of patella ; chelicerae not uniform in colour 4

4. Sternum with a conspicuous "V"-shaped mark ..... *minutus*

Sternum without such marks 5

5. Dorsum of the abdomen mid-longitudinally provided with white chevrons and sides with greenish brown and pale patches ..... *timida*

28. *Pardosa atropalpis* Gravely

1924. *Pardosa atropalpis* Gravely, *Rec. Indian Mus.*, **26** : 610.

1992. *Pardosa atropalpis* : Biswas & Biswas, *Fauna of West Bengal*, Part III, Araneae : Spiders, State Fauna Series No. 3 : 444.

Material examined : 1 ♀, Lower Hundung culvert, Dist. Ukhrul, Manipur, 8. iv. 1992, coll. *A. K. Sanyal & party* ; 1 ♀, West bank of Laero river, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Hazra & party.*

Distribution : India : Manipur (Dists. Ukhrul, Moreh), New record ; West Bengal ; Bihar ; Orissa ; Andhra Pradesh ; Karnataka ; Tamil Nadu.

29. *Pardosa sumatrana* (Thorell)

1890. *Lycosa sumatrana* Thorell, *Ann. Mus. Stor. nat. Genova*, **30** : 136.

1995. *Pardosa sumatrana* : Biswas & Majumder, *Fauna of Meghalaya*, Part II, Araneae : Spiders, State Fauna Series No. 4 : 111.

Material examined : 1 ♀, Checklaphai reserve forest, Singhal, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *S. C. Majumder* ; 1 ♂, Thomas school campus, upper Hundung, Dist. Ukhrul, Manipur, 8. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dists. Churachandpur, Ukhrul), New record ; Meghalaya ; West Bengal ; Tripura ; Kerala ; Karnataka ; Tamil Nadu ; Andhra Pradesh ; Arunachal Pradesh ; Himachal Pradesh ; Madhya Pradesh ; Maharashtra ; Gujarat ; Rajasthan.

Elsewhere : Bangla Desh, Nepal, Sri Lanka.

30. *Pardosa birmanica* Simon

1884. *Pardosa birmanica* Simon, *Ann. Mus. civ. stro. nat. Genova*, **20** : 333.

1995. *Pardosa birmanica* : Biswas & Majumder, *Fauna of Meghalaya*, Part-II, Araneae : Spiders, State Fauna Series No. 4 : 110.

Material examined : 1 ♀, Keibul Lamjao National Park, Dist. Churachandpur, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party* ; 5 ♀, River Impha Thang, near Mahabali Temple, Dist. Churachandpur, Manipur, 29. iii. 1992, coll. *A. K. Sanyal & party* ; 2 ♀, Lamjung village, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *A. K. Sanyal & party* ; 1 ♀, Churachandpur *forest range*, Dist. Churachandpur, Manipur, 19. xii. 1992, coll. *R. S. Mridha* ; 1 ♂, Chozing village, Dist. Imphal, Manipur, 6. iv. 1992, coll. *A. K. Hazra & party* ; 2 ♀, Tuilaphai, bank of river Lavana, Dist. Churachandpur, Manipur, 4. iv. 1992, coll. *S. C. Majumder* ; 1 ♀, Thomas school campus, Upper Hundung, Dist. Ukhrul, Manipur, 8. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dists. Churachandpur, Ukhrul, Imphal), New record ; Meghalaya ; West Bengal ; Bihar ; Orissa ; Maharashtra ; Punjab ; Gujarat; Uttar Pradesh; Himachal Pradesh, Madhya Pradesh ; Andhra Pradesh ; Tamil Nadu.

Elsewhere : Myanmar, Pakistan.

31. *Pardosa minutus* Tikader & Malhotra

1976. *Pardosa minutus* Tikader & Malhotra, *Proc. Indian Acad. Sci.*, **83** (3) : 126.

1992. *Pardosa minutus* : Biswas & Majumder, *Fauna of Meghalaya*, Part II, Araneae : Spiders, State Fauna Series No. 4 : 110.

Material examined : 1 ♀, Forest range office of Churachandpur, Dist. Churachandpur, Manipur, 19. xii. 1992, coll. *R. S. Mridha.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Meghalaya ; Maharashtra ; Himachal Pradesh (Type-locality).

32. ***Pardosa timida*** (Simon)

1882. *Lycosa timida* Simon, *Ann. Mus. civ. nat. Genova,* **18** : 207.

1980. *Pardosa timida* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 321.

Material examined : 1 ♀, Chozing village, Dist. Imphal, Manipur, 6. iv. 1992, coll. *A.K. Hazra & party.*

Distribution : India : Manipur (Dist. Imphal), New record as well as first record from Indian sub-continent.

22. Genus ***Lycosa*** Latreille

1804. *Lycosa* Latreille, *Nouv. Dist. d Hist. Nat.* **24** : 135.

1970. *Lycosa* : Tikader, *Rec. zool. Surv. India,* **64** (1-4) : 63.

1992. *Lycosa* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 440.

Type-species : *Lycosa taruntula* Ross

Distribution : Cosmopolitan.

Key to the species of the genus *Lycosa* Latreille

1. Coxae of all legs provided with brown patches, dorsal side of abdomen dark brown with small pale patches ..... *tista*

   Coxae of all the legs not provided with any patches, dorsal side pale except the mid-longitudinal brown irregular markings 2

2. Carapace provided with a median broad pale band extending from base to the second row of eyes to the bases of the cephalothorax .... *himalayaensis*

   Carapace not provided with a median broad pale band extending from the bases of the second row of eyes to the bases of the cephalothorax 3

3. Ventral side of the tibia IV not provided with dark brown broad bands ..... *shillongensis*

   Ventral side of the tibia IV provided with dark brown broad band 4

4. Tibia, metatarsi and tarsi of I and II legs are generaly pale ventrally ..... *iranii*

   Tibia, metatarsi and tarsi of I and II legs not pale ventrally 5

5. Femora of the legs provided with conspicuous irregular greenish brown patches ..... *barnesi*

   Femora of the legs not provided with conspicuous irregular greenish brown patches 6

6. Carapace mid-longitudinally not provided with light brown band ; tips of palps dark brown in female ..... *madani*

   Carapace provided with light brown band ; tips of palps not dark brown in female 7

7. Carapace reddish brown and the femora of legs provided with light green patches .... *kempi*

33. ***Lycosa tista*** Tikader

1970. *Lycosa tista* Tikader, *Rec. zool. Surv. India,* **64** (1-4) : 67.

1980. *Lycosa tista* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 384.

Material examined : 1 ♀, Chozing village, Dist. Imphal, Manipur, 6. iv. 1992, coll. *A. K. Hazra & party* ; 1 ♀, Thomas school campus, Upper Hundung, Dist. Ukhrul, Manipur, 2. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dists. Imphal, Ukhrul), New record ; West Sikkim.

34. ***Lycosa himalayaensis*** Grevely

1924. *Lycosa himalayaensis* Gravely, *Rec. Indian Mus.,* **26** : 603.

1992. *Lycosa himalayaensis* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 441.

1995. *Lycosa himalayaensis* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 112.

Material examined : 1 ♀, Thomas School campus, Upper Hundung, Dist. Ukhrul, Manipur, 8. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Ukhrul), New record ; Assam ; Meghalaya ; West Bengal.

35. ***Lycosa shillongensis*** Tikader & Malhotra

1980. *Lycosa shillongensis* Tikader & Malhotra, *Fauna of India,* Arneae : spiders, **1** (2) :403.

1992. *Lycosa shillongensis* : Biswas & Biswas, *Fauna of West Bengal, Part III,* Araneae : Spiders, State Fauna Series No. **3** : 442.

1995. *Lycosa shillongensis* : Biswas & Majumder *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 112.

Material examined : 1 ♀, Christian village, Dist. Churachandpur, Manipur, 22. iii. 1995, coll. *D. K. Mandal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Meghalaya ; West Bengal.

36. ***Lycosa iranii*** Pocock

1901. *Lycosa iranii* Pocock, *J. Bombay nat. Hist. Soc.* **13** (3) : 485.

1995. *Lycosa iranii* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. 4 : 112.

Material examined : 1 ♀, Singda, Dist. Imphal, Manipur, 25. ii. 1993, coll. *S. K. Saha & party.*

Distribution : India : Manipur (Dist. Imphal), New record ; Meghalaya ; Maharashtra.

37. ***Lycosa barnesi*** Gravely

1924. *Lycosa barnesi* Gravely, *Rec. Indian Mus.,* **26** : 599.

1995. *Lycosa barnesi* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. 4 : 111.

Material examined : 1 ♀, Checklaphai reserve forest, Singhal, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Meghalaya ; South Malabar.

38. ***Lycosa madani*** Pocock

1901. *Lycosa madani* Pocock, *J. Bombay nat. Hist. Soc.,* **13** (3) : 486.

1980. *Lycosa madani* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 396.

Material examined : 6 ♀, 1 ♂, Keibul Lamjao National Park, Dist. Churachandpur, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Maharashtra ; Kerala ; Karnataka ; Andhra Pradesh ; Orissa ; Bihar.

39. ***Lycosa kempi*** Gravely

1924. *Lycosa kempi* Gravely, *Rec. Indian Mus.,* **26** : 602.

1992. *Lycosa kempi* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 442.

1995. *Lycosa kempi* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. 4 : 112.

Material examined : 2 ♀, Thomas school campus, Upper Hundung, Dist. Ukhrul, Manipur, 8. iv. 1992 ; coll. *S. C. Majumder* ; 1 ♀, Checklaphai reserve forest, Singhal, Dist. Churachandpur, Manipur, 3. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dists. Ukhrul, Churachandpur), New record ; West Bengal ; Meghalaya ; Assam ; Sikkim.

Elsewhere : Bhutan, Pakistan.

23. Genus ***Venonia*** Thorell

1894. *Venonia* Thorell, *Bull. Soc. Ent. Ital.,* **26** : 332.

1980. *Venonia* : Tikader & Malhotra, *Fauna of India,* Araneae : Spiders, **1** (2) : 434.

Type-species : *Venonia coruscans* Thorell

Distribution : India, Singapore, New Holandda.

40. ***Venonia himalayaensis*** Gravely

1924. *Venonia himalayaensis* Gravely, *Rec. Indian Mus.,* **26** : 608.

1992. *Venonia himalayaensis* : Biswas & Biswas, *Fauna of*

West Bengal, Part III, Araneae : Spiders, State Fauna Series No. **3** : 446.

1995. *Venonia himalayaensis* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 113.

Material examined: 1 ♀, Tuilaphai, bank of river Lavana, Dist. Churachandpur, Manipur, 4. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Gujarat ; West Bengal ; Meghalaya.

X. Family TETRAGNATHIDAE Menge

24. Genus ***Tetragnatha*** Latreille

1804. *Tetragnatha* Latreille, *Neuv. Diet. d'Hist. Nat.,* **24** : 135.

1981. *Tetragnatha* : Tikader & Biswas, *Rec. zool. Surv. India,* Occ. pap. No. **30** (1) : 45.

Diagnosis : Cephalothorax longer than wide, eyes in two rows, lateral eyes nearly contiguous ; chelicerae very long, especially in the male. Abdomen long and narrow and bears the spinnerets near its end. These are orb-weaving spiders, they are common on grass and on low plants. The spiders rest by day with their legs stretched before and behind and are only active at night. They spin large orb-webs at sun down among grasses and other foliage usually in the vicinity of water.

Type-species : Tetragnatha extensa *Linn.*

Distribution : Tropical countries of the world.

41. ***Tetragnatha andamanensis*** Tikader

1977. *Tetragnatha andamanensis* Tikader, *Rec. zool. Surv. India,* **72** : 175.

1992. *Tetragnatha andamanensis* : Biswas & Biswas, *Fauna of West Bengal,* Araneae : Spiders, State Fauna Series No. **3** : 448.

1997. *Tetragnatha andamanensis* : Biswas & Biswas, *Fauna of Delhi,* Araneae : Spiders, State Fauna Series No. **6** : 481.

Diagnosis : Cephalothorax longer than wide, narrowing in cephalic region ; flat, centre depressed. Eyes are in two rows. Chelicerae nearly as long as carapace and strongly divaricate. Outer and inner row of chelicerae provided with ten teeth, first in larger, others gradually diminishing in size. Fang slender and unarmed. Legs are very long, clothed with hair and spines. Abdomen decorated with minute silvery white-dots.

Material examined: 1 ♀, Keibul Lamjao National Park, Dist. Churachandpur, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party* ; 2 ♀, 2 ♂ Phungyo Baptist Charch compound, Dist. Ukhrul, Manipur, 9. iv. 1992, coll. *A. K. Sanyal & party* ; 2 ♂, Keibul Lamjao National Park, Dist. Bishnupur, Manipur, 23. iii. 1993, coll. *D. K. Mandal & party* ; 1 ♂, Western bank of river Lairo, Dist. Moreh, Manipur, 13. iv. 1992, coll. *A. K. Hazra & party,* 1 ♀, 1 ♂, Thoubal, Dist. Thoubal, Manipur, 26. ii. 1993, coll. *S. K. Saha & party.*

Distribution : India : Manipur (Dists. Churachandpur, Ukhrul, Thoubal, Bishnupur), New record ; West Bengal ; Andaman Islands.

XI. Family *Araneidae* Latreille

Key to the genera of the family ARANEIDAE Latreille

1. Thoracic groove transverse ; epigyne with distinct scape, often wrinkled, not provided with any lateral lobes ..... ***Araneus***

   Thoracic groove not transverse, epigyne without scape, and with lateral lobes 2

2. Eyes of anterior row not evenly spaced or medians closer to each other than to laterals ..... ***Argiope***

   Eyes of anterior row evenly or median not closer to each other than laterals 3

3. Carapace flat with distinct thoracic furrow ; abdomen anteriorly very high one provided with at least one pair of shoulder humps ..... ***Cyrtophora***

   Carapace not flat, without thoracic furrow, abdomen anteriorly flat, without shoulder humps 4

4. Cephalic region brownish black than light coloured thoracic region and provided with very few hair, dorsum of abdomen with distanct folium ..... ***Zygeilla***

   Dorsum of the abdomen not provided with distinct folium 5

5. Cephalothorax truncate in front ; femora of IV legs with fringe of long hair ; abdomen spotted with silvery pigment ..... ***Leucauge***

   Cephalothorax not truncate and fringe of long hair, abdomen without silvery pigment 6

6. Thoracic groove longitudinal epigyne with unwrinkled scape and provided with one or two pairs of lateral lobes ..... ***Neoscona***

25. Genus *Araneus* Clerck

1757. *Araneus* Clerck, *Argn. Suec.*, : 15.

1982. *Araneus* : Tikader, *Fauna of India,* Araneae : Spiders, **2** (1) : 219.

Type-species : *Araneus angulatus* Clerck

Distribution : Cosmopolitan.

42. *Araneus mitifica* (Simon)

1886. *Epiera mitifica* Simon, *Act. Soc. Linn.*, Bordeaux, **40** : 150.

1992. *Araneus mitifica* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 452.

Diagnosis : Cephalothorax longer than wide, narrowing in front clothed with pubescence and hair. Posterior median eyes encircled by black rings. Lateral eyes close and each situated on black tubercles. Chelicerae strong, yellowish, provided with moderate boss. Legs are long and moderately strong, yellowish, distal ends of metatarsi and tarsi with dark brown transverse bands. Abdomen nearly globular but slightly narrow anterior than posteriorly. Dorsum provided with a pair of wing shaped large median black patch and two lateral black patches. Two pairs of small but distinct tubercles at the posterior end of the abdomen.

Material examined : 1 ♀, 1 ♂, Moulaei village, Dist. Churachandpur, Manipur, 1. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Maharashtra ; Karnataka.

Elsewhere : Pakistan, Burma.

26. Genus *Argiope* Audouin

1826. *Argiope* Audouin, in Savigny, *Descriptions de l'Eygypte,,* **1** (4) : 121.

1982. *Argiope* : Tikader, *Fauna of India,* Araneae : Spiders, **2** (1) : 111.

Type-species : *Argiope lobata* (Thorell)

Distribution : Tropical and temperate countries of the world.

Key to the species of the genus *Argiope* Audouin

1. Maxillae roundish in shape, dark brown at the proximal part ..... *pulchella*

   Maxillae not roundish in shape, not dark at the proximal part 2

2. Cephalothorax and legs are light brownish yellow in colour ..... *shillongensis*

43. *Argiope pulchella* Thorell

1881. *Argiope pulchella* Thorell, *Annali. Mus. civ. Genova,* **18** : 74.

1992. *Argiope pulchella* : Biswas & Biswas, *Fauna of West Bengal,* Part-III, Araneae : Spiders, State Fauna Series No. **3** : 455.

1997. *Argiope pulchella* : Biswas & Biswas, *Fauna of Delhi,* Araneae : Spider, State Fauna Series No. **6** : 482.

Material examined : 1 ♀, Mahabali Temple near river Imphal Thang, Dist. Imphal, Manipur, 29. iii. 1992, coll. *S.C. Majumder.*

Distribution : India : Manipur (Dist. Imphal), New record ; West Bengal ; Meghalaya ; Assam ; Maharashtra ; Orissa ; Madhya Pradesh ; Tamil Nadu ; Uttar Pradesh ; Andaman and Nicobar Islands.

Elsewhere : Myanmar, Malya Peninsula.

44. *Argiope shillongensis* Sinha

1951. *Argiope shillongensis* Sinha, *Rec. Indian Mus.*, **49** : 76.

1995. *Argiope shillongensis* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. **4** : 94.

Material examined : 1 ♀, Circuit house, Dist. Churachandpur, Manipur, 4. iv. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; Meghalaya.

27. Genus *Cyrtophora* Simon

1864. *Cyrtophora* Simon, *Hist. Nat. des Araign.*, **1** : 261.

1982. *Cyrtophora* : Tikader, *Fauna of India,* Araneae : Spiders, **2** (1) : 271.

Type-species : *Cyrtophora citricola* (Forskal)

Distribution : Tropical and sub-tropical countries of the world.

45. *Cyrtophora citricola* (Forskal)

1775. *Aranea citricola* Forskal, Descriptions animalium, : 86.

1992. *Cyrtophora citricola* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 461.

Diagnosis : Cephalothorax variable from uniform flavour to blackish ; abdomen also variable from white greybrown, yellowish brown, reddish brown to even black. Cephalothorax with a median deep longitudinal fossa. Abdomen oval, with three pairs of humps, of which caudal pair bifurcate the abdomen posteriorly ; epigyne provided with a narrow rim.

Material examined : 4 ♀, Loktak Lake near Mairang Dist., Manipur, 20. xii. 1992, coll. *A. K. Lahiri & party.*

Distribution : India : Manipur (Dist. Mairang), New record ; West Bengal ; Assam ; Gujarat ; Punjab ; Karnataka ; Maharashtra ; Tamil Nadu ; Madhya Pradesh.

Elsewhere : Africa, Australia, Burma, Egypt, Europe, Madagascar, Malyasia.

27. Genus *Zygeilla* F.O.P. Cambridge

1902. *Zygeilla* F.O.P. Cambridge, *Ann. Mag. nat. Hist.*, **9** (7) : 15.

1982. *Zygeilla* : Tikader, *Fauna of India,* Araneae : Spiders, **2** (1) : 214.

Type-species : *Zygeilla artica* (C. L. Koch)

Distribution : Cosmopolitan.

Key to the species of the genus *Zygeilla* F.O.P. Cambridge

1. Cephalic region blackish brown in colour .... *indica*

   Cephalic region not blackish brown in colour 2

2. Ocular quad slightly longer than wide..... ..... *melanocrania*

46. *Zygeilla indica* Tikader & Bal

1980. *Zygeilla indica* Tikader & Bal, *Proc., Indian Acad. Sci.* **89** (3) : 243.

1992. *Zygeilla indica* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 465.

Material examined : 1 ♀, Nambal, Dist. Bishnupur, Manipur, 19. iii. 1993, coll. *S. K. Saha & party* ; 5 ♀, Sunusuphi village, Dist. Churachandpur, on the way of Imphal, Manipur, 2. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dists. Bishnupur, Churachandpur), New record ; West Bengal ; Maharashtra.

47. *Zygeilla melanocrania* (Thorell)

1887. *Epeira melanocrania* Thorell, *Annali. Mus. in Genova,* **25** : 209.

1992. *Zygeilla melanocrania* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 465.

Material examined : 4 ♀, Sunusuphi village, Dist. Churachandpur, on the way of Imphal,

Manipur, 2. iv. 1992. coll. *A. K. Sanyal & party* ; 1 ♀, Nambal, Dist. Bishnupur, Manipur, 19. iii. 1993, coll. *S. K. Saha & party.*

Distribution : India : Manipur (Dists. Bishnupur, Churachandpur), New record ; West Bengal ; Orissa.

Elsewhere : Burma, Pakistan.

29. Genus *Leucauge* White

1841. *Leucauge* White, *Ann. Mag. nat. Hist.*, 7 (1) : 463.

1992. *Leucauge* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 471.

Type-species : *Leucauge hortorum* (Hents)

Distribution : Tropical and sub-tropical countries of the world.

48. *Leucauge tessellata* (Thorell)

1887. *Callinethis tessellata* Thorell, *Annali. Mus. civ. Genova,* 25 : 153.

1992. *Leucauge tessellata* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 473.

1995. *Leucauge tessellata* : Biswas & Majumder, *Fauna of Meghalaya,* Part-II, Araneae : Spiders, State Fauna Series No. 4 : 100.

Diagnosis : Cephalothorax longer than wide, flat, clothed with hair ; cephalic region slightly elevated than thoracic region and provided with posteriorly trifid deep groove. Lateral eyes are smaller than medians, close and situated on moderately prominent tubercles, both rows of eyes recured but anterior row strongly recurved. Chelicerae large, very strong and stout, dark brown, having small boss. Legs are very long and slender, clothed with hair and spines. Abdomen a little elongated, anteriorly with two blunt rounded prominences and a blunt caudal hump at the posterior end. Dorsum of abdomen provided with silvery white and chalk white patches in between epigastric furrow and spinnerets. Epigyne plate like having a thin semilunar rim.

Material examined : 1 ♀, Chaldongkon village from C. C. P. to Tuilaphai, Dist. Churachandpur, Manipur, 4. iv. 1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Meghalaya ; Sikkim ; Assam ; Gujarat ; Karnataka.

Elsewhere : Bhutan, Burma.

30. Genus *Neoscona* Simon

1864. *Neoscona* Simon, *Hist. nat. des. Aragin.*, 1 : 261.

1992. *Neoscona* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. 3 : 465.

Type-species : *Neoscona anabesca* (Walckenaer)

Distribution : Species of *Neoscona* distributed all over the world, but many species of this genus have been erroneously placed under the genus *Araneus* and *Epeir.*

Key to the species of the genus *Neoscona* Simon

1. Cephalic region provided with a "V"-shaped conspicuous dark brown patches ..... *mukerjei*

   Cephalic region not provided with a "V"-shaped dark brown patches 2

2. Sternum dark brown in colour, provided with longitudinal white band ..... *theis*

   Sternum not dark brown in colour, not provided with longitudinal white band 3

3. Abdomen triangular, epigynal scape short, broad and triangular ..... *nautica*

   Abdomen sub-triangular, epigynal sape long, narrow 4

4. Epigynal scape right angle to the base ; lateral lobes inconspicuous ..... *bengalensis*

49. *Neoscona mukerjei* Tikader

1980. *Neoscona mukerjei* Tikader, *Proc, Indian Acad. sci.,* 89 (3) : 247.

1995. *Neoscona mukerjei* : Biswas & Majumder, *Fauna of Meghalaya,* Part II, Araneae : Spiders, State Fauna Series No. 4 : 98.

Material examined : 4 ♀, Leikul, Dist. Chandel

Manipur, 30.iii.1993, coll. *D. K. Mandal & party* ; 1 ♀, Keibul Lamjao National Park, Dist. Churachandpur, Manipur, 2.iv.1992, coll. *A. K. Sanyal & party* ; 1 ♀, Checklaphai reserve forest, Singhai, Dist. Churachandpur, Manipur, 3.iv.1992, coll. *A. K. Sanyal & party.*

Distribution : India : Manipur (Dists. Chandel, Churachandpur), New record ; West Bengal ; Meghalaya, Maharashtra.

50. *Neoscona theis* (Walckenaer)

1887. *Epeira theis* Walckenaer, *Hist. Nat. Ins. Apt.*, **2** : 53.

1995. *Neoscona theis* : Biswas & Majumder, *Fauna of Meghalaya,* Part-II, Araneae : Spiders, State Fauna Series No. **4** : 98.

1997. *Neoscona theis* : Biswas & Biswas, *Fauna of Delhi,* Araneae : Spiders, State Fauna Series No. **6** : 482.

Material examined: 1 ♀, Koirengei, Dist. Imphal, Manipur, 15.iii.1993, coll. *D. K. Mandal & party.*

Distribution : India : Manipur (Dist Imphal), New record ; West Bengal ; Meghalaya ; Uttar Pradesh ; Gujarat ; Maharashtra ; Orissa.

Elsewhere : South New Guinea.

51. *Neoscona nautica* (L. Kock)

1875. *Epeira nautica* L. Koch, *Aegypt. Abyssin. Arachn. Jickeli,* : 17.

1995. *Neoscona nautica* : Biswas & Majumder, *Fauna of Meghalaya,* Part II Araneae : Spiders, State Fauna Series No. **4** : 99.

Material examined: 1 ♀, Keibul Lamjao National Park, Dist. Churachandpur, Manipur, 2.iv.1992, coll. *A. K. Sanyal & party.*

Distribution: India : Manipur (Dist. Churachandpur), New record ; West Bengal ; Meghalaya ; Assam ; Gujarat ; Maharashtra.

Elsewhere : Myanmar, Pakistan, North America.

52. *Neoscona bengalensis* Tikader & Bal

1981. *Neoscona bengalensis* Tikader & Bal. *Rec. zool. Surv. India,* Occ. pap. No. **24** : 15.

1992. *Neoscona bengalensis* : Biswas & Biswas, *Fauna of West Bengal,* Part III, Araneae : Spiders, State Fauna Series No. **3** : 466.

Material examined: 1 ♀, Phungyo Baptist Church compound, Dist. Ukhrul, Manipur, 1. iv. 1992, coll. *A. K. Sanyal & party* ; 1 ♀, Chiron village, Dist. Moreh, Chandel, Manipur, 13. iv. 1992, coll. *S. C. Majumder* ; 2 ♀, River Impha, Dist. Imphal, Manipur, 29. iv. 1992, coll. *S. C. Majumder* ; 1 ♀, Golabari Basti, Dist. Imphal, Manipur, 30. iii. 1992, coll. *S. C. Majumder.*

Distribution : India : Manipur (Dists. Ukhrul, Moreh or Chandel, Imphal), New record ; West Bengal ; Meghalaya.

SUMMARY

About 350 example of spiders have been studied and identified. A total 52 species belonging to 30 genera under 11 families are dealt with here of those, all the families, genera and species form new records for the state and also one species recorded there for the first time from Indian Subcontinent. Out of these, one species one genus under one family is new to science. Keys to all the taxonomic categories are provided. Distributional data of all the families are followed. All the relevant literatures pertaining to these families are reviewed under history.

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INSECTA : THYSANURA

A.K. HAZRA, M. BISWAS* and S. K. MITRA
Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The order Thysanura includes some of the most primitive popularly known insects of "Silver fish," "Fire brats", and "Bristle tails" belonging to subclass Apterygota. The members are frequently commensals of man, in whose habitations and storage building they have established themselves and where they may cause considerable damage of papers, photographs, lace curtain, book binding etc. due to their omnivorous feeding habits. They are small to moderate sized, spindle shaped, active, swift running, mostly scaled, terrestrial wingless primitive insects. They are considerably largar insects than the other members belonging to subclass Apterygota though they do not exceed 2 cm. in length. Most species are some what hairy or heavily clothed with over lapping scales which give these insects a grey or silvery appearance and hence commonly known as "Silver fish."

The members of the order are easily distinguishable from the other closely related insects by very long many segmented antennae and 2 anal cerci and a single median telson projecting posteriorly from the terminal part of abdomen. The free living species are found in quite variable habitat. Majority of the species prefer damp places under leaves; debris; bark; in rotten woods; mosses; lichens; on stones and trunk and limbs of trees; and in the nest of ants and termites. A great many species, however, are found in dry soil; among dry leaves and in building particularly in the basement, around stoves and furnaces and fire places.

The study of Indian Thysanuran fauna has been neglected for a long time incontrast to world fauna. A good amount of work was carried out from various parts of the world. The first record of Thysanura from India is that of Escherich (1903) who described the species *Lepisma indica.* The study of Indian fauna of Thysanura based on only some stray works by Escherich (1905), Silvestri (1913, 1938, 1948), Wygodzinsky (1954, 1972) Subsequently Hazra (1980, 1993, 1996) described some species from West Bengal and Delhi. Mendes (1990) published on zoogeographic affinities of Indian Thysanura and pointed out the poorly known diversity of the group due to not proper exploration.

PRESENT STATE OF KNOWLEDGE

The Indian fauna of Thysanura can be grouped under two suborder viz., Microcoryphia and Zygentoma. Two families Machilidae and Meinertellidae can be recognised under Microcoryphia while suborder Zygentoma has three families viz., Lepismatidae, Nicoletiidae and Ateluridae. The Indian fauna is presently represented by 32 species belonging to 20 genera and 5 families. The Thysanuran fauna of Manipur was first known by the work of Wygodzinsky (1954). He recorded only a single species under the family Lepismatidae namely *Ctenolepisma longicaudata* from Kangpokpi Bunglow, near fire

* Expired on 17.10.2001. Both authors dedicate this contribution to the memory of Late M. Biswas[the young scientist with the fond remeptance of working together.

place, 3500 ft. This specimen was collected by J. Phillipson and C. Pollock on the Durham University French Moroccan Expedition of 1952 and the material was deposited in British Museum (Natural History). Since then the knowledge of diversity of Thysanura from Manipur remains still ingnored due to lack of proper survey and there exists ample scope for further exploration of more taxa from this region in future. The present work is based upon a small collection of 19 examples available in the National Zoological Collection of Zoological Survey of India made in 1972 and 1992 collected by Dr. M. S. Shishodia and Dr. A. K. Hazra of Zoological Survey of India during their survey to Manipur State. Thus the report from the state of Manipur does not reflect the total fauna of this order and extensive exploration might enrich our knowledge further from this area.

The paper deals with only 2 species and 1 genus under the family Lepismatidae of which 1 species is recorded for the first time from the state and is marked with one astrix. Lepismatidae the dealing family comprehend the most commonly encountered species. The species data concerning Manipur refer only to Cosmopolitan synanthropous species, with no zoogeographic interest. Descriptions and keys for the determination of the two species are provided with necessary drawings with distributisonal data and taxonomic comments. The classification followed in the present study is after Wygodzinsky, 1972.

MATERIALS AND METHOD

The order Thysanura mostly posseses hypodermal pigment and the scales of the dorsal surface may form the complex pattern. The study of Taxonomy of Thysanura is based to a large extent on the structure and distribution of large, regularly arranged setae, the macro chaetae. These may not be intact in poorly preserved specimens, but sockets indicates the place of their insertion. Some experience and adequate optical equipments are necessary to analyze the arrangements of the macrochaetae. Incase of doubt, a slide mount of the whole insect or of critical structure must be prepared.

SYSTEMATIC ACCOUNT

Order THYSANURA

Suborder ZYGENTOMA

Super Family LEPISMATOIDEA

Family LEPISMATIDAE

Genus ***Ctenolepisma*** Escherich

1905. *Ctenolepisma* Escherich, *Zoologica (Stuttgart)* **83** : 1 : 164.

Ctenolepisma longicaudata Escherich, 1905

1905. *Ctenolepisma longicausdata* Escheirch, *Zoologica (Stuttgart)* vol. **83** : 83

1905. *Ctenolepisma urbana*, Slabaugh, *Ent. News.*, **51** : 95

1993. *Ctenolepisma longicaudata*, Hazra, *Rec. Zool. Surv. India.*, (4) **3** : 1-17

Diagnosis : A large white species without marked silvery shine; length 13 mm to 15 mm; width across the thorax $3^1/_2$ mm; Body elongate, thorax slightly wider than the abdomen, gradually tapering with relatively short segments; Antennae, cerci, and median tail appendages distinctly longer than the body; maxillary palpi five segmented and slender; labial palpi 4 segmented, last segments broad and oval; abdominal terga II - VI with 3 + 3 bristle combs; Tergite *X* 'x' twice as long as tergite *IX* and wide at base with distinctly truncate apex; stylets long; present on sternum VIII - IX; ovipositior long and slender.

Material Examined : India : 1 ♀ (ZSI Manipur Survey, 1992), Manipur, Churachandpur, Circuit House, (at night), 1.iv. 1992, coll. A. K. Hazra and party; 1 ♂, 1 ♀ (ZSI Manipur Survey, 1992), Churachandpur, Circuit House, (at night), Stn. no. 7, 2.iv.1992, coll. A. K. Hazra and party; 6 ♂, 1 ♀, (ZSI Manipur Survey, 1992), Churachandpur, Circuit House, (at night), 3.iv.1992, coll. A. K. Hazra and party.

Geographical distribution : India : Manipur, West Bengal (Calcutta, Siliguri, Darjeeling, Bankura, Bardhaman, Murshidabad), Orissa

(Barkuda Island), Karnataka (Bangalore, Marikuppam); Andhra Pradesh (Waltair), Kerala (Trivandrum), Uttar Pradesh (Allahabad) and Uttaranchal (Kumaon).

Elsewhere : Sri Lanka, Burma, U.S.A., Australia, and South Africa.

Remarks : This Species is originally been described from South Africa and common in the warmer parts of the world. This species is widely distributed in British India. The distribution of the species is likely to be wide spread but due to lack of proper survey it appears to be restricted in distribution. This is a synanthropic species and very common in houses and library and considered a very serious house hold pest, *Ctenolepisma urbana* has been correctly synonymized with *longicaudata* by Paclt (1966). The best descriptions of the species is given by Escherich (1905).

*2. *Ctenolepisma ciliata* (Dufour)

1831. *Lepisma ciliata* Dufour, *Ann. Sci. nat.*, Vol. **22** : 420

1905. *Ctenolepisma ciliate* Escherich, *Zoologica* (Stuttgart) **83** : 80

Diagnosis : Maximum length about 10 mm; width about 3 mm; Body elongated; head broad; eyes clearly elevated; thorax broader than abdomen; antennae and caudal filament shorter than body; distinct violaceous hypodermal pigment on head, body and appendages; tergum IX small, half the length of tergum VIII; tergite X is as long as those of IX and VII together, trapizoidal shape with 1 + 1 bristle comb; abdominal terga II - VI with 3 + 3 bristle combs; abdominal sterna without median bristle combs; maxillary palps with five segments; Stylets 2 pairs on VIII and IX segments Ovipositor long and slender and lacking fossorial spines.

Material examined : India : 1♀ (ZSI Manipur Survey, 1975), Song Song area, Mao, Stn. no. 2, Alt. - 5762, (ZSI lot no. 129\75), 13. ix. 1975, coll. M. S. Shishodia and party; 1♂ (ZSI Manipur Survey, 1975), Manipur, N. Churachandpur, Bungnucal, Stn. - 7, Alt. 3000 m, (ZSI lot no. 129\75), 19.ix.1975, coll. M. S. Shishodia and party; 2♂, 1♀ (ZSI Manipur Survey, 1992), Churachandpur, Circuit House (at night), Station 7, 2.iv.1992, coll. A. K. Hazra and party; 2♂ (ZSI Manipur Survey, 1992), Churachandpur, Circuit House (at night), 3.iv.1992, coll. A. K. Hazra and party.

Geographical Distribution : India : Manipur, West Bengal (Bankura, Birbhum, Calcutta (now Kolkata), Murshidabad, Puruliya, 24-Parganas).

Elesewhere : U.S.A. (California, Los Angles, Mexico), Africa, Spain.

Remarks ; This is a Mediterranean species and also undoubtedly a Palaearctic species. It extends its limits to the oriental region is due to introduced by man into areas and regions different from those where the species are native. However this species is recorded for the first time from Manipur and likely to occur in other states of India. The best description of the species are given by Escherich (1905) and Stach (1935).

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 51-66, 2004

INSECTA : COLLEMBOLA

A.K. HAZRA, G.P. MANDAL, S. K. MITRA and B. BHATTACHARYYA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

"Collembolans" popularly known as 'Spring tails' (small and primarily wingless insects) owing to the presence of spring-like forked jumping organ underneath the fourth abdominal segment. They are small to minute in size measuring from 0.25 mm to 5 mm in length; antennae primarily with four segments. Some species can live freely even on the surface of water *(viz : Podura aquatica).* Few species are living permanently on glacier or snow fields.

The first taxonomic study of collembola from India is of Ritter (1911). Imms (1912) made a significant contribution on Indian Collembola. The knowledge of Indian Collembola was further enriched through the contributions of several workers like Carpenter (1913, 1924), Handschin (1920), Mukherjee (1932), Denis (1936), Salman (1957), Baijal (1955), Choudhuri (1963), Choudhuri and Roy (1965), Yosii (1965, 66a, b), Mitra (1967-2000), Prabhoo (1971) and Hazra (1995-2001).

The first collection of Collembola from Manipur, was made by Dr. T. Clay, of the British Museum Natural History, London during 1952 and was studied by J. T. Salmon of New Zealand (1956, 58, 64 and 1969). Mitra (1973) described a subspecies of *Salina* from the collection made by Dr. T. Clay. The present study of collembolan fauna is based on collection made during 1992 and 1993 from Manipur by Zoological Survey of India as a part of the Action Plan on 'State Fauna'

It is note worthy to mention that this contribution is the first consolidated record of this group of insects from the state of Manipur involving 27 species under 14 genera and 3 families.

Order COLLEMBOLA
Suborder ARTHROPLEONA

Key to the super families of ARTHROPLEONA

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 ..... ENTOMOBRYOIDEA 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
2. Pseudocelli absent ..... HYPOGASTRURIDAE Bourlet, 1839

Key to the families of ENTOMOBRYOIDEA

1. Hind coxae usually with tronchanteral organ. Abdomen IV appreciably longer than abdomen III. Scales present or absent, often ciliated. Furcula well developed ..... ENTOMOBRYIDAE Tomosvary, 1882
2. Hind coxae without tronchanteral 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 Börner, 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. Serrated or Coarsely ciliated dental spine is absent 3

— Serrated or Coarsely ciliated 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

This family is best recognised by the absence of true pseudocelli and the simplicity of the sense organ of the third antennal segment.

This family represents two genera and species from Manipur.

Genus ***Hypogastrura*** Bourlet, 1839

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

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

Material examined : Keibul National Park, *Churachandpur distt.*, 2.iv.1992, coll. A. K. Hazra, 2 exs.

Diagnosis characters : Body length upto 0.8 mm. Brownish black granular, ocelli on black fields. Sparse to heavy clothing of short and long curved simple setae. Antennae shorter than head. 8+8 eye. PAO very irregular, consists of 4-12 indistinct disconnected lobes with or without central boss. Abd. VI with two long anal spines on papillae. Tenent hairs never clavate. Claw and unguiculus finely granulate; mucro finely granulate and spoon-shaped with two distinct lamellae.

Distribution : India : Manipur, Sikkim.

II. Genus ***Xenylla*** Tullberg, 1869

The genus represented by single species.

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

1912. *Xenylla obscura* Imms

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

Material examined : West bank of Lairo river, Moreh, Chandel distt. 13.4.1992, coll. A.K. Hazra, 10 exs.

Diagnostic characters : Body length upto 1.4 mm; elongate in shape. Colour indigo-blue, segmental margins and ventral side pale. Ant. ratio as 10 : 12 : 12 : 14. Postantennal organ absent. Unguis carinate, without lateral teeth, but with 1, 1, 1 inner tooth near the apex. unguiculus 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 and blunt on apex, with a narrow rounded lamella, which is often very obscure.

Distribution : India : Manipur, Nagaland, Sikkim, Maharashtra (Bombay).

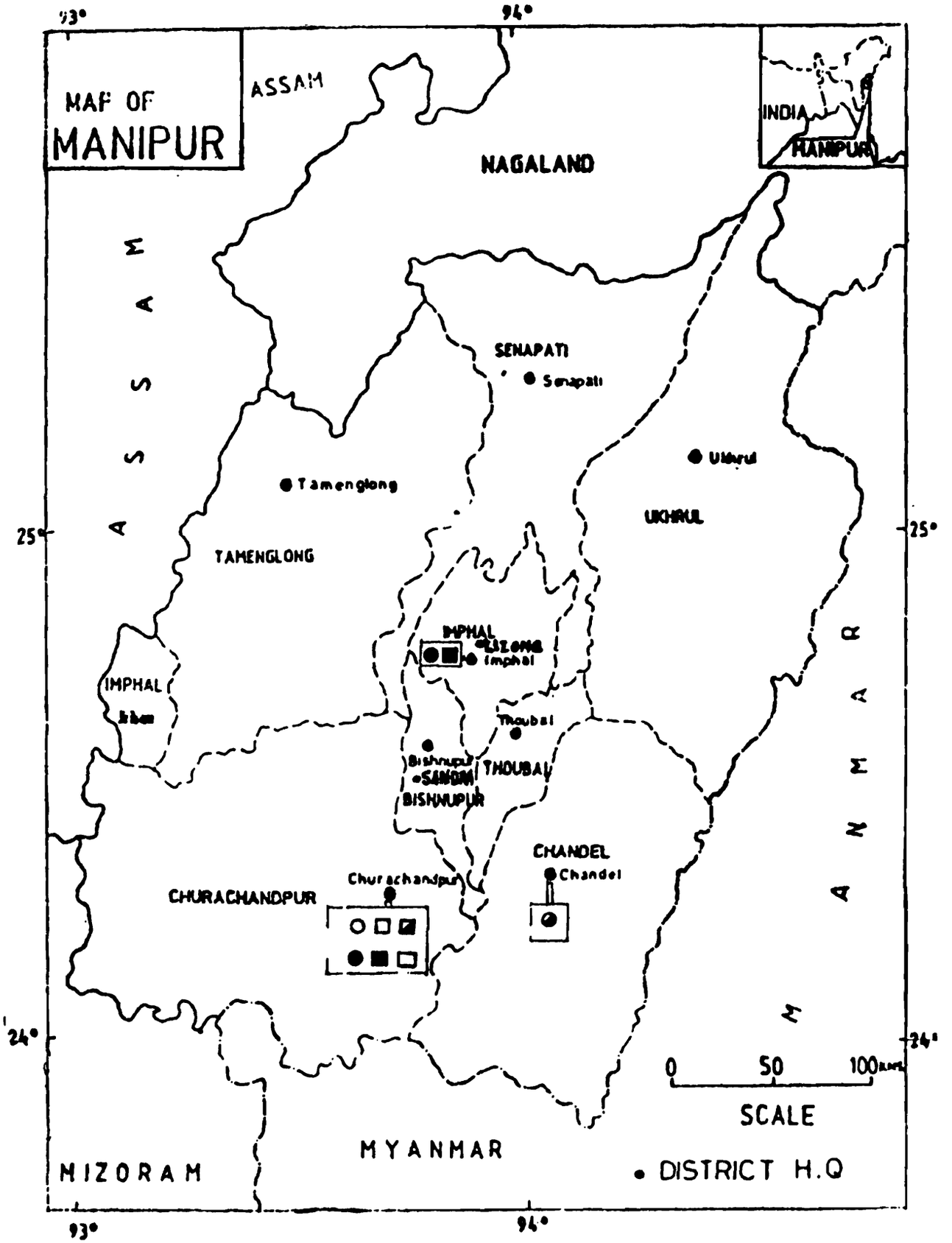
Family ENTOMOBRYIDAE

Subfamily ENTOMOBRYINAE, Schaeffer, 1896

Dentes crenulated dorsally. Mucrone fulcate with basal spine, it is short and hook-like. 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.

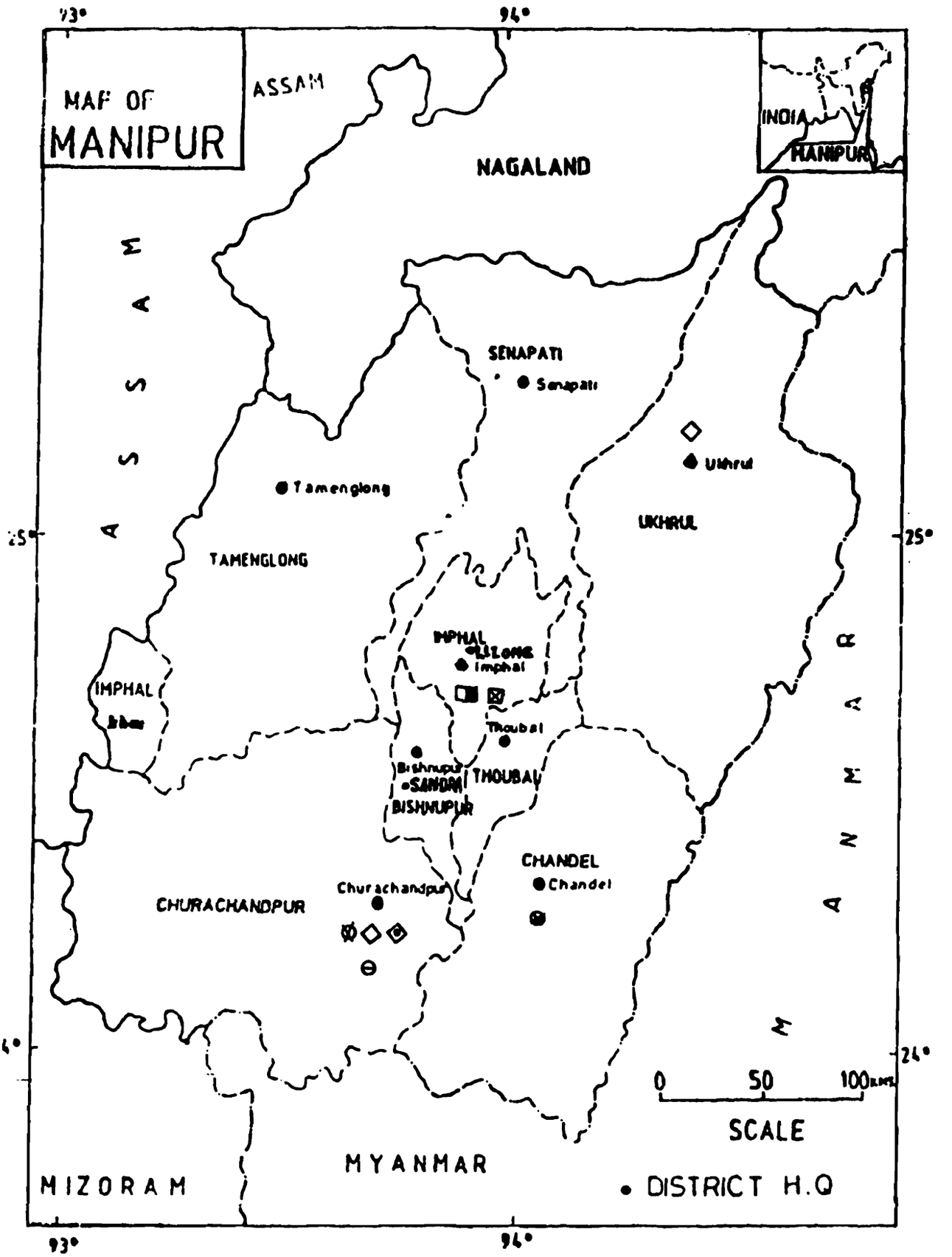
III. Genus ***Lepidocyrtus*** Bourlet, 1839

The genus is represented by seven species from Manipur.



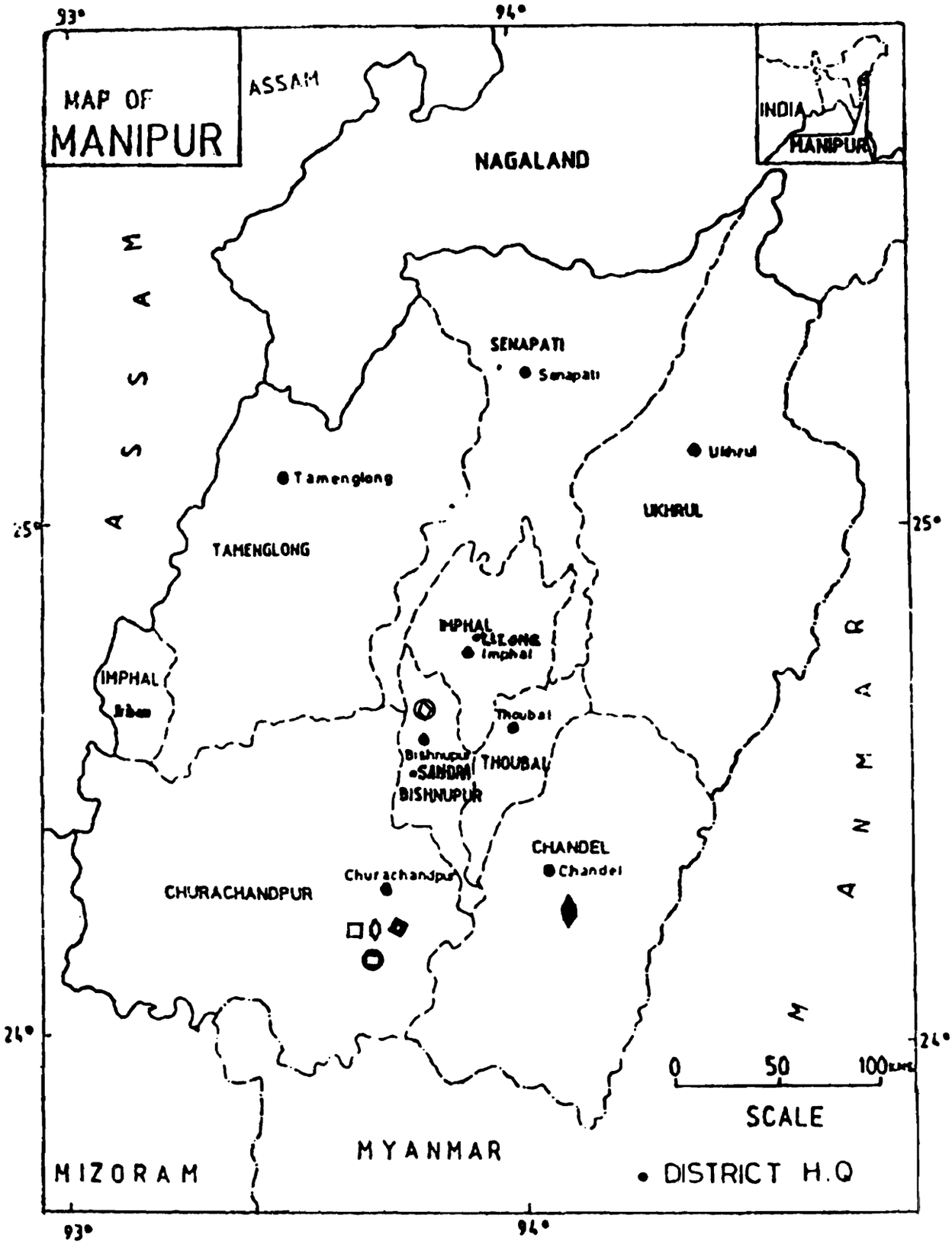
Map 1 : Showing the distribution of Collembola in different districts of Manipur.

- ○ *Hypogastrura indovaria*
- □ *Lepidocyrtus caudatua*
- ● *L* (s. str) *magnificus*
- ▭ *L (Acrocyrtus) heterolepis*
- ◔ *Xenylla obscura*
- ◪ *L (Acrocyrtus) malayanus*
- ■ *L* (s. str) *medius*



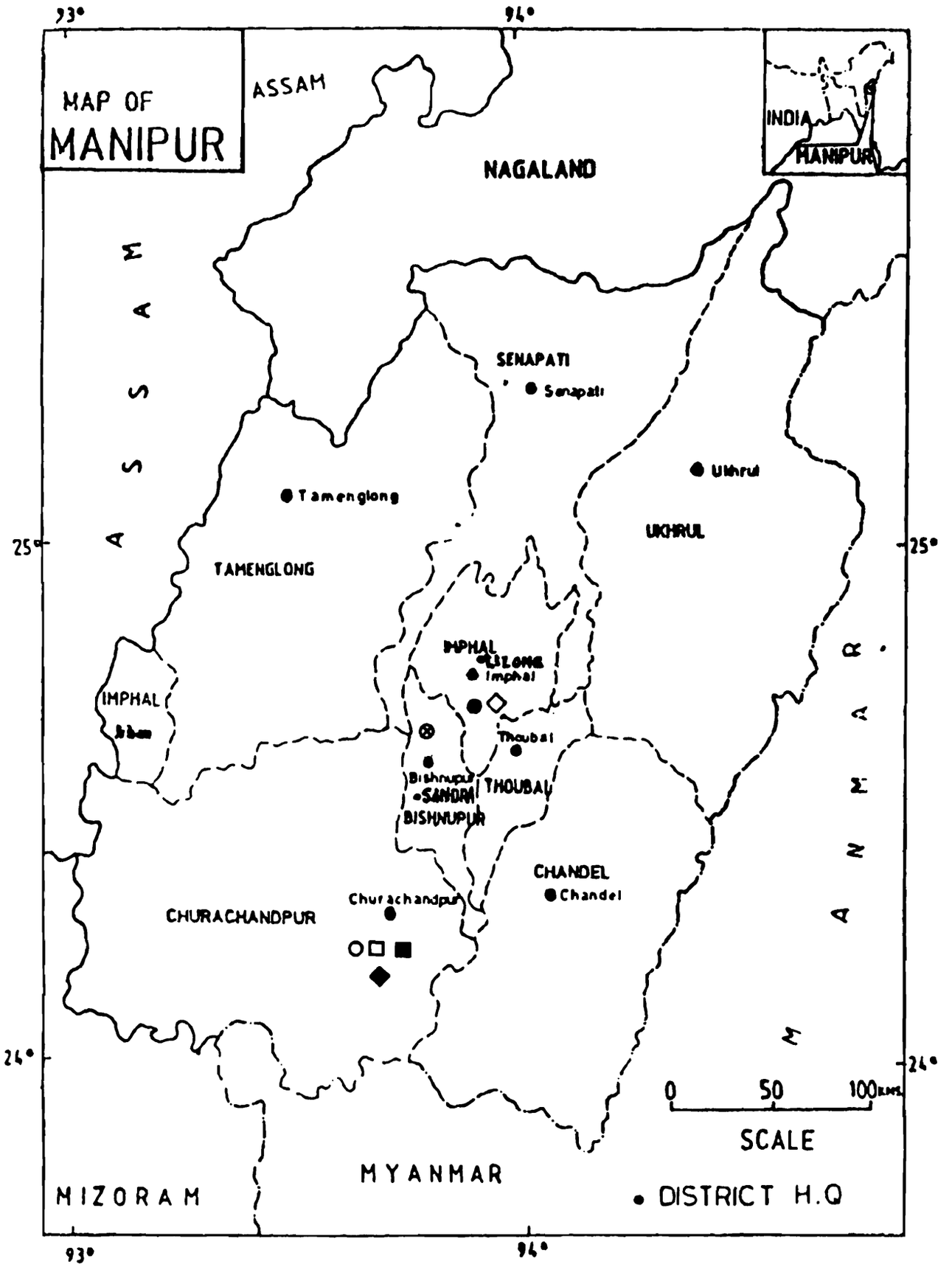
Map 2 : Showing the distribution of Collembola in different districts of Manipur.

- *L. scaber*
- *Dicranocentrus indicus*
- *Setogaster manipuri*
- *Homidia cingula*
- *L cyaneus*
- *Callyntrura japonica*
- *Cyphoderus javanus*



Map 3 : Showing the distribution of Collembola in different districts of Manipur.

- ⊘ *Callyntrura lineata*
- ◆ *Dicranocentroides flavescens*
- ⬮ *D. fasciculatus*
- ⬮ *Callyntrura vestita*
- □ *D. indica*
- ○ *D. salmoni*



Map 4 : Showing the distribution of Collembola in different districts of Manipur.

- □ *Salina indica*
- ○ *S. montana*
- ⊗ *S. tricolor tricolor*
- ◇ *Pseudoparonellides bulbosa*
- ■ *L cyaneus*
- ● *Callyntrura japonica*
- ◆ *Cyphoderus javanus*

Key to the families of LEPIDOCYRTUS

1. VIth abdominal segment with elongate cerciform tergum .... *Lepidocyrtus caudatus* Carpenter, 1917

— VIth abdominal segment without elongate cerciform tergum 2

2. Dental lobe with accessory apparatus .... *Lepidocyrtus (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. Abd. III : IV=1 : 3 .... *L. medius* Schaeffer, 1893

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

— Mesonotum is strongly protruded over the head. Th. II : III as 2 : 1. Abd. III : IV as 9 : 40 ..... *Lepidocyrtus scaber* Denis, 1948

5. Mesothorax slightly protruded over the head Th. II : III as 5 : 3. Abd. III : IV as 4 : 13 ..... *Lepidocyrtus cyaneus* Tullberg

3. ***Lepidocyrtus caudatus*** Carpenter, 1917

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

Material examined : Santipur, *Churachandpur Distt.* 3.4.1992, coll. A. K. Hazra, 12 exs., Litan, *Churachandpur Distt.* 16.6.1993, coll. R.S. Burman, 3 exs.

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

Distribution : India : Manipur, Sikkim, Lower Burma, Singapore.

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

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

Material examined : Santipur, *Churachandpur distt.* 3.4.1992, coll. A.K. Hazra, 20 exs.

Diagnostic characters : Ground colour brownish white, antennae distally with bluish pigment from Ant. II. Eye 6 + 6. Scales are present dorsally upon ant. I and II, Ratio of Ant. Segs. = 9 : 18 : 11 : 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. Body length 2.5 mm.

Distribution : India : Manipur, Sikkim, Tripura (West Distt.), Singapore.

5. ***Lepidocyrtus*** (s.str) ***magnificus*** Carpenter, 1924

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

Material examined : Near Mahabali Temple, *Imphal,* 29.3.1992, coll. A. K. Hazra, 11 exs., Santipur, *Churachandpur distt.* 3.4.1992, coll. A.K. Hazra, 26 exs., Checklaphai Reserve Forest, *Churachandpur distt.* 3.4.1992, coll. A.K. Hazra, 32 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. Color 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 : Manipur, Sikkim, Tripura (West Distt.), Assam.

6. ***Lepidocyrtus*** (s.str.) ***medius*** Schaeffer, 1898

1898. *Lepidocyrtus* (s.str.) *medius* Schaeffer, *Contr. Biol. Lab. Kyoto Univ.,* **10** : 26.

1913. *Lepidocyrtus* (s.str.) *medius* : Borner, *Tijdchr. V. Entomon.,* **56 :** 44-61.

1926. *Lepidocyrtus* (s.str.) *medius* : Handschin, *Treubia* **8 :** 446-461.

1949. *Lepidocyrtus* (s.str.) *medius* : Uchida *Insecta Mats. Sapporo.*, **17** : 38-47.

Material examined : Keibul National Park, *Churachandpur distt.* 2.4.1992, coll. A.K. Hazra, 10 exs., Jiribam, 23.6.1993, coll. R.S. Burman, 3 exs., *Imphal*, 21.6.1993, coll. R.S. Burman, 16 exs., Singat, *Cuhrachandpur distt.* 18.6.1993, coll. R.S. Burman, 12 exs.

Diagnostic characters : Colour brownish white. Antennae pigmented purple distally. A median spot between eyes. Ant. segs. as 12 : 28 : 30 : 42. Th. II is protruded considerably over the head. Th. II : III as 15 : 7. Abd. III : IV = 1 : 3. Manubrium : dens as 1 : 1. Mucro with apical tooth elongated, anteapical tooth is little smaller.

Distribution : India : Manipur, Sikkim, Tripura (West Distt). Singapore.

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

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

Material examined : Longtinmanlei, *Churachandpur distt.*, 16.6.1993, coll. R.S. Burman, 11 exs., S. Vaoying, *Churachandpur distt.*, 4.4.1992, coll. A.K. Hazra, 2 exs.

Diagnostic characters : Length upto 1.6 mm. Antennae uniformly bluish pigmented. A transverse stripe along the fore margin of head. Eyes black. Ant. segm. ratio as 15 : 30 : 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 : 18. Mucro bidentate, two teeth subequal and with a basal spine.

Distribution : India : Manipur Singapore, Malay.

8. ***Lepidocyrtus scaber*** Ritter, 1910

1910. *Lepodocyrtus scaber* : Ritter

1929. *Lepidocyrtus orientalis* Handschin

1948. *Lepidocyrtus suborientalis* Denis

1970. *Lepidocyrtus scaber* Salmon, *Roy Soc. N.Z. Biol. Sci.*, **12** (13). 145-152.

Diagnostic characters : Mesonotum is strongly protruded over the head. Th. II : III as 2 : 1. Abd. III : IV as 9 : 40. Labral setae 4/5, 5, 4, prelabral setae ciliated, median intrusion of smooth area narrow and wedge-shaped, distal labral margin with two pairs of tubercles; Lateral flap of ventral tube with many ciliated setae and some 7 smooth larger setae.

This species was recorded from Manipur by Salmon (1970), based on the collection of Dr. T. Clay in 1952.

Distribution : India : Manipur, Sikkim, Ceylon, Singapore, Vietnam, Formosa.

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

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

Material examined : St. Thomas School - Camp, Upper Hundung, *Ukhrul distt.*, 8.4.1992, coll. A.K. Hazra, 15 exs.; S. Vaoying, *Churachandpur distt.*, coll. A.K. Hazra, 4.4.1992, 7 exs.

Diagnostic characters : Body length upto 1.0 mm. Legs are coloured on the proximal half of each coxae. Furcula coloured until to the basal part of dentes. Ant. segm. 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 teminal setae.

Distribution : India : Manipur, Singapore, Malay, Vietnam.

IV. Genus ***Dicranocentrus*** Schott, 1925

This genus represented only by single species from Manipur.

10. ***Dicranocentrus indicus*** Bonet, 1930

1960. *Dicranocentrus indicus* Yosii, *Kyoto Univ. Sci. expd. Kara. and Hindukush.* **8** : 333-405.

Material examined : Khowpuibung village, *Churachandpur distt.*, 1.4.1992, coll. A.K. Hazra, 6 exs., Santipur, *Churachandpur distt.*, 3.4.1992, coll. A.K. Hazra, 10 exs., T. Nagaloimur village,

Churachandpur, 4.4.1992, coll. A.K. Hazra, 20 exs., Checkalphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 4 exs., Litan, *Churachandpur,* 12.6.1993, coll. R.S. Burman, 2 exs.

Diagnostic characters : Body length upto 3.2 mm. Antennae 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.

Distribution : India : Manipur, Nagaland, Mizoram,; Formosa, South Pacific Island.

V. Genus ***Setogaster*** Salmon, 1951

11. ***Setogaster manipuri*** Salmon, 1951

1951. *Setogaster manipuri* Salmon, *Roy. Soc. N.Z. Biol. Sci.*, **51**, 41-48.

Material examined : Nil.

Diagnostic characters : Pale yellow with violet pigmented ocellar fields. Body length female upto 1 mm, male upto 1.3 mm. Antennae annulated on III-IV in female and on IV only in male. Abd. IV four times longer than Abd. III. claw with a pair of strong outer lateral teeth; five inner teeth in male and six inner teeth in female; A slender very family clavate tenent hair; Dens annulated and corrugated; the mucro with very prominent, slightly curved, double basal spine. Lamella serrated.

Salmon (1951) recorded this species from Manipur based on the collection of Dr. T. Clay made in 1952 from Manipur.

Distribution : India : Manipur.

VI. Genus ***Homidia*** Borner, 1906

12. ***Homidia cingula*** Borner, 1906

Material examined : Near Mahaball Temple, Imphal, 29.3.1992, coll. A.K. Hazra, 22 exs.

Diagnostic characters : Back ground yellowish. Blue black pigment forming transverse band on the IIIrd and IVth abdominal segments. Body not compressed. Dental spine '33' in numbers. Apical mucronal tooth smaller than ante apical.

Distribution : India : Manipur, Sikkim.

Subfamily CYPHODERINAE Borner, 1913

Members of this subfamily may be distinguished from other-Entomobryids by the reduced member of ocelli, dental scale-like folliate appandages and sometimes dental spine and appandages only one genus has been found in Manipur.

VII. Genus ***Cyphoderus*** Nicolet, 1842

13. ***Cyphoderus javanus*** Borner, 1906

1906. *Cyphoderus lavanus* 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 Insects*, **5** (1) 38.

Material examined : Longtinmanlei, *Churachandpur,* 16.6.1993, coll. R.S. Burman, 1 ex., Sikamai village, *Mao,* 20.6.1993, coll. R.S. Burman, 2 exs.

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

Distribution : India : Manipur, Sikkim, West Bengal (Calcutta), Kerala, Java, Malay, Thailand, Japan.

Subfamily PARONELLINAE BÖRNER, 1913

The members of 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 is 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 4
2. Eye 8+8 3
— Eye reduced in number .....
3. Basal seta of the outer maxillary ramus is blunt..... CALLYNTRUPA Bonnet
— Basal seta of the outer maxillary ramus is pointed..... DICRANOCENTROIDES Schott
4. Mucro stout, usually tridented, dentes not annulated ..... SALINA MacGillivary
— Mucro vestigial, sometimes visible as hooklet fused with dentes, dentes annulated .....

VIII. Genus ***Callyntrura*** Borner, 1906

The genus is represented by three species from Manipur.

Key to the species of Callyntrura

1. Th. II-abd. I. with many macro setae, median group of abd. IV. in one level .... *Callyntrura japonica* (Kinoshita, 1917)
2. Dental scale appandage present, ventral side of the mucro without scrration ..... *C. (Handschinphysa) lineata* (Parona, 1892)
— Dens with apical setae heavily ciliated, the small spine-like basal tooth on the posterior face of the mucro almost rudimentary ..... *C. (Handschinphysa) vestita* (Handschin, 1925)

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

1954. *Handschinphysa japonica* : Yosii

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

Material examined : Knowpuibung village, *Churachandpur,* 1.4.1992, coll. A.K. Hazra, 92 exs., Checkalphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 12 exs.

Diagnostic characters : Body length is 3 mm. Ground colour of body is creamish white. Head is dark all over, the base of the antennae are more deeper in colour. Thorax is obscurely dusky all over along the marginal area of each segments. Fourth abdominal segments bears a narrow transverse patch. Antennae scaled dens without spines but with prominent dorsal vesicle. Mucro elongated with teeth.

Distribution : India : Manipur, Meghalaya (East Khasi Hills distt., West Bengal Hills distt.); Japan.

15. ***Callyntrura (Handschinphysa) lineata*** (Parona, 1892)

1892. *Entomobrya lineata* Parona, *Atti. Soc. Hal. Milano.,* **34**, 132-135.

1912. *Paronella borneri* : Imms, *Proc. Zool. Soc. London,* pp. 80-126.

1912. *Paronella phanolepis* : Imms, *Proc. Zool. Soc. London,* pp. 80-125.

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

Material examined : Nil.

Diagnostic characters : Body length upto 3.75 mm; pale to deep yellow with deep blue-black ocellar fields; Antennae little longer than body. Ant segs. ratiod as 75 : 80 : 85 : 55 125. Manubrium to dens to micro as 105 : 130 : 7/8; Mucro with two apical teeth, two plate-like teeth and a spine-like tooth on the posterior face and one or two lateral teeth.

Distribution : India : Manipur, Sikkim.

Remarks : The collection of this species are lacking in the present survey. Salmon (1957), recorded this species from Manipur based on the collection of Dr. T. Clay made in 1952 from Manipur.

16. ***Callyntrura (Handschinphysa) vestita*** (Handschin, 1925)

1925. *Microphysa vestita* Handschin, *Treubia,* **6**, 225-270.

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

1974. *Callyntrura (Handschinphysa) vestita* Mitra, *Rev. Ecol. Biol. Soc.,* **11** (3) : 391-439.

Material examined : Checkalphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 24 exs.

Diagnostic characters : The length of the body is 3.8 mm; ground colour pale whitish. Head,

thorax and upto III abdominal segments are completely covered with black pigment. Ventral tube covered with black pigment. Legs are deeply pigmented on basal two segments and with median patch on each tibiotarsus. Ratio of antennal segment as 40 : 35 : 20 : 60. Scales are present on the basal segments of antennae. Fourth antennal segment is annulated and with sub-apical cone. Furca ventrally scaled. Dens bears more than '20' spiny smooth setae arranged irregularly along the inner side near the base. Mucro short and with '6' teeth.

Distribution : India : Manipur, Meghalaya; Java.

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

The genus is represented by four species from Manipur.

Key to the species of *Dicranocentroides*

1. Body devoid of dark pigmented patches..... ..... *Dicranocentroides flavescens* Yosii

— Body with distinct dark pigmented patches 2

2. Ground colour of body brown with faint purple blue pigment all over body. Abd. IV with faint longitudinal strands descending from its anterior margin; tergal margin darkest; Ant. I, II, III each with a pigmented distal ring .... *D. indica* (Handschin) 1929

3. Thorax II totally pigmented, Abd. III with its lateral extensions and Abd. IV totally drak, no distinct transverse band on Abd. IV. In living specimens shining metallic golden pigment occurs posteriorly on head, Th. II, Abd. I, II, postero 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

17. ***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 : Longtinmantei, *Churachandpur,* 16.6.1993, coll. R.S. Burman, 1 ex.

Diagnostic characters : A dark patch, characteristic of the species, present on vertex in between two ocellar fields. Dark patches absent on body. Ocelli 8+8. Relative length index of Ant. I : II : III : IV = 15 :17 : 12 : 19. The 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 : 49 : 5.5 : 2. Ventral tube long with a row of macrochaetae anteriorly. Manubrium : mucrodens = 28 : 38, dentes armed with two closely apposed rows of spines of inner margin; mucro large, parallel sided with '6' teeth. Body length 2-3.5 mm.

Distribution : India : Manipur, Sikkim Tripura (West Distt.), West Bengal, Maharashtra, Uttar Pradesh.

18. ***Dicranocentroides indica*** (Handschin, 1929)

1929. *Aphysa indica* Handschin, *Res. Suisse Zool.*, **36** : 221-262.

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

Material examined : Santipur, Churachandpur, 3.4.1992, coll. A.K. Hazra, 10 exs., Keibul National Park, *Churachandpur,* 2.4.1992, coll. A.K. Hazra, 2 exs., Checkalphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 22 exs.

Diagnostic characters : Ground colour brown with faint blue pigments all over the head and body. Head with two dark ocellar fields, each field containing '8' ocelli arranged in two longitudinal parallel rows. Ant. I : II : III : IV = 17 : 19 : 13 : 25; Ant IV superficially annulated, apical sense-knob not distinct. Th. II : III = 12 : 9. Abds I : II : III : IV : V : VI = 6 : 6 : 3 : 29 : 3 : 1. Manubrium : mucrodens = 22.35; each

dentes with two closely apposed rows of spines on inner margin; mucro short with six teeth.

Distribution : India : Manipur, Nagaland, Mizoram, 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** : 561-566, 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 : West bank of Lairo river, *Moreh,* 13.4.1992, coll. A.K. Hazra, 3 exs., Checklphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 8 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 Ths II : III = 46 : 32; Relative length index of Abds I : II : III : IV : V : VI = 21 : 21 : 13 : 108 : 9 : 4. Manubrium : mucrodens = 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 : Manipur, Nagaland, Sikkim, Mizoram, U.P.

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

1957. *Dicranocentroides fasiculatus* 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 : Checkalphai Reserve Forest, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 32 exs., Kharasam, *Churachandpur,* 14.6.1993, coll. R.S. Burman, 3 exs.

Diagnostic characters : Th. III, Abds I, II almost always dark pigmented. Antennae subequal 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 = 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 : Manipur, Nagaland, Meghalaya, Assam, Sikkim.

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

The genus is represented by three species from Manipur.

Key to the species of *Salina*

1. Mucro long, narrow, superficially lobed into teeth, dental scale appendage relatively small, each tergite with many macrochaetae 2

— Mucro short, broad, deeply lobed, into teeth, dental scale appendage relatively large, each tergite with reduced number of macrochaetae 3

2. Body without any pigment, sometime tergal margins of Th. II, III, abd. I, II darker..... .....*S. indica* (Imms)

— Body always with patches involving blue-black or orange pigment, blue-black patches sometimes suffused with orange pigment.

3. Lateral margins of Th. II, III and Abd. I, II, darker; darker pigments intrudes than tergal margin of Abd. II to its posterodorsal margin .....*S. montana* (Imms).

— Pigment does not cover entire surface of any segment..... *tricolor tricolor*

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

1912. *Cremastocephalus indicus* Imms, *Proc. zool. Soc. London,* 80-125.

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

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

Material examined : Santipur, *Churachandpur,* 3.4.1992, coll. A.K. Hazra, 2 exs., Singut, *Churachandpur,* 18.6.1993, coll. R.S. Burman, 37 exs.

Diagnostic characters : Ground colour yellowish, overlaid irregularly by violet pigment which usually follows a lateral edges of the terga. Ocelli on black fields 8 + 8 General clothing of short to medium length ciliated setae with some long, stout, 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 : Manipur, Sikkim, Tripura (West and South Distt.), West Bengal, U.P.

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 Ins.*, **7** (2) : 159-202.

Material examined : Checkalphai Reserve Forest, *Churachandpur*, 3.4.1992, coll. A.K. Hazra, 15 exs.

Diagnostic characters : Body length 2 mm. Ground colour of head and body usually white; sometimes pale yellow; Head pear-shaped, with 1+1 dark ocellar field, each field with 8 + 8 ocelli. Relative length index of the antennal segments = 47 : 67 : 57 : 43; Ths. II : III = 29 : 17; Relative length inded 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, subequal to the length of mucro.

Distribution : India : Manipur, Uttar Pradesh, 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 : Nil

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 along the edges; legs generally brown with diffused blue pigment. Head pear-shaped dorsally; relative length index of Ants I : II : III : IV = 26 : 33 : 29 : 46; Ths 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, subequal to mucro.

Distribution : India : Manipur, Kerala, Nagaland.

Remarks : This species was recorded from Manipur by Mitra (1973) based on the collection of Dr. T. Clay in 1952 from Manipur.

Subfamily PARONELLINAE

XI. Genus ***Pseudoparonellides*** Salmon, 1941

24. ***Pseudoparonellides bulbosa*** Salmon, 1957

1957. *Pseudoparonellides bulbosa* Salmon, *Acta. Zool. Cracov.*, **11**, (14) : 314-362.

1993. *Salina bulbosa, Sensu* Mitra, *Rec. zool Surv. India* **93** (1-2) : 139-158

Material examined : Nil.

Remarks : Mitra (1993) considered *Pseudoparonellides* as a subgenus of *Paronellides* and observed the species is worth-including in the genus *Salina* in the nature of its mucrones and in the presence of distinct dental scale appendages. *Pseudoparonellides* is endemic to New Zealand.

Family ISOTOMIDAE BORNER, 1913

Subfamily ISOTOMINAE SCHAEFFER, 1896

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

XII. Genus ***Isotomurus*** Borner, 1906

25. ***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 : Longtinmanlei, *Churachandpur,* 16.6.1993, coll. R.S. Burman, 15 exs., Kharasam, *Churachandpur,* 14.6.1993, coll. R.S. Burman, 1 ex., Singat, *Churachandpur,* 18.6.1993. coll. R.S. Burman, 12 exs.

Diagnostic characters : Colour with a violettish black pigment which from distinct transverse band on the anterior margin of tergites. Antennal ratio = 10 : 15 : 16 : 26; Ant. IV with two short subapical 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 subapical and a large external lateral teeth.

Distribution : India : Manipur, Tripura (West distt.), Kerala.

XIII. Genus ***Rhodanella*** Salmon, 1945

26. ***Rhodanella plumosa*** Salmon, 1969

1969. *Rhodanella plumosa,* Salmon, *Victo. Univ. Wellington,* **51** : 40-49.

Material examined : Nil.

Diagnostic characters : White overlain by pale bluish-violet pigment in dorsal and lateral areas of meta-thorax and Abd. I-IV; Antennae only slightly longer than head as 16 : 13; Ocelli on black pigment patches, eight to each side, PAO small more or less egg-shaped and double outlined, Abds. III and IV subequal in length; Abds. V and VI fused; manubrium: mucrodens as 30 : 95. Mucro indistinctly separated from dens, small, related to the dens as 91 : 4. Dens annulated and corrugated. Body length upto 0.6 mm.

Distribution : India : Manipur, Lachung, Sikkim.

Remarks : No materials of this species have been collected during present survey. Salmon (1969) recorded this species from Manipur based on the collection of Dr. T. Clay made in 1952 from Manipur.

XIV. Genus ***Cryptopygus*** Willem, 1901

27. ***Cryptopygus thermophilus*** (Axelson), 1900

1947. *Isotoma thermophilus* Stach, *Medd. Soc. Fauna Flora Fenn.*, **26** : 113.

1966. *Cryptopygus thermophilus* Yosii, *Contr. Biol. Lab. Kyoto. Univ.* **15** : 4.

Material examined: Khowpuibung village, *Churachandpur,* 1.4.1992, coll. A.K. Hazra, 2 exs.

Diagnostic characters : Generally dark back ground with numerous pale spots. Fourth antennal segment without clearly distinguishable blunt setae. P.A.O. about 3 times as long as the nearest eye. Eyes 8 + 8 or 7 + 7. Unguis without lateral teeth but with a clear inner tooth; unguiculus tooth less. Ventral tube with 2 basal posterior setae and 4 + 4 distal anterior setae. Manubrium 1/2 - 3/5 as long as dens, with 1 + 1 ventral setae. Dens with numerous dorsal crenulations, 6-6 dorsal seate, and about 20 ventral setae. Maximum length 1.2 mm.

Distribution : India : Manipur, North America, Japan.

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INSECTA : EPHEMEROPTERA

V. D. SRIVASTAVA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Ephemeroptera are popularly known as mayflies. These insects are amphibiotic in their life cycle. Immature stages from oviposition to different stages of developing larvae are aquatic, while adults are winged form and are of conspicously short duration. These insects play significant role in food-chain, fish-food, model for fish bait and also as bioindicator of water quality.

These are soft bodied, minute to medium sized (2-25 mm) insects, with minute setaceous antennae, atrophied mouth parts, two pairs of wings, a long filamentous cerci and usually with a median caudal filament. Larvae are aquatic, spindle shaped or broad bodied and with number of tracheal gills. These insects are relatively less consipicuous, specially in their adult stage because of very short span of life.

The order is known to be represented in India by 105 species spread over 40 genera and 13 families *vis-a-vis* a little over 2000 species world over under 155 genera and 22 families. Major component of Indian Ephemeroptera are represented under families Baetidae (40 species), Heptageniidae (15 species) Ephemeridae (15 species), Leptophlebiidae (13 species). Thus these 4 families together constitute a little more than 4/5 (or 83 : 22) of whole Indian Ephemeroptera. Ephemeroptera fauna of Manipur is represented by six species under five genera and four families; leaving there by further scope of additional species for the state.

HISTORICAL BACK GROUND

Perusal of literature reveals that hitherto no contributions were made on these insects from Manipur. It is, though, found that two mayflies species are recorded from erstwhile Assam in general and record of five species, four genera and two families *viz.*, Ephemeridae and Heptageniidae Hubbard and Peters (1978) and Srivastava (1995). Mayfly species recorded from Assam, *Anagenesia lata* (Walker) and *Anagenesia robustsa* (Eaton) both representing family Palingeniidae. Same is true on wider Indian scenerio as well, which can be atributed mainly due to very short adult life span and less developed taxonomy of larvae of these insects. Among neighbouring Meghalaya (also part of erstwhile Assam) mayfly component are known due to Chopra (1927) and Kimmins (1937). Chopra (1927) described a new species of Ephemeridae *viz., Ephemera (Ephemera) annandalei.* Later on a new genus was established by Kimmins namely *Cinygmina* (Heptageniidae) to accomodate a new species as its genotype *viz., C. assamensis* Kimmins. Three other new species were also established by Kimmins (1937) of Heptageniidae. One of these was under genus *Heptagenia* Walsch, namely *H. nubilia* Kimmins; while other two new species were under genus *Ecdyonurus* Eaton. *Viz.,*. *E. eatoni* Kimmins and *E. subfuscus* Kimmins. Subsequently Hubbard (1974) changed the last named species to *indicus* as *subfuscus* was preoccupied thus was established *E. subfuscus* (= *E. indicus* Hubbard). Besides, record of five species from Meghalaya under four genera and two families by Srivastava (1995).

SYSTEMATIC ACCOUNT

Ephemeroptera fauna of Manipur is known only by six species, five genera and four family *viz.*, Baetidae, Ephemeridae, Heptageniidae and Palingeniidae. A brief mention is made of saliant morphological features, with special reference to taxonomic importance. A note on collection preservation and study techniques are also provided, along with comprehensive list of technical terms used, key and synonymy, diagonastic feature, discussion and distribution. Same was left necessary before dealing systematic account.

GENERAL MORPHOLOGY

Imago (adult) and subimagos are small to medium size (Manipur component are in range of 6-15 mm body length). These are air breathing, soft bodied insects with small setaceous antennae. Mesothorax much larger than Pro-and Metathorax. Wings paired, membraneous, fragile with network of longitudinal, and cross veins in between. Legs are long, prothoraxic leg in some instance longer than body. Abdomen 11 segmented, last reduced and fused with X. Epiproct is tergal part of XI, truncate at posterior margin, which is called supra anal plate or pygidium. On it is based the stump of median caudal filament the tail or 'telofilum' Paraprocts are lateral portions of vestigeal 11 segment and support two lateral tails or cerci. Male genetalia is comprised of forceps and penes; former is 4 segmented. Penes are bilobed, lobes separated or joint. Tip of each lobe may have titillators, which are prolonged sclerites and may be pointed or hooked.

COLLECTION PRESERVATION AND STUDY TECHNIQUE

Mayflies adult (imago) and subimago are very short lived. These are though winged form but are not good fliers, hence remain normally very much in the vicinity of water bodies to which they are associated in their immature stages. Imago/subimago normally remain sitting/resting amongsts vegetation; mostly on the underside of leaves. These can be collected by hand picking using forcep, soft brush or even with delicate hold or thumb and forefinger. Imagos are also collected on their flight in the evening (dusk) and also can be picked up when occasionally get attracted to light source.

Imago and adult are best preserved in 70% alcohol; which enables their study easier, even after long duration of preservation. Wings tend to crumple or folded. A set of dry preserved specimen is also useful for studying wings venation. In both cases mentioned above, wing venation (specially smaller sized) antennae, cerci and genitalic are best studied on slide mounts. Pigmentation can be examined in reflected light; hypodermaly lodged pigments in west and cuticular pigments in dry preserved specimens are best observed.

Terms and explanation used in key and text

A list of technical terms used in key and or text are indicated below, alongwith their explanations. Same are arranged alphabetically.

Name of term	Explanation
Annulated	with annules (ring) like external markings without corresponding internal septa/ wall.
Bistre	Pigment of warm brown colour.
Bulf	Light yellow colour.
Bulla	A weak spot on principal vein midway their length, increases flexibility of wing tip.
Chesnut pigment	Light brown
Costal space	Space between costa and subcosta.
Cross vein	Veins running across longitudinal veins.
Cubitoanal area	Lower basal portion of wing where anal and cubital veins are present.

Emarginate	Inward cleft or dent in the margin.
Endemic	Confined to particular area
Epiproct	Plate covering anus from above primarily tergite XI, but often regarded as part of tergite X.
Fuscous	Brown.
Paraprocts	A pair of ventral plates of abdomen XI on the sides and below abdomen.
Pygidium	It is a term equivalent to epiproct; and is met with in Ephemeroptera and Isoptera.
Sagittate marking	Markings shaped as arrow head.
Stigmatic area	Very slightly chitinized in apical side of costal space
Subcostal space	Space between subcostal and radius first vein.
Subimago	A stage of life cycle in mayflies (prior to adult-imago stage) immediately after emergence from last stage aquatic larva.

SYSTEMATIC ACCOUNT OF EPHEMEROPTERA

Key to the families represented

1. Venis M and Cui strongly divergent at base, M_2 strongly bent towards base, outer fork of Rs in hindwing absent, Hind tarsi 4 jointed ..... Family EPHEMERIDAE

— Veins M and Cui only little or not divergent at base M_2 almost symmetrical, outer fork of Rs in hind wing present or absent, hind tarsus 3-5 jointed 2

2. Venation greatly reduced, hind wing absent or when present less developed .... Family BAETIDAE

— Venation rather well developed, hind wing present and well developed 3

3. Cubital intercalaries in two parallel pairs, long and short alternatively .... Family HEPTAGENIIDAE

— Cubital intercalaries not in two parallel pairs ..... Family PALINGENIIDAE

SYSTEMATIC ACCOUNT

Family EPHEMERIDAE

Family Ephemeridae is represented in India by 3 genera *viz.*, *Ephemera* Linnaeus, *Eatonigenia* Ulmer and *Icthyobotus* Eaton. Of these only former is represented in Manipur. Hence no key is provided for the genera.

Genus ***Ephemera*** Linnaeus

1758. *Ephemera* Linnaeus. *Syst. Nat.* : 546.

1973. *Ephemera* : McCafferty and Edmunds, *Pan-Pac. Ent.*, **49** : 300.

1978. *Ephemera* : Hubbard and Peters. *Oriental Ins.*, Suppl., **9** : 15.

Remarks : This genus is represented in India by 12 species and having maximum species after genus *Baetis* Leach (Baetidae) with 22 species. This genus was recognized with two subgenera *viz.*, *Ephemera* Linnaeus and *Aethephemera* McCafferty and Edmunds; only former of these is represented in Manipur, hence no key to the subgenera is provided. The subgenus *Ephemera* is represented in India by 9 species but in Manipur only represented by single species hence no key to the species of the genus is provided.

Members of the genus are characterized by moderate size (10-15 mm), wings dark spotted, eyes of male relatively small separated by distance of at least the diameter of one eye. Cross veins at and below bulla distinctly more; in hind wing M_2 often detached from M_1 at base and directed downwards toward Cu_2; paired cerci, and median cercus all of equal length.

1. *Ephemera (Ephemera) annandalei* Chopra

1937. *Ephemera (E.) annandalei* Chopra, in Hafiz, *Rec. Indian Mus.*, **39** : 360.

1971. *Ephemera annandalei* : Dubey, *Oriental Ins.*, **5** : 529.

1978. *Ephemera (E.) annandalei* : Hubbard and Peters, *Oriental Ins.*, Suppl., **9** : 15.

Material examined : 2 exs., Locchou river bank, Moreh, Manipur, 22.ii.1975, coll. P.T. Cherian.

Diagnostic features : Moderate sized (Body length, Forewing 15 : 13.5 mm for male subimago and 15 : 15 mm for female imago). Wings dirty white, pale yellow subcostal zone, a very prominent spot at bifurcating point of M; Sc and R are opaque white. Abd. 3-9 with 3 clear streakes on each side, submedian oblique and meets with other side at the anterior end of tergite; black square spot on abd. 10.

Remarks : This species was described on male subimago, female imago but larva (nymph) are not known. It has resemblance with *Ephemera (E.) exspectans* (Walker) known in India from Bihar, Uttar Pradesh, Karnataka; Myanmar. It is distinguished from same by more dark and dense pigmentation on dorsum, wing membrane also brighter as compared to dull white, lesser subsidiary veins at the wings inner margin from A_1 and more pointed, finger like structure at the sides of penes lobe.

Distribution : India : Manipur (Locchou river bank, Moreh) and Meghalaya.

Family BAETIDAE

Family Baetidae is represented in India by 35 species, 6 genera. Of these only genus *Cloeon* Leach is represented in Manipur.

Genus *Cloeon* Leach

1815. *Cloeon* Leach, *Brewsters Edinburgh encyclop.*, **9** : 137.

1866. *Cloeopsis* : Eaton, *Ann. Mag. Nat. Hist.*, **18** (3) : 146.

1932. *Neocloeon* : Traver, *J. Newyork Esst. Soc.*, **40** : 365.

1978. *Cleon* : Hubbard and Peters, *Oriental Ins.*, Suppl., **9** : 7.

Remarks : This genus is represented in India by 10 species. This genus thus represents second largest number of species under the family Baetidae; the maximum number of species (18) are represented under genus *Baetis* Leach. Genus has representation in Manipur by two species.

Members of the genus are of small size (Body : 4-8 mm. wings : 3-7 mm.). Eyes of male turbinate, while of female single; larger than that of genus *Baetis*, Fore leg of male slightly shorter than body. Hindwing are absent in contrast to highly reduced hindwing of the genus *Baetis*. In forewing marginal intercalaries are single. Foreleg of male slightly shorter than body. Basal joint of forceps in male short and stout, apical margin of 9 sternite of female almost straight but for very slight backwards extension at the mid ventral line.

Key to the species of genus *Cloeon* Leach

1. Costal and subcostal space clear with somewhat faint pigments only .... *C. kimminsi* Hubbard

   Costal and subcostal space not clear..... ..... *C. bengalense* Kimmins

2. *Cloeon kimminsi* Hubbard

1947. *Cloeon viridis* Kimmins, *Proc. R. Ent. Soc.* London, (B), **16** : 98.

1974. *Cloeon kimminsi* : Hubbard *J. Kanss. Ent. Soc.*, **47** : 358.

Material examined : 2 exs., Locchou river bank, Moreh, Manipur, 22.ii.1975, coll. P.T. Cherian.

Diagonastic feature : This is of moderate size (6 mm). Head pale yellow with narrow brown stripe, thorax yellowish green, this in males are green to dark green with two parallel robust stripe lacking a margin at mid-dorsum, wings slightly shorter (5 mm.) band of yellow green present in the area of costal and subcostal space; wing hyaline, venations dark brown but costa, subcosta and radius pale. Abdomen yellowish green, superimposed on it is a broad dorsal band of reddish brown. Tergite of male subimago 2-9

and female 2-7 with darker pigmentation pattern; in male imago, these markings becomes obscure. Wing marking at costal, subcostal also less prominent. Male of this was not included in original description; latter male subimago, imago were dealt with by Srivastava & Ray (1981). Female larger than that of male in ratio of 6 : 2 : 4 : 2 mm., while wings in ratio of 3 : 2 : 9. Cerci slightly longer than body, filiform, finely annulated that of female with dark band inter spread between these annules.

Distribution : India : Manipur (Locchou river bank, Moreh), West Bengal, Maharashtra (Western Ghats) and Malaysia.

Remarks : This species has resemblance with *C. bicolor* in body marking, specially that of the abdomen. It is known in having costal area yellowish green instead of luteous costal and dark brown subcostal streak; venation dark brown, except pale, costa, subcosta, radius and cross veins; with relatively broader pale area dividing the head region in two by longitudinal narrow brown stripes instead of 2 chesnut red long stripes on each side of median line.

3. ***Cloeon bengalense*** Kimmins

1947. *Cloeon bengalense* Kimmins, *Proc. R. ent. Soc.*, London, (B), **16** : 95.

1978. *Cloeon bengalense* : Hubbard and Peters, *Oriental Ins.*, Suppl., 9 : 8.

Material : 1 ex., Awangtong, Ukhrul, Manipur, 1.x.1975, coll. M. S. Shishodia.

Diagnostic features : White bula in darker costal and subcostal space absent, 3 cross vein in stigmatic area present.

Distribution : India : Manipur (Awangtang, Ukhrul) and West Bengal.

Family HEPTAGENIIDAE

Family Heptageniidae is represented in India by 15 species and 8 genera. Of these 8 genera only 3 are represented in neighbouring Meghalaya by 4 species. These genera are *Cinygmina* Kimmins, *Ecdyonurus* Eaton and *Heptagenia* Walsch. While this family is represented in Manipur by two genera and two species.

Key to the genera of HEPTAGENIIDAE

1. Penese lobe dilated laterally, genital stimuli developed, distinct, in shape of small spine ..... ***Ecdyonurus*** Eaton.

   Penese lobe dilated apically, genital stimuli reduced to a pair of small, thin chitinous plates ..... ***Cingymina*** Kimmins

Genus ***Ecdyonurus*** Eaton

1868. *Ecdyonurus* Eaton, *Trans. Ent. Soc.*, : 142.

1978. *Ecdyonurus* : Hubbard and Peters, *Oriental Ins.*, Suppl., **9** : 19.

4. ***Ecdyonurus bengalensis*** Ulmer

1920. *Ecdyonurus bengalensis* Ulmer, *Archiv. Naturges.*, (A), **85** : 75.

1962. *Ecdyonurus bengalensis* : Weidner, *Mitt. Hambarg. Zool. Mus. Ins.*, **60** : 99.

Material : 4 exs., Imphal, Manipur, 5.x.1975, coll. M.S. Shishodia.

Diagnostic features : Moderate sized (10-12 mm; Wings 15-17 mm, Cerci 30-36 mm) body in general brown, head blackish brown, distal part of abdominal segment 1 and 2, whole of segments 8 to 10 dark pigmented, wing light brown penes lobe's apical and dorsal aspect slightly darker, dilated at apex; genital forceps 4 segmented, basal broadest and smallest, second longest and slightly arched inwards.

Distribution : India : Manipur (Imphal) and West Bengal.

Genus ***Cinygmina*** Kimmins

1937. *Cinygmina* Kimmins, *Ann. Mag. nat. Hist.*, (10) : **19** : 435.

1978. *Cinygmina* : Hubbard and Peters, *Oriental Ins.*, Suppl., **9** : 18.

Remarks : This genus is represented in India by single species *viz., C. assamensis* Eaton from Khasi Hills (Meghalaya) and is endemic to it. No key to the species of genus is required as it is

endemic to the sole representative. This species is also the genotype.

Members of this genus are of moderate size (Body : Wing 8-9 : 110-13); Caudal cerci and body 20-30 : 8-9). Numerous, well spread cross veins; 2 parallel pair of inter calaries which are basaly free; no cross-veins in stigmatic area in fore wing. Fore tarsus 1.5 times tibia; fore tarsus : Tibia 4 : 7, hind-tarsus : tibia, 10 : 9. Genital forcep 4 segmented, penes joint at base, diverges apically and widens; apical lobes rounded, devoid of spine, genital stimuli reduced, paired chitinous plate.

5. *Cinygmina assamensis* Kimmins

1937. *Cinygmina assamensis* Kimmins, *Ann. Mag. nat. Hist.*, (10), **19** : 435.

1978. *Cinygmina assamensis* : Hubbard and Peters, *Oriental Inst.*, Suppl., **9** : 18.

Material : 1 ex., Imphal, Manipur, 5.10.1975, coll. M.S. Shishodia.

Diagnostic features : Body length M : F-8 : 9 mm; wing 10 : 13-14 mm. Cerci 23-25 : 20 mm. Ground colour brown-reddish brown on head, yellowish brown on thorax and abdomen. Fore tarsal segments in ratio of 8 : 14 : 10 : 5 : 5 and hind tarsal segments 10 : 9 : 7 : 5 : 12. Wings hyaline, venation pale; costa, subcosta and radius grey, a black spot at junction of subcosta and cross-vein. Abd. 1-9 with broad reddish brown stripe; additional pair of triangular spot on abd. 2, paired reniform spot on abd. 3-8.

Remarks : This species was described by Kimmins based on imago of both sexes; larva is yet to be described.

Distribution : India : Manipur (Imphal) and Meghalaya.

Family PALINGENIIDAE

This family has relatively very little representation among Indian Ephemeroptera under the single genus *Anagenesia* Eaton.

Genus *Anagenesia* Eaton

1883. *Palingenia (Anagenesia)* Eaton, *Trans. Linn. Soc. London* (Ser.-2) *Zool.*, **3** : 25.

1920. *Anagenesia* : Ulmer, *Stettin. Ent. Z.*, **81** : 101.

Genus *Anagenesia* has characteristically 5 jointed tarsi, 3 jointed genital forcep, besides other details under species.

6. *Anagenesia robusta* (Eaton)

1892. *Palingenia robusta* Eaton, *Journ. As. Soc. Bengal*, **60** : 407-408.

1920. *Anagenesia robusta* : Ulmer, *Stettin. Entomol. Zeitung.*, **81** : 102.

Material : 2 exs., Imphal, Manipur, 5.x.1975, coll. M.S. Shishodia.

Diagnostic features : Anagenesia robusta is easily recognised by its large size and light colour of body and wings. Some of the male being as much as 28.00 mm long with the caudal setae about 70.00 mm. The wing is about 24.00 mm. long. The females are somewhat smaller in size. The species is further distinguished from the other two species, on account of the last joint of the male forcep being longer than the penultimate.

Remarks : This species was described by Eaton from Cachar, Assam. The nymphs were described by Gravely.

Distribution : India : Manipur (Imphal) and Assam (Cachar).

SUMMARY

Present paper deals with known Ephemeroptera fauna of Manipur and study of type/other material : faunal composition is very meagre and is known to comprise of 6 species under 5 genera and 4 families *viz.*, Baetidae, Ephemeridae, Heptageniidae and Palingeniidae. A systematic list, key to various taxa is also provided;besides diagnostic characters, affinity with allied taxa distribution.

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INSECTA : ODONATA

V. D. SRIVASTAVA AND C. SINHA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Odonata fauna of Manipur comprises of elements of both submontane and montane zone. Material on which this work is based was mainly collected by various Zoological Survey of India parties. This includes collection made recently on special state faunal studies programme; besides those present in National Zoological Collections. Present contribution also includes the study of type material of certain species and earlier odonata work from the state so as to make it more comprehensive. Details of material studied are indicated under each species in the systematic account of present contribution.

Perusal of literature reveals so far a total of 57 species of Odonata are recorded from Manipur, Mitra (1975 & 1996), Lahiri (1977, 1979 & 1987) and Asahina (1978, 1984 & 1985). With this paper the total Odonata composition from Manipur is of 68 species, 41 genera and 8 families.

GENERAL MORPHOLOGY

Morphology of Odonaa, commonly known as dragonfly are adapted to suit their environment. These insect pass their adult life as swift flyers in vicinity of aquatic ecosystem and larval stages within water bodies.

A brief morphological features are, though, indicated here for convenience and ready reference. For detailed morphological features of both adult and larvae work of Fraser (1933, 34, 36, 57) and Tillyard (1917) need be referred, which have been also basis of present work, specially in respect of wing venation and nomenclature thereof.

Adult are air breething, head large, linked with thorax by delicate connection, antennae minute, filiform. Eyes large almost covering major part of dorsal surface of head in all Libellulds and other families of Anisoptera; while these are not so large in most of Zygopterans and are separated by wide gap. prothorax, mesothorax and metathorax are fused, angled forwardly, so are their respective legs. Wings are paired, reticulated, almost of same shape and size in practically all the Zygopterans; while most of the Anisopterans have the posterior pair of wing wider, specially in their anal area. Abdomen is long, slender, ten segmented terminating in paired anal appendages. Most characteristic feature of male accessory genitalia is that these are shifted to the underneath of 2, 3 abdomen, while gonopore are in their usual position. This necessiates their peculiar bending and coupling, in male-female forming some short of loop called 'tandem' Ovipositors are simple for exophytic forms (most of Anisopterans) or strong, serrated for endophytic forms (most of Zygopterans).

Larvae are long, elongated cylindrical in littoral and stout, broad bodied in benthic forms. These have extensile, prehensile labium, Zygopterans have abdominal gills and caudal filament, which are lacking in Anisopterans and these breeth by clocal chamber suited for necessary exchange of disolved oxygen.

LIST OF TECHNICAL TERMS

A list of technical terms used in key and or text are indicated, here-under, along with their explanation. Same are arranged alphabetically :—

Name of term	Explanation
Anal appendage	Male of Zygopterans with 2 pairs, male of anisoptera with 1 pair & single inferior and one pair in female uniformly at the end of abdomen.
Anal loop	An area of cells at the base of hindwing just adjacent to discoidal cell.
Anal triangle	Triangle at extreme base of hind wing in male of Anisoptera.
Antenodal nervures	Short transverse nervures, running from the costal to radius, proximal to node.
Caudal gill	Accessory respiratory organs at the distal end of Zygopteran larvae.
Cubital space	Space posterior to basal space, extending to base of discoidal cell.
Discoidal cell	Triangular or quadrilateral space near the wing base, distal to cubital space. It is four sided in Zygoptera, three sided in Anisoptera.
Discoidal field	Space distal to discoidal cell, bounded by MA and Cuii and border of wings.
Enfumed	Smoky or brownish in tint.
Hypertrigone	Narrow triangular cell above discoidal cell of Anisopterans.
Imago	Adult.
Nodal index	Count of ante-and post-nodal nervure in fore and hind-wings.
Node	Thickening at costal margin nearer base of Zygoptera but in middle of Anisopterans.
Ocellus	Simple eye, three uniformly in all dragonfly and damselflies, disposed in a line in front of vesicle or in a triangle around vesicle on vertex of head.
Postnodal nervures	Short transverse nervures running from the costal to radius, distal to node.
Pterostigma	Small, thickened spot on the apical side on costal border.
Teneral	Freshly emerged adult prior to hardening and acquiring full adult pigmentation.
Tornus	Part of basal and posterior part of wing, either angular or rounded, of Anisopterous wings.
Vertex	Dorsal surface of head, bearing vesicle and ocelli.
Vesicle	Small protuberance/ eminence on vertex of head overhanging ocelli or located between them.
Vulvar scales	Sheath covering ovipositor formed of two plates attached to ventral segments of 8, 9 abdomen.

MATERIAL AND METHOD

Collection techniques : Collection techniques which have been adopted were totally different for imago (adult : male and female) than their larval counter parts, as their ecological niche and habitat are totally different. Former inhabit aquatic vegetation in the vicinity of water body. Zygopterans (Damselfly) were best collected by sweeping with insect net. Anisopterans (dragonfly) were collected amongst vegetation near water body or even quite away, flying fast. In these cases insect net was effectively used by stroking head-backwardly action. Larvae were collected

by using water net by the side of water body amongst aquatic vegetation, under localized shelter of pebbles, stones or by scooping and washing bottom mud/sub-stratum for benthic forms. Some specimens of emerging imagos teneral forms are attracted to light and were collected by gentle swing of net as these were observed not to begood fliers as compared to the imagos during day time.

Study technique : Material of imagoes (adult male and female) are best studied by usual process of relaxing, properly spreading, setting and pinning. Set specimens are examined under binocular microscope by fixing at desirable angle, level over plasticine cone/mounds fixed on slide or over convenient size of pith/thermocole plate. External genitalia are examined sometimes directly by adjusting specimens under desirable angle or by dissecting out and mounting on to the slides. Wings, their venation were examined in transmitted light while pigmentation pattern were best observed under reflected light. Observation of Wing's nodal index was invariably made to ascertain nodal variations. Irridiscence and metallic pigmentation pattern, in most of Zygopterans and some Anisopterans, were also best observed under reflected light.

SYSTEMATIC ACCOUNT

Odonata fauna of Manipur comprises of 68 species under 41 genera and8 families. This component is just a small fraction of whole Indian Odonates approximately 1 : 7.26 (68 : 494). In comparison to Meghalaya Odonates studied by present authors (Srivastava and Sinha, 1995) it is approximately 1 : 2.22 (68 : 151). Among these the Zygopterans (Damselflies) are represented by 41 species, 23 genera and 6 families. Anisopteran (dragonflies) component comprises of 27 species 18 genera and 2 families. Libellulidae is the single largest family having representation among odonata fauna of Manipur by 26 species under 17 genera. The Zygopterous family coenagrionidae is next large family having representation by 21 species and 10 genera. Thus above mentioned 2 families are relatively represented respectively by 26 species, 17 genera, 21 species, 10 genera.

Family-wise systematic account of Manipur component of odonates are dealt, hereunder, along with original reference, material examined and or based on reviewed literature, a diagonosis, distribution pattern within Manipur, elsewhere in India and also extended distribution if any, in orient or other Zoogeographical zones. These are formulated, partly based on, Fraser (1933, 34, 36, 57) and partly modified on basis of authors own observations/interpretations.

TAXONOMIC ACCOUNT

Order ODONATA

Key to the suborders, Superfamilies and Families

1. Fore and hind-wings more or less of same shape and venation, head transversely elongated, both superior and inferior anal appendage in male paired 2

— Fore and hind-wings are distinctly different in shape and venation-hindwings broader specially in anal area, head not transversely elongated rather globular; paired superior and single inferior anal appendage in male .... ANISOPTERA.....5

2. Eyes widely separated, frons not rigid nor markedly raised, larvae with abdominal and caudal gill ..... ZYGOPTERA.....3

3. Antenodals more than 2, postnodals not coinciding with veins below .... CALOPTERYGOIDEA.....6

— Only 2 antenodals, postnodals coinciding with veins below 4

4. IR iii and R IV + V more near node than arc, Males anterior hamules subquadrate..... ..... COENAGRIONOIDEA.....8

— IR iii and R IV + V more near are than node, Males anterior hamules elongate .... LESTOIDEA.....9

(Contains only a single family—Lestidae)

5. Labial mask of larvae flattened without setae, lateral lobes narrow with long robust movable

hook ..... AESHNOIDEA.....10

(Contains only a single family—Aeshnidae)

— Labial mask of larvae broad, concave with numerous setae, lateral lobes broad with tuft of setae ..... LIBELLULOIDEA...

(Contains only a single family—Libellulidae)

6. 2 primary antenodal, distinct from secondaries petiolation far proximal from the level of arc ..... CHLOROCYPHIDAE

— 2 primary antenodal, not distinct from secondaries 7

7. First lateral suture of synthorax incomplete, not distinctly seen upto the spiracle .... EUPHAEIDAE

— First lateral suture of synthorax complete, not distinctly seen beyond spiracle .... CALOPTERYGIDAE

8. Discoidal cell with costal and hinder side subequal, inner distal angle obtuse .... PLATYCNEMIDIDAE

— Discoidal cell with costal side much shorter than hinder side, inner distal angle acute or subacuta ..... COENAGRIONIDAE

Suborder ZYGOPTERA

Superfamily COENAGRIONOIDEA

This superfamily is represented in Manipur by 2 families *viz.*, Coenagrionidae and Platycnemididae.

Family COENAGRIONIDAE

This family is represented in Manipur by 21 species and 10 genera under 5 subfamilies *viz.*, Coenegrioninae, Pseudagrioninae, Ischnurinae, Agriocnemioninae and Argiinae.

Key to the subfamilies of COENAGRIONIDAE

1. Valvar spine present on eiththh abdomen of female, 10th abdomen often raised into a bifid tubercle ..... ISCHNURINAE

— Valver spine absent on eighth abdomen of female, 10 abdomen not with tubercle 2

2. Legs relatively short and robust 3

— Legs relatively long and slender 4

3. Wing petiolation longer, ab arising at the hind broader of wing at the point where ac meets ..... PSEUDAGRIONINAE

— Wing petiolation shorter ab arising at the hind border of wing where ac meets it .... COENAGRIONINAE

4. Pterostigma differing in shape and size in fore and hindwing; postocular colour spot well developed ..... AGRIOCNEMIDINAE

— Pterostigma differing in shape and size in fore and hindwing, post ocular colour spot well developed ..... ARGIINAE

Subfamily ISCHNURINAE

This subfamily has four representative genera in Manipur *viz.*, *Aciagrion* Selys and *Ischnura* Charpentier, *Enallagma* Charpentier and *Rhodischnura* Laidlaw (contain only a single species).

Genus ***Aciagrion*** Selys

1876. *Pseudagrion* Selys. *Bull. Acad. Belg. Sci* (2) **42** : 509 (Pars).

1891. *Aciagrion :* Selys, *Ann. Mus. Civ. Genova* (2) : **10**(32) : 509.

1933. *Aciagrion :* Fraser, *Fauna Brit. India Odon.*, **1** : 333.

Key to the species of the genus *Aciagrion*

1. Ground colour pale yellow, without black markings on head and thorax..... ..... *pallidum* Selys

— Ground colour blue with black markings on head, thorax and abdomen, anal appendage in male black ..... *tillyardi* Laidlaw

1. ***Aciagrion pallidum*** Selys

1891. *Aciagrion pallidum* Selys *Ann. Mus. Civ. Genova* (2). **10**(3) : 512.

1933. *Aciagrion pallidum :* Fraser, *Fauna Brit. India Odon.*, **1** : 344.

Distribution : India : Manipur, Meghalaya, Assam, Arunachal Pradesh, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Sikkim, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Myanmar.

Remarks : This species is included on the basis of the literature review. It normally inhabits dry areas amongsts grass and other vegetation whereit easily mingles.

2. *Aciagrion tillyardi* Laidlaw

1919. *Aciagrion tillyardi* Laidlaw, *Rec. Indian Mus.*, **16** : 187.

1933. *Aciagrion approximans* Fraser, *Fauna Bot. India, Odon.*, **1** : 342.

Distribution : India : Manipur, Assam, Meghalaya and Arunachal Pradesh.

Elsewhere : Malaysia.

Remarks : This species is included on the basis of the literature review. They are commonly found along grassy edges of small streams or even stagnant water bodies. It differs from *A. olympicum* and *A. azureum* by shorter and most robust abdomen.

Genus *Ischnura* Charpentier

1940. *Ischnura* Charpentier *Lib. Europ.*, : 20.

1933. *Ischnura :* Fraser, *Fauna Brit. India, Odon.*, **1** : 346.

Key to the species of genus *Ischnura*

1. Species with the ground-colour of both the sexes bright orange red 2

— Species with ground-colour of males and isochrome females blue or pale grass-green 4

2. Abdominal segments 8-10 only black .... *rufostigma rufostigma* Selys

— Abdominal segments 7-10 black.....3

3. Segment 8 in both sexes marked with blue. ..... *mildredae* Fraser

— Segment 8 unmarked with blue .... *annandalei* Laidlaw

4. Abdominal segments 3-6 citron-yellow, inferior anal appendages shorter than superiors ..... *aurora aurora* (Brauer)

— Abdominal segments 3-6 black on dorsum 5

5. Posterior lobe of prothorax greatly prolonged at the middle, 2nd abdominal segment non-metallic ..... *elegans* (Vander Lind.)

— Posterior lobe of prothorax not prolonged, 2nd abdominal segment steely metallic blue on dorsum ..... *senegalensis* (Rambur)

3. *Ischnura rufostigma rufostigma* Selys

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

1933. *Ischnura rufostigma :* Fraser, *Fauna Brit. India Odon.*, **1** : 362.

1977. *Ischnura rufostigma rufostigma*Selys : Lahiri. *Rec. zool. Surv. India,* **72** : 413.

Distribution : India : Manipur, Meghalaya, Assam, Bihar, Himachal Pradesh, Madhya Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : This species is included on the basis of the literature review. It is usually known to found swarming in and around weedy, stagnant and often ephemeral water bodies.

4. *Ischnura mildredae* Fraser

1927. *Ischnura mildredae* Fraser, *Rec. Indian Mus.*, **xxix** : 87, 88.

1933. *Ischnura mildredae :* Fraser, *Fauna Brit. India. Odon.*, **1** : 366.

Distribution : India : Manipur.

Elsewhere : Upper Myanmar and Maymyo.

Remarks : This species is included on the basis of literature review. This species is very closely related to *I. annandalei* but distinguished from it by having dorsal marking on segment 2 and blue dorsal spot on segment 8.

5. *Ischnura annandalei* Laidlaw

1919. *Ischnura annandalei* Laidlaw, *Rec. Ind. Mus.*, **xvi**, 175, 177.

1993. *Ischnura annandalei :* Fraser, *Fauna Brit. India. Odon.*, **(1)** : 364.

Distribution : India : Manipur.

Elsewhere : Burma.

Remarks : This species is included on the basis of literature review. This species is very closely related to *I. rufostigma.* It differs by having segments 2 and 7 marked broadly with black.

6. *Ischnura aurora aurora* (Hagen)

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

1915. *Ischnura aurora* (Brauer) : Ris. *Nova Caledonia Zool,* **2**(4) : 67.

1933. *Ischnura delicata :* Fraser, *Fauna Brit. India. Odon.*, **1** : 360.

1949. *Ischnura aurora aurora* (Brauer) : Lieftinck. *Nova Guinea* (New Ser.) **5** : 220.

Material : 1♂, Lamjao, Bishenpur, 22.v.93, M. Sil coll.

Diagnosis : Smallest species (abd. 16-26 mm) hind wing (10-15 mm). Ptesostigma kite shaped, rose red for its proximal half but hyaline its distal half. Abdomen 8-10 entirely azure blue. Segment 10 with broad quadrate black dorsal spot.

Distribution : India : Manipur (Lamjao, Bishenpur), Meghalaya, Assam, Andhra Pradesh, Himachal Pradesh, Kerala, Maharashtra, Orissa, Punjab, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Sri Lanka, China, Malaysia, Indonesia, Australia, New Zealand and Pacific Islands.

Remarks : This species is known to commonly inhabit marshy areas flying through grasses and weeds. In rainy seasons these are also found over grassy fields in neighbourhood of stagnant water bodies or slow running streams.

7. *Ischnura elegans* Vander Lind

1823. *Agrion elegans* Vander Lind, *Opusc. Sci.*, **4** : 104.

1867. *Ischnura elegans* Selys, *Bull. Acad. Belg.*, **(2)** : 277.

1933. *Ischnura elegans :* Fraser, *Fauna Brit. India, Odon,* **1** : 351.

Material : 1 ♂, Lamjao National Park, Bishnupur dist., St. No. 5, 23.iii.93, D. K. K. coll.

Diagnosis : Posterior lobe of prothorax prolonged at the middle. Segment 2 of abdomen with a steely blue reflex on dorsum, seg. 8 azure blue.

Distribution : India : Manipur (Lamjai National Park, Hishenpur dist.) and Orissa.

Remarks : Very closely related to *Ischnura senegalensis* from which the male can be distinguished by the truncate lobule of the middle of the posterior lobe of prothorax.

8. *Ischnura senegalensis* (Rambur)

1842. *Agrion senegalensis* Rambur, *Ins. Nevrop.*, 276.

1933. *Ischnura senegalensis :* Fraser, *Fauna Brit. India, Odon.*, **(1)** : 348.

Distribution : India : Manipur, West Bengal, Himachal Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.

Elsewhere : Myanmar, Sri Lanka, Malaysia, Philippines, Japan and Africa.

Remarks : This species is included on the basis of literature review. Small dominent insect is found in colonies from sea level to over 7000 ft.

Genus *Enallagma* Charpentier

1840. *Enallagma* Charpentier, *Lib. Europ.*, : 21.

1933. *Enallagma :* Fraser, *Fauna Brit. India, Odon.*, **1** : 371.

Key to the species of genus *Enallagma*

1. Small species, abdomen 17 mm, or less, postnodal nervure in forewing only 6 or 7.. ..... *parvum* Selys

— Large species, abdomen 20 mm. or more, postnodal nervure in forewing more than 7. ..... *cyathigerum* Charp

9. *Enallagma parvum* Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.*, **(2)** 41 : 537.

1993. *Enallagma parvum :* Fraser, *Fauna Brit. India, Odon.*, **1** : 376.

Material : 1♀, Researve forest, Manipur, F. C. No. 15, 12.xiii.92, P.H. Roy and party coll.; 1 ♀, Longienmandeei, Churachandpur, Stn. No. 7, 16.iv.93, R. S. Barman and party coll.

Diagnosis : Postnodal nervures in forewings 6 to 7 in number. Abd. pale sky blue, segment 2 with a broad thistle shaped dorsal spot.

Distribution : India : Manipur (Longienmandeei, Churachandpur), Meghalaya, Karnataka, Kerala, Maharashtra, Punjab, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Sri Lanka and Myanmar.

Remarks : It is one of the smallest dragonflyies and distinguish from other species of the genus by the shape of the anal appendages and postocular spots.

10. ***Enallagma cyathigerum*** Charpentier

1782. *Agrion acreus* Harvis, *Expos. Eng. Ins.*, pl. 29, figs. 3, 4.

1840. *Enallagma cyathigerum :* Charp. *Lib. Europ. :* 163.

1933. *Enallagma cyathigerum :* Fraser, *Fauna Brit. India. Odon.*, **1** : 373.

Material : 1♂, Lamjao, Bishenpur, 22.v.93, M.Sil and party coll.

Diagnosis : Vertex and occiput black, marked with large pyriform postocular pale blue spots, in between present a similar coloured streak but not connecting two spots. 8 to 10 fine spines on hind femora and tibae. Abdomen bright glossy azure blue. Dorsum of segment 2 with a small subapical cordate black spot.

Distribution : India : Manipur (Lamjao, Bishenpur), Jammu and Kashmir and West Bengal.

Elsewhere : Europe, Central Asia, Tibet, North America and British Isles.

Remarks : It inhabits stagnant water bodies and also amongsts marshy habitats.

Genus ***Rhodischnura*** Laidlaw

1919. *Rhodischnura* Laidlaw, *Rec. Indian Mus.*, 171, 177.

1933. *Rhodischnura :* Fraser, *Fauna Brit. India, Odon.*, **1** : 368.

No key to the species of genus *Rhodischnura* is provided as it is represented by a single species, namely *R. nursei* (Morton).

11. ***Rhodischnura nursei*** (Morton)

1907. *Ischnura nursei* Morton, *Trans. Ent. Soc. London*, 306, 307.

1919. *Rhodischnura nursei* Laidlaw, *Rec. Indian Mus.*, **16** : 171 : 177.

1933. *Rhodischnura nursei :* Fraser, *Fauna Brit. India, Odon.*, **1** : 369.

Material : 1 ♀, Moirang, Bishenpur dist., Stn. No. 10, 20.iii.94, D.K.M. coll.

Diagnosis : In male, tubercles on apical border of segment 10 widely separated by a shallow notch. In female, basal spots on segment 1 larger. Ventral border of segment 7-10 and vulvar scales bright ochreous.

Distribution : India : Manipur (Moirang, Bishenpur dist.), Assam, Bihar, Uttar Pradesh, Madhya Pradesh, Gujarat, Rajasthan and West Bengal.

Elsewhere : Pakistan.

Remarks : Character of the abdomen which is bright crimson citron yellow and black distinguish this species from others.

Subfamily PSEUDAGRIONINAE

This subfamily has two representative genera in Manipur. *Pseudagrion* Selys and *Ceriagrion* Selys.

Key to the genera of PSEUDAGRIONIENAE

1. Prominent frontal ridge on frons, no postocular coloured spot on head, head and thorax of uniform colour, without any dark markings. ..... ***Ceriagrion*** Selys

— Frontal ridge not present, postocular coloured spot present on head, head and thorax of not uniform colour, black or dark markings on body present ..... ***Pseudagrion*** Selys

Genus ***Ceriagrion*** Selys

1876. *Ceriagrion* Selys, *Bull. Acad. Belg. Sci.*, **42** ; 525.

1933. *Ceriagrion :* Fraser, *Fauna Brit. India, Odon.*, **1** : 313.

1967. *Ceriagrion :* Asahina, *Jap. J. Zool.*, **15** : 255.

Key to the species of the genus *Ceriagrion*

1. Ab arising distinctly proximal to the point where ac meets, abdomen yellow changing to black on segments 7-10 .... *fallax cerinomelas* Lieftinck

— Ab arising at the point where ac meets, abdomen marking absent or variable.....2

2. Abdomen uniformly dull olivaceous in both sexes ..... *olivaceum* LaidLaw

— Abdomen not uniformly dull olivaceous of variable colour and markings present or absent, abdomen bright citron yellow .... *coromandelianum* Fabricius

12. *Ceriagrion fallax cerinomelas* Lieftinck

1927. *Ceriagrion fallax cerinomelas* Lieftinck, *Tijdschr Ent.*, **70** : 88.

Distribution : India : Manipur, Assam, Himachal Pradesh, Meghalaya, Sikkim and West Bengal.

Remarks : This species is included on the basis of the literature review. It is commonly found only during the few months following the monsoon around temporary water bodies.

13. *Ceriagrion olivaceum* Laidlaw

1914. *Ceriagrion olivaceum* Laid. *Rec. Indian Mus.*, **viii** : 345.

1933. *Ceriagrion olivaceum :* Fraser, *Fauna Brit. India. Odon.*, **1** : 324.

Distribution : India : Meghalaya, Assam, Kerala, Maharashtra, Orissa, Arunachal Pradesh, South Andaman and West Bengal.

Remarks : This species is included on the basis of literature review. Quite frequently inhabiting long grasses in the vicinity of water body.

14. *Ceriagrion coromandelianum* (Fabr.)

1789. *Aciagrion coromandelianum* Fabriciaus *Ent. Syst. Suppl.*, : 287.

1842. *Aciagrion cerinum :* Rambur *Hist. Nat. Ins. Neurop.*, : 279.

1876. *Ceriagrion coromandelianum :* Selys, *Bull. Acad. Belg. Sci.*, (2) **13** : 528.

1933. *Ceriagrion coromandelianum :* Fraser, *Fauna Brit. India, Odon.*, **1** : 315.

Material : 1 ♀, Manipur, Reserve forest, F.C. No. 15, 12.xii.92, P.H. Roy and party coll.; 2 ♂ ♂ Kharasom, Manipur, Stn. No. 6, 14.vi.93, R. S. Barman and party coll.; 2 ♂ ♂, 2 ♀ ♀, Longienmandeei, Churachandpur, Stn. No. 7, 16.vi.93, R. S. Barman and party coll.; 1 ♀, Kangpokpi, Sonapati, Stn. No. 2, 17.iii.94, D.K.M. coll.

Diagnosis : This species has whole of its abdomen pale citron yellow, devoid of any markings.

Distribution : India : Manipur (Kharasom, Longienmandeci, Churachandpur,Kangpokpi, Sonapati), Meghalaya, Assam, Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Mizoram, Orissa, Punjab, Chennai, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Sri Lanka, Burma, Indochina and Thailand.

Remarks : It is one of the very common damselfly; breeds in weedy ponds and tanks; easily distinguished from others by its pale lemon-yellow abdomen.

Genus *Pseudagrion* Selys

1876. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.*, (2) **42** : 490.

1933. *Pseudagrion :* Fraser, *Fauna Brit. India, Odon.*, **1** : 274.

Key to the species of the genus *Pseudagrion*

1. Superior anal appendage as long as abdomen 10, Superior anal appendage bifid .... *australasiae* Selys

— Superior anal appendage shorter than abdomen 10, superior anal-appendage expanded on inner side 1-3 small spine near base on this border ..... *microcephalum* (Rambur)

15. *Pseudagrion australasiae* Selys

1876. *Pseudagrion microcephalum* race? *Bull. Acad. Belg. Sc.*, (2) **42** : 506 (pars).

1916. *Pseudagrion australasiae* : Laidlaw, *Rec. Indian Mus.*, **12** : 21.

1919. *Pseudagrion bengalense* : Laidlaw. *Rec. Indian. Mus.*, **16** : 192.

1933. *Pseudagrion bengalense* : Fraser, *Fauna Brit. India. Odon.*, **1** : 282.

Distribution : India : Manipur, Meghalaya, Assam, Chandigarh and West Bengal.

Elsewhere : Thailand, Malaysia and Australia.

Remarks : This species is included on the basis of the literature review. it has similarity with *P. microcephalum,* but is distinguishable from same by elongate vase-shaped spot instead of goblet-shaped on abd. 2 and in absence of basal spines.

16. ***Pseudagrion microcephalum*** Rambur

1842. *Agrion microcephallum* Ramb. *Ins. Neurop.*, 259.

1876. *Pseudagrion microcephallum* Selys, *Bull. Acad. Belg.*, **2**, XLII : 504.

1933. *Pseudagrion microcephallum* Fraser, *Fauna Brit. India, Odon,* **1** : 278.

Material : 1 ♀, Phubala, Bishenpur dist., 24.v.93, M. Sil coll.; 1 ♂, Moirang, Bishenpur dist., 22.v.93, M. Sil coll.

Diagnosis : Segment 1 with a small quadrate black spot. Dorsal marking on segment 2 goblet shaped. Superior anal appendages with 3 small spines on inner border.

Distribution : India : Manipur (Phubala, Moirang, Bishenpur dist), Plains of Uttar Pradesh, Bihar, Maharashtra and Madhya Pradesh.

Elsewhere : Myanmar, Sri Lanka, Australia and Java.

Remarks : Inhabits plains, submontane zones. Male is distinguished by its character of dorsal marking on segment 2. Female is distinguished by its black bifid marks on abd. 9.

Subfamily ARGIINAE

This subfamily is represented, in Manipur, by a single genus *viz., Onychargia* Selys, hence no key is provided. Genus again has got only a single species represented.

Genus ***Onychargia*** Selys

1865. *Onychargia* Selys, *Bull. Acad. Belg.*, (2), **20** : 416.

1933. *Onychargia :* Fraser, *Fauna Brit. India, Odon,* **1** : 416.

17. ***Onychargia atrocyana*** Selys

1865. *Onychargia atrocyana* Selys, *Bull. Acad. Belg.* (2), **20** : 416.

1933. *Onychargia atrocyana :* Fraser, *Fauna Brit. India, Odon.,* 1 : 417.

Material : 1 ♀, Laktake, Bishenpur dist., Stn. No. 9, 26.iii.93, D.K.M. coll.

Diagnosis : Tarsal claw hooks of equal length; thorax velvety black. In male deep purplish reflex on dorsum of thorax but in female without purple reflex. In male abdomen too black, anal appendage slightly shorter than abdomen 10. In female abdomen marked with yellow. Anal appendage conical black.

Distribution : India : Manipur (Laktake, Bishenpur dist), Assam, Bihar, Orissa, south India, Karnataka, Kerala and West Bengal.

Elsewhere : Myanmar and Sri Lanka.

Remarks : Inhabits wet submontane areas in scattered colonies. This species is rarely plentiful but occasionaly large colonies are found.

Subfamily AGRIOCNEMIDINAE

This subfamily is represented in Manipur by two genera *viz., Agriocemis* Selys and *Argiocnemis* Selys.

Key to the genera of AGRIOCNEMIDINAE

1. Moderately large species, abdomen 28-32 mm in length, 10 to 12 postnodal nervure in forewing..... ***Argiocnemis*** Selys

— Relatively smaller species, abdomen 20-25 mm in length, 6 to 8 postnodal nervure in forewing..... ***Agriocnemis*** Selys

Genus ***Argiocnemis*** Selys

1877. *Argiocnemis* Selys, *Bull. Acad. Belg. Sci.,* (2) **43** : 135.

1933. *Argiocnemis :* Fraser, *Fauna Brit. India, Odon.,* **1** : 405.

Genus ***Argiocnemis*** Selys

This genus is represented in Manipur by a single species *viz., Argiocnemis rubescens* Selys, hence no key is provided.

18. ***Argiocnemis obscura*** Laidlaw

1914. *Argiocnemis obscura* Laidlaw, *Rec. Indian Mus.*, **8** : 345.

1877. *Argiocnemis rubescens* Selys, *Bull. Acad. Belg.*, (2) **43** : 136.

1953. *Argiocnemis rubescens* : Fraser, *Fauna Brit. India Odon.*, **1** : 406.

Material : 1 ♂, Luloo, E.H. Jiriban, 11.v.93, M. Sil coll.

Diagnosis : Thorax black on dorsum marked with pale greenish blue antehumeral stripes. Abdomen pale blue laterally with black on dorsum. Segment 1 with a quadrate spot on mid dorsum. Segment 2 with a broad dorsal spot on mid dorsum. inferiors of anal appendage less than half the length of superiors. Its outer angle produced as two minute spines.

Distribution : India : Manipur, Assam, Meghalaya and West Bengal.

Elsewhere : Myanmar.

Remarks : This species is known to inhabit bushes near small stagnant water bodies.

Genus ***Agriocnemis*** Selys

1869. *Agriocnemis* selys, *Pollen and van Dam, Fauna Mad. Ins.*, : 24.

1933. *Agriocnemis* : Fraser, *Fauna Brit. India, Odon.*, : 379.

Key to the species of the genus *Agriocnemis*

Superior anal appendages longer than inferiors ..... *pygmaea* (Rambur)

Superior anal appendage shorter than inferiors .....*femina* (Brauer)

19. ***Agriocnemis pygmaea*** (Ramb.)

1842. *Agrion pygmacum* Rambur, *Hist. nat. Ins. Nevrop.*, 278.

1877. *Agriocnemis pygmaea* Selys, *Syn. Agr. 5me. Legion : Agrion (Suite etfin)* : 52.

1933. *Agriocnemis pygmaea* : Fraser, *Fauna Brit. India, Odon.*, **1** : 398.

Material : 1 ♀, Loktake, Bishnupur dist., Stn. No. 9, 26.iii.93, D.K.M. coll.; 3 ♂♂, 3 ♀♀, Moirang, Bishenpur dist, Stn. No. 10, 25.iii.93, D.K.M. coll.; 1 ♂, Keibul, Lamjao National Park, Bishnupur dist., Stn. No. 5, 23.iii.94, D.K.M. coll.

Diagnosis : Labrum entirely metallic blue. Segment 2 of abdomen with a broad dorsal thistle-shaped marking.

Distribution : India : Manipur (Loktake, Moirang, Keibul, Lamjao National Park, Bishenpur dist., Meghalaya, Assam, Himachal Pradesh, Uttar Pradesh, Madras, Malabar, nicobar, Punjab, Rajasthan and West Bengal.

Elsewhere : China, Sri Lanka, Myanmar, Malaysia, Indonesia, New Guinea, Taiwan, Philippines, Australia, Pacific Islands and Seychellies.

Remarks : This is one of the smallest damselfly found in wide ranging ecosystems. The male can be distinguished by different colour in fore and hind wings, reddish coloured end segments of abdomen, the shape of anal appendage and the female with unenclosed antehumeral stripes.

20. ***Agriocnemis femina*** Brauer

1868. *Ischnura femina* Brauer, *Verh. zool. bot. Ges. Wien.*, **xviii** : 554.

1890. *Agriocnemis femina* : Kirby, *Cat. Odon.*, : 158.

1933. *Agriocnemis femina* : Fraser, *Fauna Brit. India, Odon.*, **1** : 402.

Distribution : India : Manipur, Assam, West Bengal and South Andaman Is.

Elsewhere : Myanmar, South China, Philippines, Annam, Sumatra, Java, Borneo, Singapore, Lombok, N. Celebes, Amboina and Darnley Island.

Remarks : This species is included on the basis of the literature review. The male anal appendages are of remarkable shape by which it is distinguishable from all other species.

Subfamily COENAGRIONINAE

This subfamily is represented in Manipur by a single genus *viz.*, *Cercion* Navas, hence no key is provided. Genus *Cercion* Navas again has got a single species *viz.*, *Cercion malyanum* Selys.

Genus ***Cercion Navas***

1807. *Cercion* Navas, *Broteria*, **6** : 55.

21. *Cercion malayanum* Selys

1870. *Cercion malayanum* (Selys). *Ann. Ent. Belo., Compterendu,* **41** : 536.

Distribution : India : Assam, Maharashtra.

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

Family PLATYCNEMIDIDAE

This family has two subfamilies under which 6 species, 3 genera are represented in Manipur.

Key to subfamilies and genera

1. Male tibiae dilated, often greatly so..... ..... PLATYCNEMININAE Fraser.....2
— Male tibiae never dilated..... .....CALICNEMINAE Fraser.....3
2. Second antennal segment as long as or even longer than third, anal appendage in male less homogeneous, variable ..... COPERA Kirby
3. Wings petiolated to the level of ac, RIV + V arising only a little proximal to the level of node ..... COELICCIA Kirby
— Wings petiolated a little proximal to ac, RIV + V arising well proximal to subnode .... CALICNEMIA Selys

Subfamily PLATYCNEMININAE

Genus *Copera* Kirby

1863. *Psilocnemis* Selys, *Bull. Acad. Belg. Sci* (2) **16** : 168.

1890. *Copera* Kirby, *Syn. Cat. Neur. Odon,* : 129.

1933. *Copera :* Fraser, *Fauna Brit. India, Odon.,* **1** : 191.

Key to the species of genus *Copera*

1. Meso an Meta-thoracic tibiae white and widely dilated ..... *ciliata* (Selys)
— Meso and Meta-thoracic tibiae not widely dilated ..... *vittata assamensis* Laidlaw

22. *Copera ciliata* Selys

1863. *Copera ciliata* Selys, *Bull. Acad. Belg. Sci.,* (2) **16** : 173.

1933. *Copera annulata :* Fraser, *Fauna Brit. India, Odon.,* **1** : 203.

Distribution : India : Manipur, Assam, Himachal Pradesh, Meghalaya, Uttar Pradesh, West Bengal, Andhra Pradesh, Karnataka, Kerala and Chennai.

Elsewhere : China, Indochina, Malaysia, Indonesia, Japan and Taiwan.

Remarks : This species is included on the basis of the literature review. It inhabits weedy ponds and small lakes. This species is easily distinguished from all others, except *C. superplatypes,* by its pronounced black colour with pale blue markings andbroadly dialated white tibiae.

23. *Copera vittata assamensis* Laidlaw

1914. *Copera vittata assamensis* Laidlaw, *Rec. Indian Mus.,* **8** : 342.

1933. *Copera assamensis :* Fraser, *Fauna Brit. India, Odon.,* **1** : 201.

Distribution : India : Manipur, Assam, Meghalaya, West Bengal and Western ghats.

Elsewhere : Indo China.

Remarks : This species is included on the basis of literature review. The male is easily distinguished from *C. vittata* by its longer legs without dilation of the tibiae. The latter character seperates this species from all other species of the genus.

Subfamily CALICNEMINAE

This subfamily is represented by 2 genera and 4 species in Manipur.

Key to the genera of subfamily CALICNEMINAE

1. Ab arising at the level of Ac; 2-3 postquadrangular antenodal cells present .... COELICCIA Kirby
— Ab arising proximal to the point where Ac meets it; 3 postquadrangular antenodal cells present ..... CALICNEMIA Strand

Genus *Coeliccia* Kirby

1857. *Trichocnemis* Selys, in Sagra. *Hist. Cube. Ins.,* : 464 (nom. preoc).

1890. *Coeliccia* Kirby : *Syn. Cat. Neur. Odon.*, : 128.

1933. *Coeliccia :* Fraser. *Fauna Brit. India. Odon.*, **1** : 152.

24. *Coeliccia didyma* (Selys)

1863. *Trichocnemis didyma* selys. *Bull. Acad. Belg. Sci.*, (2) **16** : 158.

1890. *Coeliccia didyma* (Selys) : Kirby. *Syn. Cat. Neur. Odon.*, : 128.

1933. *Coeliccia didyma :* Fraser. *Fauna Brit. India. Odon.*, **1** : 154.

Distribution : India : Manipur, Assam, Meghalaya, Himachal Pradesh, Nagaland and West Bengal.

Elsewhere : Tibet, Myanmar and Malaysia.

Remarks : This species is included on the basis of the literature review. It is known to occur at a lower altitude. The species is easily distinguished from all others by the two pyriform dorsal thoracic spots, pale blue in colour.

25. *Coeliccia rotundata* Asahina

1984. *Coeliccia rotundata* Asahina. *Trans. Shikoku. Ent. Soc.*, **16** : 4.

Distribution : India : Manipur.

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

26. *Coeliccia schmidti* Asahina

1984. *Coeliccia schmidti* Asahina, *Trans. Shikoku. Ent. Soc.*, **16** : 6.

Distribution : India : Manipur.

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

Genus *Calicnemia* Strand

1863. *Calicnemis* Selys. *Bull. Acad. Belg. Sci.*, (2) **16** : 159.

1933. *Calicnemis :* Fraser. *Fauna Brit. India. Odon.*, **1** : 171.

1926. *Calicnemia* Strand. *Arch. Natur gesch.* 92A : 46.

This genus represented in Manipur by a single species, hence no key is provided.

27. *Calicnemia miles* (Laidlaw)

1886. *Calicnemia eximia* race *atkinsoni* Selys, *Mem. Cour.*, 131, 132.

1917. *Calicnemis miles* Laid., *Nom. nov. Rec. Indian Mus.*, **13** : 330.

1933. *Calicnemis miles :* Fraser, *Fauna Brit. India, Odon.*, **1** : 178.

Distribution : India : Manipur.

Elsewhere : Upper Myanmar.

Remarks : The species is included on the basis of the literature review. The male closely resembles that of *C. miniata,* but is easily distinguished by the larger abdomen; with black spots on last three segments only 2; much lower postnodal index 14 to 15 only in *C. miles* as contrasted with 18 to 21 in *C. miniata.*

Superfamily LESTOIDEA

Family LESTIDAE

Subfamily LESTINAE

This subfamily is represented by single genus in Manipur, hence no key is provided.

Genus *Lestes* Leach

1815. *Lestes* Leach (in Burmeister) *Edinb. Encycl.*, **9** : 137.

1933. *Lestes* Fraser : *Fauna Brit. India, Odon.*, **1** : 29.

Key to the species of genus *Lestes*

1. Apex of the superior anal appendages acutely pointed ..... *garoensis* Lahiri

— Apex of the superior anal appendages not acutely pointed, but broad and tapering rapidly to a point ..... *nodalis* Selys

28. *Lstes garoensisi* Lahiri

1987. *Lestes garoensis* Lahiri, *Rec. zool. Surv. India, Occ. Paper No.* 99 : 66.

Distribution : India : Manipur and Meghalaya.

Remarks : This species is included on the basis of the literature review (Lahiri, 1987). It is very close to *L. nodalis* Selys but differs from the same in the shape of superior anal appendages.

29. *Lestes nodalis* selys

1891. *Lestes nodalis* Selys, *Ann. Mus. Civ. Genova.*, (2) **10** : 496-497.

1933. *Lestes nodalis*, Fraser, *Fauna Brit. India*, **1** : 51-53.

Distribution : India : Manipur, Assam, Bihar and Orissa.

Elsewhere :Myanmar and China.

Remarks : This species is included on the basis of the literature review. It is easily distinguished from other species by having longitudinally bicolours pterostigma, small black nodal point on the costa and broad right-angled anal appendages.

Superfamily CALOPTERYGOIDEA

Family CHLOROCYPHIDAE

Key to the genera of the family CHLOROCYPHIDAE

1. Forewing of male without pterostigma; sectors of arc arising from a common point .... LIBELLAGO Selys

— Forewing of male with pterostigma; sectors of arc not arising from a common point but separated at their origin..... ..... RHINOCYPHA Rambur

Genus *Libellago* selys

1840. *Libellago* Selys, *Mon. Lib. Eur.*, : 200 (parts).

1934. *Libellago* : Fraser, *Fauna Brit. India Odon.*, **2** : 53.

1842. *Micromerus* Rambur, *Hist. nat. Ins. Nevrop.*, : 238.

Key to the species of genus *Libellago*

1. Abdominal markings citron yellow, black tip to forewings of male only 3 mm in length ..... *lineata indica* (Fraser)

— Abdominal markings black and bright greenish or golden-yellow, black tip to forewings of male more than 3 mm in length..... ..... *lineata lineata* (Burm.)

30. *Libellago lineata indica* (Fraser)

1919. *Micromerus lineatus* Fraser, *Rec. Indian Mus.*, **16** : 197, pl. 23.

1928. *Micromerus lineatus indica* Fraser, *J. Bombay Nat. Hist. Soc.*, **32** : 686.

1934. *Libellago l. indica :* Fraser, *Fauna Brit. India. Odon.*, **2** : 63.

Material : 1 ♀, 3 km. N.W. of Churachandpur, Stn. No. 12, 25.ix.75, M.S. Shishodia and party coll.

Diagnosis : Small insects, a crown-shaped mark on occiput, with an elongate medial point, apical black spot of forewing distinctly longer. Abdominal markings citron yellow.

Distribution : India : Manipur (Churachandpur), Karnataka, Kerala, Maharashtra and Western Ghat.

Elsewhere : Ceylon, Myanmar and Siam.

Remarks : This species found throughout the year. It can be distinguished from typical *L. lineata* by its abdominal markings.

31. *Libellago l. lineata* (Burmister)

1839. *Calopteryx lineata* Burmeister, *Handb. Ent.*, (2) 826.

1840. *Libellago lineata :* Selys, *Mon. Lib. Eur.*, : 200.

1934. *Libellago l. lineata :* Fraser, *Fauna Brit. India. Odon.*, **2** : 60.

Distribution : India : Manipur, Assam, Himachal Pradesh, Kerala, Maharashtra, Chennai, Uttar Pradesh, Andaman Islands and West Bengal.

Elsewhere : Myanmar, Thailand, Vietnam, Malaysia and Indonesia.

Remarks : This species is included on the basis of the literature review. It is commonly found in comparatively open habitate in the vicinity or along sides of streams or small rivers, which has sandy bottom and clear water.

Genus *Rhinocypha* rambur

1831. *Agrion* Guerin, *Mag. Zool. Ins.*, 1 : 15.

1842. *Rhinocypha* Rambur, *Ins. Nevron.*, 232.

1934. *Rhinocypha :* Fraser, *Fauna Brit. India. Odon.*, 2 : 5.

Key to the species of genus *Rhinocypha*

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

— Wings coloured in male 2

2. Dorsal mesothoracic triangle coloured, extending as far as base of wings, apical

vitreous spot moderately larger.....
..... *q. quadrimaculata* Selys

— Dorsal mesothoracic triangle large, extending half way along dorsum, apical vitrous spot shorter..... *biforata* Selys

32. *Rhinocypha immaculata* Selys

1879. *Rhinocypha immaculata* Selys, *Bull. Acad. Belg.*, (2) **47** : 385.

1934. *Rhinocypha immaculata :* Fraser, *Fauna Brit. India. Odon.*, **2** : 35.

Distribution : India : Manipur, Meghalaya, Assam, West Bengal and Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. It is known to inhabit vegetation in vicinity of montane streams in comparatively open habitat. This species is characterised in its wing lacking any marking or even vitreous iridescence in quite contrast to alter Indian species of the genus.

33. *Rhinocypha q. quadrimaculata* selys

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

1934. *Rhinocypha quadrimaculata :* Fraser, *Fauna Brit. India, Odon.*, **2** : 14.

1950. *Aristocypha quadrimaculata* (Selys) : Laidlaw, *Trans. R. ent. Soc. London.*, **101** : 273.

Material : 2 ♂♂, Manipur, 3 kms. N.W., Stn. No. 12, 25.ix.75, M.S. Shishodia and party coll.; 2 ♂♂, near forest office, Moreh, Stn. No. 14, 24.ii.75, P.T. Cherian and party coll.; 1 ♂, Moreh, Lock chou River Bank, Stn. No. 12, 22.ii.75, P.T. Cherian and party coll.

Diagnosis : Reticulation very close. Apical vitreous spot elongate and narrower than long, extending one cell row posterior to IR iii. Mid row of vitreous spots well separated 3 in number. Costal spot extending much nearer to node than middle spot.

Distribution : India : Manipur (Moreh, Lock Chow river bank), Meghalaya, Assam, Himachal Pradesh, Kashmir, Sikkim, Nagaland, Western Himalays, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : It can be distinguished from *Rhinocypha spuria* in having very close reticulation instead of open, vitreous strip extending in opaque area for a distance of 7 to 8 cells instead of 3-5 apical spot transversely elongate instead of square.

34. *Rhinocypha biforata* Selys

1859. *Rhinocypha b. biforata* Selys, *Bull. Acad. Belg.*, (2) **7** : 446.

1934. *Rhinocypha biforata :* Fraser, *Fauna Brit. India, Odon.*, **2** : 45.

Distribution : India : Manipur and Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. This species is not found in its typical form within Indian limits. It is characterised by the greater extent of the opaque area in the hind wings.

Family EUPHAEIDAE

This family in Manipur is represented by 4 genera and 4 species.

Genus *Euphaea* Selys

1840. *Euphaea* Selys, *Mon. Lib. Fur.*, : 200.

1890. *Pseudophaea :* Kirby, *Syn. Cat. Neur. odon.*, : 109.

1929. *Allophaea :* Fraser, *Fauna Brit. India.*, **2** : 95.

1929. *Indophaea :* Fraser, *J. Bombay nat. Hist. Soc.*, 33 : 293.

This genus is represented by a single species in Manipur, hence no key is provided.

35. *Euphaea o. ochracea* Selys

1859. *Euphaea ochracea* Selys, *Bull. Acad. Belg.*, (2) **7** : 443.

1890. *Pseudophaea ochracea :* Kirby, *Cat. Odon.*, : 109.

1929. *Allophaea ochracea :* Fraser, *J. Bombay nat. Hist. Soc.*, **33** : 288.

1934. *Allophaea ochracea :* Fraser, *Fauna Brit. India. Odon.*, **2** : 96.

Material : 1 ♂, 3 kms. Moreh west, Stn. No. 5, 27.ix.75, M. S. Shishodia and party coll.; 1 ♂, 3 kms. Moreh Rly. Stn., Stn. No. 12, 25.iv.75,

M.S. Shishodia and party coll.; 1 ♀, C.R.P. Camp, Churachandpur, 18.ix.75, M.S. Shishodia and party coll.; 1 ♀, 3 kms. Moreh, West, Stn. No. 14, Alt. 2000, 24.ix.75, M.S. Shishodia and party coll.

Diagnosis : Prothorax and thorax mat black. Thorax marked with a series of four pairs of stripes on each side. Wings hyaline, broadly saffron. Hind wings slightly broader and shorter than forewings.

Distribution : India : Manipur (Moreh, Churachandpur), Meghalaya and Assam.

Elsewhere : Myanmar.

Remarks : This species can be distinguished by its hyaline wings, saffronated but without opaque areas.

Genus ***Pseudophaea*** Kirby

1842. *Euphaea,* Selys, *Ins. Nevrop.,* 228.

1890. *Pseudophaea,* Kirby, *Cat. Odon.,* 109.

This genus is represented by a single species in Manipur, hence no key is provided.

36. ***Pseudophaea masoni*** Selys

1879. *Euphaea masoni* selys, *Bull. Acad. Belg.,* (2) **18** : 377.

1890. *Pseudophaea masoni* Kirby, *Cat. Odon.,* : 110.

1934. *Pseudophaea masoni :* Fraser, *Fauna Brit. India. Odon.,* **2** : 102.

Material : 2 ♂♂, Burma border East, Stn. No. 13, 21.ix.75, M.S. Shishodia and party coll.; 1 ♂, 3 kms. Moreh east, Stn. No. 5, 27.ix.75, M.S. Shishodia and party coll.; 1 ♂, Burma border, 26.ix.75, M.S. Shishodia and party coll.; 1 ♀, 3 kms. N.W., 25.ix.75, M.S. Shishodia and party coll.

Diagnosis : Prothorax and thorax velvety black. Prothorax unmarked. Wings opaque blackish brown. Segment 10 of abdomen with a very prominent carinal spine.

Distribution : India : Manipur (Moreh east, Burma border east), Nagaland and Assam.

Elsewhere : Upper Myanmar, Lower Myanmar, Tonkin and Siam.

Remarks : It is one of the blackest dragonflies and very conspicuous on the wing. The wing markings of this species will serve to distinguish it from other species.

Genus ***Bayadera*** Selys

1853. *Epallge,* group *Bayadera* Selys, *Syn. Cal.,* : 49.

1934. *Bayadera :* Fraser, *Fauna Brit. India, Odon.,* (2) : 78.

No key to the species of genus *Bayadera* is provided as it is represented by only species namely *B. longicauda* from Manipur.

37. ***Bayadera longicauda*** Fraser

1928. *Baydera longicauda* Fraser, *J. Bombay nat. Hist. Soc.,* **33** : 53.

1933. *Bayadera longicauda :* Fraser, *Fauna Brit. India. Odon.,* **2** : 83.

Material : 1 ♂, Ranginmanlli, Churachandpur, Stn. No. 7, 16.vi.93, R. S. Barman and party coll.

Diagnosis : Labium entirely black. Posterior lobe of prothorax yellow. Antehumeral stripes complete. Abdomen more or less unmarked. Pterostigma black. Ventral spine of superiors vestigial and a robust obtuse tubercle at middle of upper and inner border.

Distribution : India : Manipur (Ranginmanlli, Churachandpur), Sikkim and West Bengal.

Remarks : This species can be readily distinguished by the shape of anal appendage, relative length of abdomen and wing and also having bright yellow posterior lobe of prothorax.

Genus ***Schmidtiphaea*** Asahina

1978. *Schmidtiphaea,* Asahina, *Proc. Jap. Soc. Syst. Zool.,* (1978) : 44.

38. ***Schmidtiphaea schmidi*** Asahina

1978. Schmidtiphaea *schmidi* Asahina, *Proc. Japanese. Soc. Syst. Zool.,* **14** : 43-46.

Distribution : Manipur.

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

Family CALOPTERYGIDAE

This family is represented in Manipur by one subfamily,m 3 genera and 3 sepecies.

Subfamily CALOPTERYGINAE

Key to the genera of subfamily CALOPTERYGINAE

1. Arc oblique, not angulated; basal space entire ..... VESTALIS Selys

— Arc angulated, not oblique; basal space traversed or reticulated 2

2. Pterostigma present, not traversed .... ECHO Selys

— Pterostigma in both the sexes hyaline, pterostigma absent in male, false or absent in female ..... NEUROBASIS Selys

Genus *Vestalis* Selys

1853. *Vestalis* Selys, *Syn. Cal.*, : 24.

1934. *Vestalis* : Fraser, *Fauna Brit. India, Odon.*, **(2)** : 124.

No key to the species of Genus *Vestalis* Selys is provided as it is single reprentative, namely *V. g. gracilis* from Manipur.

39. *Vestalis g. gracilis* (Rambur)

1842. *Calopteryx gracilis* Rambur, *Hist. nat. Ins. Nevrop.*, 224.

1929. *Vestalis gracilis gracilis* : Fraser, *J. Bombay nat. Hist. Soc.*, **33** : 582.

1934. *Vestalis gracilis gracilis* : Fraser, *Fauna Brit. India. Odon.*, **2** : 126.

Distribution : India : Manipur, Meghalaya, Assam, Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Chennai, Andaman and Nicobar Islands, Bihar and West Bengal.

Elsewhere : Myanmar, Thailand, Vietnam and Malaysia.

Remarks : This species is included on the basis of the literature review. It is known to inhabit vegetation in vicinity of montane and submontane streams. This species is distinguishable from *V. smaragdina* Selys in having untinted wings and from *V. amoena* Selys in having two rows of cells between origin of Cuii and IA instead of a single row.

Genus *Echo* Selys

1853. *Echo* Selys, *Syn. Cal.*, : 19.

1934. *Echo* : Fraser, *Fauna Brit. India, Odon.*, **2** : 134.

No key to species of genus *Echo* Selys is provided as has only species namely *E. m. margarita* from Manipur.

40. *Echo m. margarita* Selys

1853. *Echo margarita* Selys, *Syn. Cal.*, : 19.

1929. *Echo margarita* : Fraser, *J. Bombay nat. Hist. Soc.*, **33** : 587.

1934. *Echo margarita margarita* : Fraser, *Fauna Brit. India. Odon.*, **2** : 136.

Material : 1 ♂, Cheklabhai forest, Churachandpur, Stn. No. 9, 17.vi.93, R.S. Barman and party coll.

Diagnosis : Prothorax shiny metallic dark green. Dorsum and sides of thorax with a coppery reflex. Wings hyaline, apical fifth dark blackish brown. Hyaline area with a bluish-purple iridescence. Pterostigma milky white in all wings.

Distribution : India : Manipur (Cheklabhai forest, Churachandpur), Meghalaya and Assam.

Elsewhere : China and Myanmar.

Remarks : Wings closely reticulated, hyaline, apical fifth dark blackish brown, slight clouding of brown at node in all wings. Pterostigma milkywhite.

Genus *Neurobasis* Selys

1853. *Neurobasis* Selys, *Syn. Cal.*, : 17.

1934. *Neurobasis* : Fraser, *Fauna Brit. India. Odon.*, **(2)** : 119.

No key to the species of the genus *Neurobasis* selys is provided as it is only representative namely *N. c. chinensis.*

41. *Neurobasis chinensis chinensis* (Linnaeus)

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

1890. *Neurobasis chinensis* : Kirby, *Cat. Odon.*, : 102.

1934. *Neurobasis chinensis chinensis* : Fraser, *Fauna Brit. India, Odon.*, **2** : 121.

Material : 1 ♂, 3 m. Moreh west, Stn. No. 5, 27.ix.75, M.S. Shishodia and party coll.

Diagnosis : Postclypeus glossy metallic green. Prothorax bronzy green. Thorax brilliant metallic green. Fore wings of both sexes hyaline. Hind wings opaque. Pterostigma absent in all wings. Basal space of wing traversed.

Distribution : India : Manipur (Moreh west), Meghalaya, Assam, Mizoram, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Sri Lanka, Myanmar, Thailand, Malaysia and Indonesia.

Remarks : It breeds in montane and submontane streams. It will be characterised by lack of pterostigma in male and false or absent in female, which is also shared by allied genus *Matrona* Selys.

Suborder ANISOPTERA

Superfamily AESHNOIDEA

Family AESHNIDAE

This family is represented in Manipur by a single subfamily namely Anactinae, one genus and one species, hence no key is provided.

Genus ***Anax*** Leach

1815. *Anax* Leach, *Edinb. Encycl.*, **ix** : 137.

1936. *Anax :* Fraser, *Fauna. Brit. India, Odon.*, **3** : 134.

No key to the species of the genus *Anax* Leach is provided since it has representative namely *A. guttatus* (Burmeister) from Manipur.

42. ***Anax guttatus*** (Burm.)

1839. *Aeschna guttatus* Burmeister, *Handb. Ent.*, **11** : 840.

1967. *Anax guttatus* Hagen, *Verh. Zool.-bot. Ges. Wien.*, **xiv** : 39.

1936. *Anax guttatus* (Burmeister) : Fraser, *Fauna Brit. India, Odon.*, **3** : 140.

Material : 1 ♀, Rakhai, Churachandpur, Stn. No. 15, alt. 900 m, 5.iv.92, D.K.M. and S.K.G. party coll.; 1 ♀, Siendra hill, Moirang, Stn. No. 6, 31.iii.92, D.K.M. and S.K.G. party coll.

Diagnosis : Face and frons golden yellow. Prothorax reddish brown bordered with yellow. Thorax pale green. Wings hyaline but with a large amber yellow patch. In female hind wings often amber yellow patch. Orange spots of abdomen more confluent and separated by jugal sutures.

Distribution : India : Manipur, (Rakhai, Churachandpur), Assam, Kerala, Chennai and West Bengal.

Elsewhere : Burma, Siam, Java and Sumatra.

Remarks : This species inhabits small weedy ponds, lakes and mostly remains in its vicinity flying majestically. It is larger (abd. 56-62; 54-56) than *A. imperator.*

Superfamily LIBELLULOIDEA

Family LIBELLULIDAE

Key to the genera of the family LIBELLULIDAE

1. Claw-hooks equal in length to claws—giving claws a bifid appearence, thorax invariably metallic ..... ZYGONYX Selys

— Claw—Hooks shorter than claws, arises from about middle of claw, not giving a bifid appearence to claws, thorax generally non-metallic (only rarely metallic) 2

2. Borders of anal-loop running upto the posterior borders of hind wings, apex of loop open. Abdomen broad at base tapers gradually, an opalescent white spot in centre of hind-wing ..... THOLYMIS Hagen

— Borders of anal-loop not running upto the posterior borders of hindwing but converges and meets before posterior border, apex of loop closed 3

3. Distal antenodal nervure in forewing complete 4

— Distal antenodal nervure in forewing incomplete 7

4. Lobe of prothorax large and fringed with long hairs 5

— Lobe of prothorax small, inconspicuous and usually naked-without fringe of long hairs 6

5. Only 6 antenodal nervures in fore wing, abd. segments 1 to 6 conspicuously dilated. 7-10 slim and cylindrical ..... ACISOMA Rambur

— Always 12 or more antenodal nervure in fore wing, abdomen of variable shape, not conspicuously dilated abd. 1 to 6 .... ORTHETRUM Newman

6. Sectors of arc in fore wing arising from a common and rather long stalk, frons metallic above ..... CRATILLA Kirby

— Sectors of arc in fore wing separated at their orgin, frons non-metallic above, Hamules of male genitalia long and conspicuous, only abd. 8 and 9 with black dorsal markings ... . UROTHEMIS Brauer

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

— Lobe of prothorax small, usually naked..... 11

8. Cuii widely separated from posterior angle of discoidal cell in hindwing, eyes meeting at a point only, discoidal field beginning with a row of 3 cells and then continued as rows of 2 cells ..... RHODOTHEMIS Ris

— Cuii arising from posterior angle of discoidal cell in hindwing, eyes more or less broadly contiguous, discoidal field variable 9

9. Borders of discoidal field bounded by MA an Cuii converging strongly at wing border .... SYMPETRUM Newman

— Borders of discoidal field in fore-wing diverging widely at wing border 10

10. Eyes contiguous for a short space, discoidal cell in hind wing entire, costal border of forewing straight, frons non-metallic above, discoidal field in forewing begining with two row of cells ..... DIPLACODES Kirby

— Eyes more broadly contiguous, discoidal cell in fore wing traversed, costal border of fore wing sinuous near base, frons metallic above, discoidal field beginning with at least 3 rows of cells ..... PALPOPLEURA Rambur

11. Sectors of arc in fore wing separated and diverging at origin. Body dark metallic, frons metallic above; wings generally broadly coloured black or black and golden amber. ..... RHYOTHEMIS Hagen

— Sectors of arc in fore wing not separate and originate from a common long stalk 12

12. Discoidal field with borders convergings strongly at wing margin 13

— Discoidal field with borders parallel or widely divergent at wing margin 14

13. Very narrow discoidal cell in forewing, its costal side only about 1/4 to 1/3 length of basal; IRii present between Rii and Riii .... PANTALA Hagen

— Discoidal cell in fore wing broader; its costal side about 1/2 of basal; no supplementary nervure IRii present between Rii and Riii .. .. TRITHEMIS Brauer

14. Cubital nervure more than one in all wings amber-yellow at base or more broadly dark reddish-brown; secondary reticulation developed, specially proximal to node .... NEUROTHEMIS Brauer

— Cubital nervure only 1 in all wings; wings usually uncoloured, or with only small basal yellow marking (except broad medial fascia in *Brachythemis*) no secondary reticulation in the wings 15

15. Red or ochreous species with basal or medial yellow markings to wings 16

— Variable coloured, darker species, Arc between the first and second antenodal nervures, two rows of cells between IRiii & Rspl ..... POTAMARCHA Karsch

16. Antenodals in fore wings $6^1/_2$ to $7^1/_2$, eyes shortly contiguous, face, frons and also abdomen never red, wings with broad reddish-yellow medial fascia .... BRACHYTHEMIS Brauer

— Antenodals in forewings $9^1/_2$ to $10^1/_2$, eyes shortly contiguous, wings with basal yellow markings, face and frons red .... CROCOTHEMIS Brauer

Genus ***Zygonyx*** Selys-Hagen

1867. *Zygonyx* Selys-Hagen, *Verh. Zool.-bot. Ges. Wien.*, **17** : 62.

1936. *Zygonyx :* Fraser, *Fauna. Brit. India, Odon.*, **3** : 391.

Genus ***Zygonyx***

This genus has a single species represented in Manipur, hence no key is provided.

43. ***Zygonyx iris iris*** Selys

1869. *Zygonyx iris* Selys *Ann. Soc. ent. Belg.*, **12** : 97.

1926. *Zygonyx iris iris* Fraser, *J. Bombay nat. Hist. Soc.*, **31** : 763.

1936. *Zygonyx iris iris :* Fraser, *Fauna Brit. India, Odon.*, **3** : 394.

Distribution : India : Manipur, Meghalaya, Assam and West Bengal.

Remarks : This subspecies is included on the basis of the literature review. It is related to *Z. iris davina,* but is differentiated from same by absence of amber yellow at the base of hindwings and possesing dark brown colour at the extreme apices of wings.

Genus ***Tholymis*** Hagen

1867. *Tholymis* Hagen, *Stett. Ent. Zeit.* XXVIII : 221.

1936. *Tholymis :* Fraser, *Fauna Brit. India, Odon.*, **3** : 410.

This genus has a single species represented in Manipur, hence no key is provided.

44. ***Tholymis tillarga*** (Fabr.)

1798. *Libellula tillarga* Fabricius, *Ent. Syst. Suppl.*, 285.

1936. *Tholymis tillarga :* Fraser, *Fauna Brit. India, Odon,* **3** : 411.

Distribution : India : Manipur, Assam, Himachal Pradesh, Madhya Pradesh, Punjab, Uttar Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa and Chennai.

Elsewhere : Australia, Burma, Sri Lanka, Madagascar and Tropical Africa.

Remarks : This species is included on the basis of the literature review. It is found all round the year and is crepuscular in habit. It is characterised from all other species of Indian odonata by its brown fascia and opalescent white spot on hindwing.

Genus ***Acisoma*** Rambur

1842. *Acisoma* Rambur, *Hist. nat. Ins. Nevrop.*, 28.

1936. *Acisoma :* Fraser, *Fauna Brit. India. Odon.*, **3** : 329.

Genus ***Acisoma*** Rambur

This genus has a single species represented in Manipur, hence no key is provided.

45. ***Acisoma panorpoides panorpoides*** Rambur

1842. *Acisoma panorpoides* Rambur, *Hist. nat. Ins. Nevrop.*, : 28.

1911. *Acisoma panorpoides panorpoides* Rambur : *Ris. Cat. Coll. Selys.*, fasc., **12** : 456-458.

1936. *Acisoma panorpoides panorpoides :* Fraser, *Fauna Brit. India. Odon.*, **3** : 330.

Material : 1 ♀, Loktake project, Bishenpur, 24.v.93, S. K. Chakraborty and party coll.; 1 ♂, Loktake project, Bishenpur, 24.v.93, A. K. Pandit coll.

Diagnosis : Small sized dragonfly. Frons non-metallic above. Abd. 1-6 dialated, 7 to 10 slim and cylindrical. 6 Antenodal nervures in forewing.

Distribution : India : Manipur (Loktake Project, Bishenpur), Arunachal Pradesh, Assam, Bihar, Chandigarh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Chennai, Uttar Pradesh, Rajasthan, South India and West Bengal.

Elsewhere : Sri Lanka, Celebes, China, Japan, Java, Thailand, Malaysia, Indonesia, Taiwan, Philippines, Sumatra and Moluccan Islands.

Remarks : The species has very weak and short flight. It breeds in heavily weeded tanks and lakes. Swelling of abd. from 1-6 will serve to distinguish it from other libellulids.

Genus ***Orthetrum*** Newman

1833. *Orthetrum* Newman. *Ent. Mag.*, **1** : 511.

1936. *Orthetrum :* Fraser, *Fauna Brit. India. Odon.*, **3** : 219.

Key to the species of the genus *Orthetrum*

1. Males coloured some shade of violaceous red frons blue-black anteriorly .... *pruinosum neglectum* (Rambur)

— Males coloured brown or black with yellow markings; often pruinosed 2

2. Abdomen consipicuously swollen at base and then slim, compressed laterally; body black marked with yellow, not pruinosed .... *s. sabina* (Drury)

— Abdomen not conspicuously swollen at base, variable in shape, not compressed laterally; mostly with pruinosed abdomen and thorax 3

3. Base of hind wing with a large black triangular marking..... *triangulare triangulare* (Selys)

— Base of hind wing without black triangular marking.....4

4. Cuii in hind wing arising from the distal side of discoidal cell well away from its posterior angle ..... *chrysostigma luzonicum* (Braker)

— Cuii in hind wing arising from the posterior angle of discoidal cell 5

5. Face black or frons blackish anteriorly; membrane black.....*glaucum* (Brauer)

— Face dark brown; membrane white .... *brunneum brunneum* (Fonscolombe)

46. *Orthetrum pruinosum neglectum* (Rambur)

1842. *Libellula neglecta* Rambur, *Hist. nat. Ins. Nevrop.*, : 86.

1909. *Orthetrum pruinosum neglectum* (Rambur) : Ris. *Cat. Coll.* Selys., **9** : 239.

1936. *Orthetrum pruinosum neglectum* : Fraser, *Fauna Brit. India. Odon.*, **3** : 311.

Material : 1 ♂, Bungmaul, Churachandpur, Stn. No. 7, 19.ix.75, M. S. Shishodia and party coll.; 1 ♂, Loktake lake, Stn. No. 8, 20.ix.75, M. S. Shishodia and party coll.; 1 ♂, N. Churachandpur, Stn. No. 21, 21.ix.75, M. S. Shishodia and party coll.; 1 ♂, 3 kms. Moreh west, 25.ix.75, M. S. Shishodia and party coll.; 1 ♂, 3 kms. Moreh west, Stn. No. 14, Alt. 2000, 27.ix.75, M. S. Shishodia and party coll.

Diagnosis : Frons blue-black anteriorly. Prothorax and thorax reddish brown. Abdomen purplish-red to vermillion red dull to pruinescence. Anal appendage red.

Distribution : India : Manipur (Bungmaul, Loktake lake, Morehi west, churachandpur), Meghalaya and West Bengal.

Elsewhere : Nepal, Tibet, China, Sri Lanka, Myanmar, Malaysia, Indonesia and Taiwan.

Remarks : This species inhabits in small ponds and tanks and it is common Libellulid from plains upto an altitude of 2000 meteres. This species is easily distinguished from *O. chrysis* and *O. testaceum* by having its unique violet coloured abdomen.

47. *Orthetrum sabina sabina* (Drury)

1770. *Libellula sabina* Drury, 111 *Exot. Ins.*, **1** : 114.

1889. *Orthetrum sabina* (Drury) : Kirby, *Trans. zool. Soc. Lond.*, **12** : 302.

1936. *Orthetrum sabina* : Fraser, *Fauna Brit. India. Odon.*, **3** : 300.

1942. *Orthetrum sabina sabina* (Drury) : Lieftinck Treubia, **18** : 475.

Material : 1♀, Bungmaul, Churachandpur, Stn. No. 7, 19.ix.75, M.S. Shishodia and party coll., 1 ♂, N. Churachandpur, Stn. No. 9, 21.ix.75, M. S. Shishodia and party coll.

Diagnosis : Frons very deeply notched forming two triangular facets. Thorax and abdomen greenish yellow. Abdomen enormously swollen at base and then abruptly slimmed and compressed laterally to the end.

Distribution : India : Manipur (Bungmaul, Churachandpur), Meghalaya, Assam, Bihar, Himachal Pradesh, Punjab and Uttar Pradesh.

Elsewhere : Sri Lanka, Myanmar, Siam and Samoa.

Remarks : This is commonly occuring species of the genus *Orthetrum*. This species is easily distinguishable from all the Indian species of *Orthetrum* by its abdomen and marking of abdomen is greenish-yellow, not pruinosed instead of pruinosed.

48. *Orthetrum t. triangulare* Selys

1878. *Libellula triangularis* Selys, *Mitth. Mus. Dresden* : 314.

1909. *Orthetrum triangulare triangulare* (Selys) : Ris : *Cat. Coll.*, Selys, **9** : 244.

1936. *Orthetrum triangulare triangulare* : Fraser *Fauna Brit. India, Odon.*, 3 : 305.

Material : 3 ♂♂, Churachandpur, Stn. No. 7, 19.ix.75, M.S. Shishodia and party coll.; 1 ♂, Sielmat Rasew forest, Churachandpur, 17.v.93, M. Sil coll.

Diagnosis : Prothorax and thorax velvety black. Base of hind wing with a large black triangular marking. Abdomen broad at base and then tapered gradually to the anal end.

Distribution : India : Manipur (Sielmat Rasew forest, Churachandpur), Meghalaya, Arunachal Pradesh, Haryana, Assam, Himachal Pradesh, Karnataka, Kashmir, Kerala, Maharashtra, Mizoram, Sikkim, Chennai, West Himalaya and Uttar Pradesh.

Elsewhere : Nepal, Sri Lanka, Myanmar and Vietnam.

Remarks : This species is known to occur upto an altitude of 2500 meters. It is robust species and can be distinguished by its black colour and by the black triangular mark at the base of hind wings.

49. *Orthetrum chrysostigma luzonicum* (Brauer)

1868. *Libellula luzonica* Brauer *Verh. Zool.-bot. Ges Wien.*, **18** : 169, 732.

1909. *Orthetrum chrysostigma luzonicum* (Brauer) : *Ris. Cat. Coll. Selys*, **9** : 210.

1936. *Orthetrum chrysostigma luzonicum* : Fraser : *Fauna Brit. India. Odon.*, **3** : 298.

1987. *Orthetrum chrysostigma luzonicum :* Lahiri, *Rec. zool. Surv. India. Occ. Paper No.* **99** : 181.

Material : 1 ♀, Methui, Churachandpur, Stn. No. 8, 2.iv.92, D.K.M. and S.K.G. party coll.

Diagnosis : Face and frons greenish yellow, thorax olivaceous green on mid-dorsum, a broad dark reddish brown humeral stripe limited posteriorly by the humeral suture. Laterally three ill-defined brown stripes on a pale olivaceus green background. Cuii in hind wing arising from the distal side of discoidal cell well away from its posterior angle. Abdomen dorsoventrally dialated at base, then narrow and tapered.

Distribution : India : Manipur, Assam, Karnataka, Kerala and West Bengal.

Elsewhere : Nepal, Sri Lanka, Myanmar, Vietnam, Malaysia, Indonesia and Philippines.

Remarks : This species is generally a submontane/montane in habtant, associated with stanant water bodies full of aquatic vegetation or in marshy zones. Cuii in hind wing arising from the distal side of discoidal cell well away from its posterior angle.

50. *Orthetrum glaucum* (Brauer)

1865. *Libellula glauca* Brauer, *Verh. zool.-bot. Ges-Wien.*, **15** : 1012.

1890. *Orthetrum glaucum* (Brauer) : Kirby, *Syn. Cat. Neur. Odon.*, : 39.

1936. *Orthetrum glaucum* : Fraser, *Fauna Brit. India. Odon.*, **3** : 307.

1987. *Orthetrum glaucum :* Lahiri, *Rec. zool. Surv. India Occ. Paper* No. **99** : 179.

Material : 3 ♂♂, N. Churachandpur, Stn. No. 9, Alt. 3000, 21.ix.75, M.S. Shishodia and party coll.; 1 ♂, M.E. School, Mao, Stn. No. 5, Alt. 5700, 16.ix.75, M.S. Shishodia and party coll.; 1 ♀, Kharasom, Stn. No. 6, 14.vi.93, R.S. Barman and party coll.; 1 ♀, Sheseri, Stn. No. 3, 13.vi.93, R.S. Barman and party coll.

Diagnosis : Moderately large species (Abd. 28-35, hind wing 33-40 mm) face and frons olivaceous or blackish brown. Abd. ventrodorsally dialated at segment 1-3 and then very slim, pruinosed pale dirty blue from segment 1 to apical end of segment 8.

Distribution : India : Manipur (Kharasom, Sheseri, N. Churachandpur), Meghalaya, Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Mizoram, Sikkim, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, China, Sri Lanka, Myanmar, Thailand, Malaysia, Indonesia, New Guinea, and Philippines.

Remarks : It is common dragonfly found throughout India. This species is strictly montane, known to occur upto an altitude of 1500 meters. It is similar to *O. brunneum,* but differs from it in having membrane black instead of pure white and it differs from *O. t. triangulare* by its longer and much narrower abdomen, by the dull coloured

thorax and absence of black triangular mark at the base of hind wing.

51. *Orthetrum b. brunneum* (Fonscolombe)

1837. *Libellula brunnea* Fonscolombo, *Ann. Soc. Ent. France*, **6** : 141, pl. 6, fig. 3.

1909. *Orthetrum brunneum brunneum* : Ris, *Cat. Coll. Selys. fasc.*, **9** : 178, 188-191.

1936. *Orthetrum brunneum brunneum* : Fraser, *Fauna Brit. India. Odon.*, **3** : 294.

Material : 1 ♂, N. Churachandpur, Stn. No. 9, 21.ix.75, M.S. Shishodia and party coll.

Diagnosis : Prothorax, thorax and abdomen pruinosed blue. Membrane pure white. Abdomen laterally and dorsoventrally broad at base and tapered gradually to the anal end.

Distribution : India : Manipur (N. Churachandpur), Meghalaya, Jammu and Kashmir, Bihar, Uttar Pradesh and Western Himalaya,

Elsewhere : South Europe, North Africa and Asia.

Remarks : This species resembles very closely to *Orthetrum anceps*. This species can be distinguished from *O. anceps* being the double row of cells between IRiii and Rspl and the shape of the genitalia of the male.

Genus *Cratilla* Kirby

1900. *Cratilla* Kirby, *Ann. Mag. Nat. Hist.*, (7), **5** : 542.

1936. *Cratilla :* Fraser, *Fauna Brit. India, Odon*, **3** : 284.

Genus *Cratilla* Kirby

This genus has a single species represented in Manipur, hence no key is provided.

52. *Cratilla lineata* (Brauer)

1878. *Orthetrum lineata* Brauer, *Sitzungsber. Akad. Wien.*, (77) : 9.

1903. *Cratilla lineata :* Forster, *Ann. Mus. Hungar.*, : 537.

1936. *Gralilla lineata* : Fraser, *Fauna Brit. India. Odon.*, **3** : 286.

Material : 1 ♀, N. Churachandpur, Stn. No. 2, 21.ix.75, M.S. Shishodia and party coll.; 1 ♀, Jaysng, Stn. No. 4, 13.vi.93, R.S. Barman and party coll.

Diagnosis : Sides of frons creamy yellow and upper surface of frons dark metallic blue. Thorax stealy black marked with yellow. Wings hyaline. Two rows of cells between IRiii and Rspl.

Distribution : India : Manipur (N. Churachandpur), Orissa, Uttar Pradesh, Kerala, Maharashtra and Western Ghats.

Elsewhere : Myanmar, Sri Lanka, Malaysia, Sundaic, Archipelago to Borneo, New Guinea and Philippines.

Remarks : It breeds in marshes in deep jungle. It can be distinguished with other known Indian species *C. metallica* by its thorax being steely or bronzed black instead of metallic green or blue and wings not tipped with blackish brown.

Genus *Urothemis* Brauer

1868. *Urothemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, **18** : 175, 366, 737.

1936. *Urothemis* Fraser, *Fauna Brit. India. Odon.*, **3** : 441.

Genus *Urothemis* Brauer

No key is provided, as the genus has sole representative *viz., U. signata signata* (Rambur) in Manipur.

53. *Urothemis signata signata* (Rambur)

1839. *Libellula sanguinea* Burmeister, *Handb. Ent.*, **(2)** : 858.

1913. *Urothemis signata signata :* Ris, *Cat. Coll. Selys, fasc.*, **(16)** : 1023.

1936. *Urothemis signata signata* Fraser, *Fauna Brit. India, Odon.*, **3** : 442.

1987. *Urothemis signata signata* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 228.

Material : 1♀, Chekla Bhai forest, Churachandpur, Stn. No. 2, 12.vi.93, R.S. Barman and party coll.; 1♀, Phulbala, Bishenpur, 23.v.93, M. Sil coll., 1♀, Luonz, S. of Imphal, 14.v.93, M. Sil coll.

Diagnosis : Frons blood red. Occiput and prothorax reddish brown. Thorax on dorsum and abdomen blood red. Legs reddish brown. Wings hyaline, extreme base of fore wing golden amber, a broader amber coloured spot at the base of hind wing.

Distribution : India : Manipur (Cheklabhai forest, Churachandpur, Phulbala, Bishenpur, Luong), Meghalaya, Assam, Bihar, Karnataka, Maharashtra, Kerala, Orissa, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Tibet, China, Bangladesh, Sri Lanka, Myanmar and Vietnam.

Remarks : It appears to be common along the course of Brahmaputra. The open character of the venation, low nodal index and character of the basal marking in hind wing will serve to distinguish this species from others.

Genus ***Rhodothemis*** Ris

1909, 1911. *Rhodothemis* Ris, *Cat. Coll. Selys, fascs.*, **ix** and **xiii** : 29, 591, 592.

1936. *Rhodothemis* : Fraser, *Fauna Brit. India, Odon.*, **3** : 366.

Genus ***Rhodothemis*** Ris

This genus has a single species represented in Manipur, hence no key is provided.

54. ***Rhodothemis rufa*** Rambur

1842. *Libellula rufa* Rambur, *Ins. Nevrop.* : 71.

1911. *Rhodothemis rufa* Ris, *Cat. Coll. selys, fasc.*, **xiii** : 592, 593.

1936. *Rhodothemis rufa* : Fraser, *Fauna Brit. India. Odon.*, **3** : 368.

Distribution : India : Manipur.

Elsewhere : Myanmar, Malaysia, Celebes, Borneo, Java and Australia.

Remarks : This species is included on the basis of the literature review. It is usually found around weedy tanks or settled on herbage. The male closely resembles large specimens of *Orthetrum chrysis, Crocothemis servilia* and *Urothemis signata* but distinguished from these species by having very short contiguity of the eyes, the discoidal field beginning with a row of 3 cells and then continued on as rows of 2 cells and the very characteristic armature of the legs.

Genus ***Sympetrum*** Newman

1833. *Sympetrum* Newman, *Ent. Mag.*, **1** : 511.

1936. *Sympetrum* : Fraser, *Fauna Brit. India, Odon.*, **3** : 370.

Genus ***Sympetrum*** Newman

This genus has a single species represented in Manipur, hence no key is provided.

55. ***Sympetrum hypomelas*** Selys

1884. *Diplax hypomelas* Selys, *Ann. Soc. Ent. Belg.*, **(28)** : 37.

1890. *Sympetrum hypomelas* : Kirby, *Cat. Odon.*, 16.

1936. *Sympetrum hypomelas* : Fraser, *Fauna Brit. India, Odon.*, **3** : 373.

1987. *Sympetrum hypomelas* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 210.

1982. *Sympetrum hypomelus* : Raja Ram *et al.*, *Rec. zool. Surv. India*, **80** : 184.

Material : 1 ♂, 10 ♀ ♀, M.E. School, Stn. No.5, 16.ix.75, M.S. Shishodia and party coll.; 1 ♂, 4 ♀ ♀, Songgong area, Stn. No. 2, 5726 mm., 16.ix.75, M. S. Shishodia and party coll.; 1 ♂, 1 ♀, Hunchung Ukhul, Stn. No. 18, 20.ix.75, M. S. Shishodia and party coll.; 1 ♀, Anenngtang, Ukhul, Stn. No. 17, i.x.75, M. S. Shishodia and party coll.; 1 ♂, 1♀, C.R.P. Camp, New Churachandpur, Stn. No. 6, Alt. 3000, 18.ix.75, M.S. Shishodia and party coll.

Diagnosis : Labrum, face, frons and vesicle suffused with bright red. Thorax golden brown on dorsum. Black markings on thorax broad. Anterior femora yellow on inner side. Abdomen bright reddish ochreous above, black beneath.

Distribution : India : Manipur (Songgong area, Hunchung, Anennglang, Ukhul, New Churachandpur), Meghalaya, Assam, Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttar Pradesh, Western Ghats and West Bengal.

Elsewhere : Nepal, Tibet, China and Myanmar.

Remarks : This species is distinguishable from *S. orientale* (Selys) by broad black marking on thorax and femora of fore leg yellow on inner side instead of black.

Genus ***Diplacodes*** Kriby

1889. *Diplacodes* Kirby, *Trans. zool. Soc. London*, **XIIL** : 263, 307.

1936. *Diplacodes* : Fraser, *Fauna Brit. India, Odon.* **3** : 331.

Genus ***Diplacodes*** Kirby

This genus has a single species represented in Manipur, hence no key is provided.

56. ***Diplacodes trivialis*** Rambur

1842. *Libellula trivialis* Rambur, *Ins. Nevrop.*, : 115.

1891. *Diplacodes trivialis* : Karsch. Ent. Nachr., **(17)** : 246.

1936. *Diplacodes trivialis* : Fraser, *Fauna Brit. India, Odon.*, **3** : 336.

1987. *Diplacodes trivialis* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 202.

Material : 2 ♀ ♀, I.B., near Challa, 20.ix.75, M.S. Shishodia and party coll.; 2 ♂ ♂, 3 ♀ ♀, Bungmual, Near Churachandpur, Stn. No. 7, 19.ix.75, M. S. Shishodia and party coll.; 2 ♀ ♀, C.R.P. Camp, near Churachandpur, Stn. No. 6, 18.ix.75, M.S. Shishodia and party coll.; 2 ♀ ♀, 3 kms. Moreh west, 25.ix.75, M.S. Shishodia and party coll.; 1 ♂, F.R. Compound, Imphal, St.No. 21, 6.x.75, M.S. Shishodia and party coll.; 1 ♀, Song Song area, Mao, Stn. No. 2, Alt. 5762, 13.ix.75, M.S. Shishodia and party coll.; 1 ♀, Reserve forest, F.C. No. 15, 12.xii.92, P.H. Ray and party coll.; 1 ♂, Christian village, Churanchandpur, Stn. No. 4, 23.iii.93, D.K.M. coll.

Diagnosis : Face, frons, vesicle palest azure blue. Prothorax pale brown to black. Thorax greenish yellow but in adult the whole thorax uniform pruinosed blue. Wings uncoloured except at base. Anal appendages yellow.

Distribution : India : Manipur (Bungmual, Moreh west, Imphal, Songsong area, Mao, Christran village, Churachandpur), Meghalaya, Andaman Islands, Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Chennai and Uttar Pradesh.

Elsewhere : China, Sri Lanka, Myanmar, Thailand, Vietnam, Malaysia, Indonesia, New guinea, Japan, Ryukyu, Philippines, Australia, Pacific Islands, Iraq and Seychellis.

Remarks : This species is with maximum occurrance round the year and of very wide distribution in plains as well as upto an altitude of 2800 meters. The clear wings, without apical or basal markings, and the creamy white anal appendages and deep pruinescence in adult age separate it from other species of the genus.

Genus ***Palpopleura*** Rambur

1842. *Palpopleura* Rambur : *Ins. Nevrop.*, **26** : 129.

1936. *Palpopleura* Rambur : Fraser, *Fauna Brit. India, Odon*, **3** : 316.

Genus ***Palpopleura*** Rambur

This genus has a single species represented in Manipur, hence no key is provided.

57. ***Palpopleura s. sexmaculata*** (Fabricius)

1887. *Libellula sexmaculata* Fabricius, *Mant. Ins.*, **(1)** : 338.

1868. *Palpopleura sexmaculata :* Brauer, *Verh. zool.-bot. Ges, Wien.*, **(18)** : 716.

1936. *Palpopleura sexmaculata sexmaculata* : Fraser, *Fauna Brit. India, Odon.*, **3** : 318.

Material : 2 ♀ ♀, N. Churachandpur, Stn. No. 21, 21.ix.75, M. S. Shishodia and party coll.; 4 ♂ ♂, 6 ♀ ♀, Bungmual, New Churachandpur, Stn. No. 7, Alt. 3000, 19.ix.75, M. S. Shishodia and party coll.; 1 ♂, C.R.P. Camp, Churachandpur, Stn. No. 6, 18.ix.75, M.S. Shishodia and party coll.; 1 ♂, 3 kms. North west, Stn. No. 14, Alt. 2000, 27.ix.75, M. S. Shishodia and party coll.; 2 ♂ ♂, Churachandpur, Stn. No. 6, 24.iii.93, D.K.M. and S.K.G. party coll.; 1 ♀, Chekla Bhai forest, Churachandpur, Stn. No. 2, 12.vi.93, R.S. Barman and party coll.; 2 ♀ ♀, Sielmat, Churachandpur, Stn. No. 6, 24.iii.93, D.K.M. coll.; 1 ♂, Sielmat, Churachandpur, 15.v.93, S.K. Chakraborty coll.; 1 ♀, Harinagar, Jiriban, 10.v.93, M. Sil coll.

Diagnosis : Small species (abd. 14-17 mm) Labrum, face creamy-yellow. Frons and vesicle brilliant metallic blue. Thorax greenish yellow. A black spot at node in forewing $^1/_2$ to $1^1/_2$ cells proximal to node. 3 black streaks in the basal half of the wing.

These are located in the subcostal between sector of arc and in cubital space.

Distribution : India : Manipur (Bungmual,

Chekla Bhai forest, Harinagar, Jiriban, Sielmat, Churachandpur), Meghalaya, Assam, Bihar, Andhra Pradesh, Himachal Pradesh, Kerala, Maharashtra, Mizoram, Punjab, Sikkim, Chennai, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Tibet, China, Sri Lanka, Myanmar Vietnam and Malaysia.

Remarks : This species characteristically differentiated from other being possesses black spot at node in fore wing covering $^1/_2$ to $1^1/_2$ cells proximal to node, a black streak in subcostal space from base to 2/3 its length to node, streak between sectors of arc and a streak in cubital space upto discoidal cell.

Genus ***Rhyothemis*** Hagen

1867. *Rhyothemis* Hagen, *Stett. Ent.*, **xxviii** : 232.

1936. *Rhyothemis :* Fraser, *Fauna Brit. India, Odon.*, **3** : 419.

Genus ***Rhyothemis*** Hagen

This genus has a single species represented in Manipur, hence no key is provided.

58. ***Rhyothemis variegata variegata*** (Linnaeus)

1763. *Libellula variegata* Linnaeus, Amoenitates *Acad.*, **(6)** : 412.

1913. *Rhyothemis variegata variegata* : Ris. *Cat. Call. Selys.*, **(15)** : 935.

1936. *Rhyothemis variegata variegata* : Fraser, *Fauna Brit. India, Odon.*, **3** : 423.

1982. *Rhyothemis variegata variegata* : Raja Ram *et al.*, *Rec. zool. Surv. India*, **80** : 187.

1987. *Rhyothemis variegata variegata* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 220.

Material : 1 ♂, 1 ♀ ♀, Loktake project, Bishenpur, 24.v.93, M. Sil coll.; 1 ♂, 1 ♀, Phubala, Bishenpur, 23.v.93, S.K. Chakraborty coll.; 2 ♀ ♀, Thenga, Bishenpur, 23.v.93, S.K. Chakraborty coll.; 1 ♂, Moigeng, Bishenpur dist., 22.v.93, B. Mitra coll.; 1 ♀, Lamsana, Imphal, 25.v.93, S.K. Chakraborty coll.; 1 ♀, Luonz, S. of Imphal, 14.v.93, B. Mitra coll.; Sendra, Bishenpur dist., 21.v.93, S. K. Chakraborty coll.

Diagnosis : Body dark metallic. Frons metallic above. Prothorax black, thorax dark metallic green. Abdomen black. Whole of wings tinted yellow. Fore wing with spots at node, discoidal cell, apex and at middle of Riii. Hind wing with similar dark spots and two broad longitudinal basal bands.

Distribution : India : Manipur (Loktake project, Phubala, Thenga, moigeng, Lamsana, Imphal, Luonz, Sendra, Bishenpur dist.), Meghalaya, Assam, Himachal Pradesh, Kerala, Maharashtra, Orissa, Chennai and West Bengal.

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

Remarks : This species is locally very common and found usually in swarms. This species can be differentiated from others by variegated pattern of colour on the wings and can be differentiated from *R. phyllis phyllis* (Sulzer) from Myanmar by having apices hyaline. Only in female instead of apices opaque in male and black in female.

Genus ***Pantala*** Hagen

1861. *Pantala* Hagen, *Syn. Neur. Amer.*, : 141.

1936. *Pantala* Fraser, *Fauna Brit. India, Odon.*, 3 : 413.

Genus ***Pantala*** Hagen

No key to the species of the genus *Pantala* is provided, as it has sole species *viz, P. flavescens* (Fabr.) not only in Manipur but whole of India.

59. ***Pantala flavescens*** (Fabricius)

1798. *Libellula flavescens* Fabricius, *Ent. Syst. Suppl.*, : 285.

1861. *Pantala flavescens* : Hagen, *Syn. Neur. N. Amer*, : 142.

1936. *Pantala flavescens* : Fraser, *Fauna Brit. India, Odon.*, **3** : 415.

Material : 1 ♂, Bugmaul, Churachandpur, Stn. No. 7, 19.ix.75, M.S. Shishodia and party coll.; 1 ♀, Ranguam, 1 km. W. of IB. Gardhill, 27.ix.75, M.S. Shishodia and party coll.; 1 ♂, Damadulis, Chima Bangni, Stn. No. 6, 12.ix75, M.S. Shishodia and party coll.; 1 ♂, M.E. School, Mao, Stn. No. 5, Alt. 5700, 16.ix.75, M.S. Shishodia and party coll.; 2 ♀ ♀, Harinagar, Jirban, 10.v.93, S.K. Chakraborty coll.

Diagnosis : Large species (abd. 30-35 mm.), Transverse belt of dark reddish brown between anterior and posterior lobe of prothorax, wing hyaline, base of hindwing pale golden yellow upto anal loop. IRiii and Riii wavy in their length. Membrane white.

Distribution : India : Manipur (Bugmaul, Churachandpur, Ranguam, Gardhill, Damaduli), Punjab, Harinagar, Jirban), Himachal Pradesh, Uttar Pradesh, Punjab, Rajasthan and West Bengal.

Elsewhere : Tibet, Myanmar, Sri Lanka and Malaysia.

Remarks : This species is most commonly occurring libellulid among plain and submontane habitats. This species can be distinguished from nearest genus to *Trithemis* by presence of broad anal area of the hind wing and a conspicuous supplementary nervure Irii situated between Rii and Riii.

Genus ***Trithemis*** Brauer

1868. *Trithemis* Brauer, *Verh. zool.-bot. Ges. Wien.*,xviii : 176.

1936. *Trithemis :* Fraser, *Fauna Brit. India., Odon.*, **3** : 381.

Key to the species of the genus *Trithemis*

1. Thorax and abdomen bright vermilion red; base of hind wing bright orange .... *kirbyi kirbyi* Selys

— Thorax and abdomen may be violaceous black or violaceous crimson; base of hindwing with small brown or reddish-brown spots 2

2. Thorax and abdomen violaceous-black; hind wing with small brown spot ....*festiva* (Rambur)

— Thorax and abdomen violaceous-crimson; base of hindwing with reddish-brown spot .... *aurora* (Burm.)

60. ***Trithemis kirbyi kirbyi*** Selys

1886. *Trithemis aurora* Kirby (pars.) *Proc. zool. Soc. London* : 327.

1912. *Trithemis kirbyi kirbyi* : Ris. *Cat. Coll. Selys,* **(14)** : 760.

1936. *Trithemis kirbyi kirbyi* : Fraser, *Fauna Brit. India, Odon.*, **(3)** : 385.

Material : 1 ♂, Singhut, 30 kms. S. of Churachandpur, 18.xii.92, S.K. Singh and party coll.

Diagnosis : Frons pale yellow usually with a bright rosyred bluish. Thorax and abdomen bright vermilion-red. Wings hyaline, a broad basal reddish yellow marking to all wings. Neuration yellow.

Distribution : India : Manipur (Singhut, Churachandpur), Himachal Pradesh, Maharashtra, Karnataka, South India, Uttar Pradesh and West Bengal.

Remarks : This species is distinguishable from other Indian species of the genus in having brright vermillion red thorax and abdomen and also having neuration yellow instead of black or crimson.

61. ***Trithemis festiva*** (Rambur)

1842. *Libellula festiva* Rambur, *Ins. Nevrop.*, : 92.

1868. *Trithemis festiva* : Brauer, *Verh. zool. bot-Ges. Wien.*, **(18)** : 736.

1936. *Trithemis festiva* : Fraser, *Fauna Brit. India, Odon.*, **(3)** : 387.

1987. *Trithemis festiva* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 213.

Material : 2 ♂ ♂, Burmobc rder East, 2000 Alt., 21.ix.75, M. S. Shishodia and party coll.; 1 ♀, 3 km. Moreh west, Stn. No. 12, 25.ix.75, M.S. Shishodia and party coll.; 1 ♂, Song song area, Mao, Stn. No. 2, Alt. 5762, 13.ix.75, M.S. Shishodia and party coll.

Diagnosis : Thorax and abdomen violaceous black. Thorax coted with a thin purplish pruinescence. Wings hyaline, base of hind wing with a small dark brown spot. Neuration black.

Distribution : India : Manipur (Burmaborder East, Moreh west, Song song area, Mao), Meghalaya, Assam, Arunachal Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Mizoram, Punjab, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Pakistan, Sri Lanka, Myanmar, Malaysia, Indonesia, Taiwan, Loovhoo Islands, Philippines, New Guinea, Turky amd Africa.

Remarks : This species is distinguisable from *T. aurora* in having black neuration instead of crimson.

62. *Trithemus aurora* (Burmeister)

1839. *Libellula aurora* Burmeister, *Handb. Ent.*, (2) : 859.

1868. *Trithemis aurora* : Brauer, *Verh. zool. bot.-Ges. Wien.*, **(18)** : 177.

1936. *Trithemis aurora* : Fraser, *Fauna Brit. India, Odon.*, **3** : 383.

1982. *Trithemis aurora* : Raja Ram *et al. Rec. zool. Surv. India*, **80** : 187.

1987. *Trithemis aurora* : Lahiri, *Rec. zool. Surv. India., Occ. Paper* No. **99** : 212.

Material : 1 ♂, M. E. Schoolmas, Stn. No. 5, 16.ix.75, M. S. Shishodia and party coll.

Diagnosis : Face and front of frons ochreous changing to reddish above. Upper surface of frons metallic violaceous. Prothorax reddish brown, thorax dull purple. Wings hyaline and a broad amber yellow fascia at base of wings. Crimison neuratin. Abdomen swollen dorso-ventrally at base.

Distribution : India : Manipur (M.E. Schoomas); Meghalaya and West Bengal.

Elsewhere : Nepal, Tibet, Pakistan, Sri Lanka, Myanmar, Vietnam, Malaysia, Indonesia, Taiwan and Philippines.

Remarks : The species is known to inhabit upon an altitude of Ca 1500 meters. General violaceous colouration will serve to distinguish it from the rest of the Indian species of the genus.

Genus *Neurothemis* Brauer

1842. *Polyneura* Rambur, *Ins. Nevrop.*, 26.

1867. *Neurothemis* Brauer, *Verh. zool. bot.-Ges. Wien.*, **xvii** : 6, 289.

1936. *Neurothemis* : Fraser, *Fauna Brit. India, Odon.*, **3** : 350.

Key to the species of the genus *Neurothemis*

1. Bases of wings of male broadly black or dark reddish brown 2

— Bases of wings pale or golden yellow at base ..... *intermedia intermedia* (Rambur)

2. Black basal area of wings edged outwardly with an opalescent white band..... ..... *tullia tullia* (Drury)

— Basal half upto middle of pterostigma dark reddish brown, no opalescent band, a clear window at apex of all wings formed by basal brown and narrow opaque brown..... .....*fulvia* (Drury)

63. *Neurothemis intermedia intermedia* (Rambur)

1842. *Libellula intermedia* rambur, *Ins. Nevrop.*, : 91.

1911. *Neurothemis intermedia intermedia* : Ris, *Cat. Coll. Selys, fasc.* **(13)** : 551.

1936. *Neurothemis intermedia intermedia* : Fraser, *Fauna Brit. India, Odon.*, **3** : 357.

Material : 1 ♀, M.S. School mas, Stn. No. 5, 16.ix.75, M.S. Shishodia and party coll.; 1 ♂, 3 kms. Moreh, Stn. No. 12, 25.ix.75, M.S. Shishodia and party coll.

Diagnosis : Labium, labrum, face and frons pale yellow. Prothorax reddish brown, thorax pale greenish-yellow. A pale brown humeral stripe on thorax. Wings hyaline, pale tinted yellow and a broad basal amber yellow marking at base of all wings.

Distribution : India : Manipur (M.S. School mas, Moreh), Meghalaya, Assam, Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Punjab, Sikkim, Chennai, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, Sri Lanka amd Myanmar.

Remarks : The very restricted basal marking of wings will serve to determine this species from all others save *N. intermedia atalanta*, in which this marking is much more sharply defined and in which the costal area is not tinted with yellow.

64. *Neurothemis tullia tullia* (Drury)

1773. *Libellula tullia* Drury, Ill. *Exot. Ins.*, **(2)** : 85.

1911. *Neurothemis tullia tullia* : Ris. *Cat. Coll. Selys* **(13)** : 551.

1936. *Neurothemis tullia tullia* : Fraser, *Fauna Brit. India, Odon.*, **3** : 360.

1982. *Neurothemis tullia tullia* : Raja Ram *et al., Rec. zool. Surv. India,* **80** : 186.

1987. *Neurothemis tullia tullia* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. **99** : 207.

Material : 1 ♂, Loktake, Stn. No. 18, Alt. 800 m, 8.iv.92, D.K.M. and S.K.G. party coll.

Diagnosis : Major parts of head blackish brown to black. Prothorax, thorax, abdomen black. Legs black. Abd. 1-8 with a broad mid dorsal interrupted creamy white stripe. Black basal area of wings edged outwardly with an opalescent white band.

Distribution : India : Manipur (Loktake), Meghalaya, Assam, Bihar, Himachal Pradesh, Uttar Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Chennai, Tripura, Sikkim and West Bengal.

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

Remarks : This species inhabits swamps or heavily weeded tanks, puddles. This species is easily distinguishable from other Indian species of the genus by having a white opalescent band bordering basal black in the wings of male and in female by broad black apices of wings.

65. *Neurothemis fulvia* (Drury)

1773. *Libellula fulvia* Drury, 111, *Exot. Ins.*, (2) **XLVI** : 84.

1889. *Neurothemis fulvia* : Kirby, *Trans. zool. Soc. Lond.*, **(12)** : 271.

1936. *Neurothemis fulvia* : Fraser, *Fauna Brit. India, Odon.*, **3** : 353.

1987. *Neurothemis fulvia* : Lahiri, *Rec. zool. Surv. India, Occ. Paper* No. 99 : 205.

Material : 1 ♀, Myanmar border East, 2000 Alt., 21.ix.75, M. S. Shishodia and party coll.; 1 ♂, Sielmata Churachandpur, Stn. No. 12, Alt. 900 m, 3.iii.92, D.K.M. and S.K.G. party coll.

Diagnosis : Labium creamy yellow. Face, frons, vesicle, occiput reddish brown. Prothorax, thorax and abdomen reddish brown. Wings dark reddish-brown from base to about middle of pterostigma. Apex of wings narrowly opaque brown to partly enclose a clear window in each wing at apex.

Distribution : India : Manipur (Myanmar border East, Sielmat, Churachandpur), Meghalaya, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Nepal, China, Bangladesh, Myanmar, Thailand, Vietnam, Malaysia and Indonesia.

Remarks : The species inhabits weedy ponds or marshes and known to occur in plains and upto an alttitude of 1000 meters. It can be easily distinguishable by its clear hyaline window enclosed in dark reddish brown wings of male and the female equally well by the uniform golden amber tint of the ground colour of wings with or without clear apex in fore wing.

Genus ***Potamarcha*** Karsch

1890. *Potamarcha* Karsch, *Berlin Ent. Zeit.*, **XXXIII** : 370.

1936. *Potamarcha* : Fraser, *Fauna Brit. India, Odon.*, **3** : 288.

This genus has a single species represented in Manipur, hence no key is provided.

66. *Potamarcha congener* (Rambur)

1842. *Libellula obscura* Rambur, *Ins. Nevrop.*, : 64.

1842. *Libellula congener,* Rambur, *Ins. Nevrop.*, : 70.

1890. *Potamarcha obscura,* Karsch, *Berlin Ent. Zeit.*, **33** : 371.

1891. *Potamarcha congener,* Selys, *Ann. Soc. Espan,* **20** : 221.

1936. *Potamarcha obscura,* Fraser, *Fauna Brit. India,* **3** : 289-291.

Material : 1 ♂, Sheseri, Stn. No. 3, 8380. 4 A.M., 13.vi.93, R. S. Barman and party coll.

Diagnosis : Labium yellow. Prothorax dark brown, thorax black. Wing apices tipped with brown. 2 rows of cells between IRiii and Rspl. Anal appendages black. Arc situated between first and second antenodal nervures. No secondary reticulation. Only one cubital nervure in all wings.

Distribution : India : Manipur (Sheseri), Meghalaya, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Nagaland, Orissa, Chennai, Tripura, Uttar Pradesh, Souh Andaman Islands and West Bengal.

Elsewhere : Sri Lanka, Nepal, Myanmar, Bangladesh, Thailand, Malaysia, Indonesia, New Guinea, Taiwan, Philippines and Australia.

Remarks : It inhabits small weedy, stagnent waterbody. Anal appendage is similar to *Cratilla lineata* (Brauer). This species is distinguishable from other species of the genus by absence of supplementary nervures to bridge and incomplete antenodal nervure in the fore wings.

Genus ***Brachythemis*** Brauer

1868. *Brachythemis* Brauer, *Verh. zool. bot.-Ges. Wien.*, **XXIII** : 367, 736.

1936. *Brachythemis* : Fraser, *Fauna Brit. India, Odon.*, **3** : 363.

No key is provided as the genus has a sole representative *viz. Brachythemis contaminata* (Fabr.) in Manipur.

67. ***Brachythemis contaminata*** (Fabricius)

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

1868. *Brachythemis contaminata* Brauer, *Verh. Zool. bot.-Ges. wien.*, **18** : 736.

1936. *Brachythemis contaminata* : Fraser, *Fauna Brit. India, Odon.*, **3** : 365.

1982. *Brachythemis contaminata* : Raja Ram *et al., Rec. zool. Surv. India*, **80** : 184.

Material : 1 ♀, Sendra Hill, Moirang, Stn. No. 6, 31.iii.92, D.K.M. and S.K.G. coll.

Diagnosis : Small sized libellulid. Body colour generally ochreous. Prothorax with dark reddish brown transverse stripes. Thorax olivaceous brown, dorsally marked with an obscure reddish brown stripe and two obscure brownish stripes on each side. Wings with bright orange fascia from base to within 2/3 cells to pterostigma. Fascia absent in female.

Distribution : India : Manipur (Sendra Hill, Moirang), Meghalaya, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Rajasthan, Uttar Pradesh, Punjab and West Bengal.

Elsewhere : Nepal, China, Bangladesh, Sri Lanka, Myanmar, Thailand, Malaysia, Indonesia, Japan, Taiwan and Philippines.

Remarks : This is one of the very commonly occuring libellulid inhabiting borders of weedy ponds, lakes, puddles and slowly moving streams. This species is distinguishable from allied genus *Crocothemis* in having broad reddish yellow medial fescia instead of small yellow dorsal markings and lessor number of antenodal nervures.

Genus ***Crocothemis*** Brauer

1868. *Crocothemis* Brauer, *Verh. zool. bot.-Ges. Wien.*, **XVIII** : 367, 736.

1936. *Crocothemis* : Fraser, *Fauna Brit. India, Odon.*, **3** : 343.

This genus has a single species represented in Manipur, hence no key is provided.

68. ***Crocothemis servilia servilia*** (Drury)

1770. *Libellula servilia* Drury, Ill. *Ex. Ins.*, **(1)** : 112.

1911. *Crocothemis servilia servilia* : Ris., *Cat. Call. Selys*, **(13)** : 533.

1936. *Crocothemis servilia servilia* : Fraser, *Fauna Brit. India, Odon.*, **3** : 345.

Material : 1 ♂, 1 ♀ Songsong area, Stn. No. 11, 16.x.75, M.S. Shishodia and party coll.; 2 ♀ ♀, N. Churachandpur, Stn.No. 21, 21.ix.75, M.S. Shishodia and party coll., 6 ♂ ♂, 5 ♀ ♀, Loktake lake, Stn. No. 8, 20.ix.75, M.S. Shishodia and party coll.; 1 ♂, 2 ♀ ♀, on E. Schoolmas, Mao, Stn. No. 5, Alt. 5700, 16.ix.75, M.S. Shishodia and party coll.; 3 ♂ ♂, 1 ♀, Loktake Lake, Stn. No. 8, 16.ix.75, M.S. Shishodia and party coll.; 4 ♂ ♂, Bungmual, Churachandpur, Stn. No. 7, 19.ix.75, M.S. Shishodia and party coll.; 1 ♂, 2 ♀ ♀, Hunchung, Ukhrul, Stn. No. 18, M.S. Shishodia and party coll.; 1 ♂, N. Churachandpur, Stn. No. 9, 21.ix.75, M.S. Shishodia and party coll.; 1 ♂, 3 ♀ ♀, N. Churachandpur, Stn. No. 7, 19.ix.75, M.S. shishodia and party coll.; 1 ♀, Bungma, 19.ix.75, M.S. Shishodia and party coll.; 3 ♀ ♀, Anengtang, Ukhrul, Stn. No. 17, M.S. Shishodia and party coll.; 1 ♀, Song song area, Mao, Stn. No. 2, Alt. 5762, 13.ix.75, M.S. Shishodia and

party coll.; 1♀, C.R.P. Camp, New Churachandpur, Stn. No. 6, Alt. 3000, 18.ix.75, M.S. Shishodia and party coll.

Diagnosis : Labrum, face, frons, vesicle, occiput, most parts of head are blood red. Thorax bright ferruginous. Bases of all wings marked with rich amber-yellow. Abdomen and anal appendages are blood red. Female on whole are yellow, ochreous to olivaceous brown.

Distribution : India : Manipur (Songsong area, N. Churachandpur, Loktake lake, Mao, M.E. Schoolmas, Bungmual, Hunchung, Ukhrul, Bungma, Anengtang), Meghalaya, Bihar, Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh.

Elsewhere : Nepal, China, Bangladesh, Sri Lanka, Myanmar, Thailand, Malaysia, Indonesia, Japan, Taiwan, Philippines and Iran.

Remarks : The species is one of the common Libellulid. This species can be distinguished from only other subspecies of the genus *C. servilia erythraea* (Brulle) in having black mid dorsal carina on abd. 8 and 9 instead of red. without black markings.

CLASSIFIED LIST OF ODONATES FROM MANIPUR

A Comprehensive list of Odonates known from Manipur is provided. This includes all species, so far known, including those which are studied on the basis of material present in the National Zoological Collections of Zoological Survey of India, recent material collected by Z.S.I. Survey parties from Manipur. [These are marked with symbol (*) ; species without such mark are based on literature review].

Order ODONATA

Suborder A. ZYGOPTERA

Superfamily COENAGRIONOIDEA

Family 1. COENAGRIONIDAE

Genus (1) ***Ceriagrion*** Selys

*1. *C. coromandelianum* (Fabricius)

2. *C. olivaceum* Laidlaw

3. *C. fallax cerinomelas* Lieftinck

Genus (2) ***Pseudagrion*** Selys

*4. *Pseudagrion microcephallum* (Rambur)

*5. *P. australasiae* Selys

Genus (3) ***Aciagrion*** Selys

6. *Aciagrion pallidum* Selys

7. *A. tillyardi* Laidlaw

Genus (4) ***Cercion*** Navas

8. *C. malayanum* (Selys)

Genus (5) ***Ischnura*** Charpentier

*9. *I. a. aurora* (Brauer)

*10. *I. elegans* (Vander Linden)

11. *I. r. rufostigma* Selys

12. *I. senegalensis* (Rambur)

13. *I. annandalei* Laid

14. *I. mildredae* Fras.

Genus (6) ***Aciagrion*** Selys

*15. *R. nursei* (Morton)

Genus (7) ***Enallagma*** Charpentier

*16. *E. cyathigerum* Charpentier

*17. *E. parvum* Selys

Genus (8) ***Agriocnemis*** Selys

*18. *A. pygmaea* (Rambur)

19. *A. femina* (Brauer)

Genus (9) ***Argiocnemis*** Selys

*20. *A. rubescens* Selys

Genus (10) ***Onychargia*** Selys

*21. *O. atrocyana* Selys

Family 2. PLATYCNEMIDIDAE

Genus (11) ***Calicnemia*** Strand.

22. *C. miles* Laidlaw

Genus (12) ***Coeliccia*** Kirby

23. *C. didyma* (Selys)

24. *C. rotundata* Asahina

25. *C. schmidti* Asahina

Genus (13) ***Copera*** Kirby

26. *C. ciliata* Selys

27. *Copera vittata assamensis* Laidlaw

Superfamily II. LESTOIDEA

Family 3. LESTIDAE

Genus (14) ***Lestes*** Leach

28. *L. garoensis* Lahiri

29. *L. nodalis* Selys

Superfamily III. CALOPTERYGOIDEA

Family 4. CHLOROCYPHIDAE

Genus (15) ***Rhinocypha*** Rambur

30. *R. immaculata* Selys

*31. *R. quadrimaculata* Selys

32. *R. biforata* Selys

Genus (16) ***Libellago*** Selys

*33. *L. lineata indica* Fraser

34. *L. l. lineata* (Burmeister)

Family 5. CALOPTERYGIDAE

Genus (17) ***Echo*** Selys

*35. *E. m. margarita* Selys

Genus (18) ***Vestalis*** Selys

*36. *V. g. gracilis* (Rambur)

Genus (19) ***Neurobasis*** Selys

*37. *N. ch. chinensis* (Linnaeus)

Family 6. EUPHAEIDAE

Genus (20) ***Bayadera*** Selys

*38. *B. longicauda* Fraser

Genus (21) ***Euphaea*** Selys

*39. *E. o. ochracea* Selys

Genus (22) ***Pseudophaea***

*40. *P. masoni* Selys

Genus (23) ***Schmidtiphaea*** Asahina

*41. *S. schmidi* Asahina

Suborder B. Anisoptera

Superfamily IV. AESHNOIDEA

Family 7. AESHNIDAE

Genus (24) ***Anax*** Leach

*42. *A. guttatus* (Burmeister)

Superfamily V. LIBELLULOIDEA

Family 8.LIBELLULIDAE

Genus (25) ***Cratilla*** Kirby

*43. *C. lineata* (Brauer)

Genus (26) ***Orthetrum*** Newman

*44. *O. b. brunneum* Fonscolombe

*45. *O. glaucum* (Brauer)

*46. *O. chrysostigma luzonicum* (Brauer)

*47. *O. pruinosum neglectum* (Rambur)

*48. *O. s. sabina* (Drury)

*49. *O. t. triangulare* (Selys)

Genus (27) ***Potamarcha*** Karsch

*50. *P. congener* (Rambur)

Genus (28) ***Acisoma*** Rambur

*51. *A. p. panorpoides* (Rambur)

Genus (29) ***Brachythemis*** Brauer

*52. *B. contaminata* (Fabricius)

Genus (30) ***Crocothemis*** Brauer

*53. *C. s. servillia* (Drury)

Genus (31) ***Diplacodes*** Kirby

*54. *D. trivialis* (Rambur)

Genus (32) ***Neurothemis*** Brauer

*55. *N. fulvia* (Drury)

*56. *N. i. intermedia* (Rambur)

*57. *N. t. tullia* (Drury)

Genus (33) ***Rhodothemis*** Ris

*58. *R. rufa* (Rambur)

Genus (34) ***Sympetrum*** Newman

*59. *S. hypomelas* (Selys)

Genus (35) ***Trithemis*** Brauer

*60. *T. aurora* (Burmeister)

*61. *T. festiva* (Rambur)

*62. *T. k. kirbyi* Selys

Genus (36) ***Palpopleura*** Rambur

*63. *P. s. sexmaculata* (Fabricius)

Genus (37) ***Rhyothemis*** Hagen

*64. *R. v. variegata* (Linnaeus)

Genus (38) ***Pantala*** Hagen

*65. *P. flavescens* (Fabricius)

Genus (39) ***Tholymis*** Hagen

*66. *T. tillarga* (Fabricius)

Genus (40)

*67. *U. s. signata* (Rambur)

Genus (41) ***Zygonyx*** Hagen

*68. *Z. i. iris* Selys

SUMMARY

Present paper deals with the diagnostic features, distribution pattern within Manipur, rest of India and elsewhere as well. Affinities with allied taxa and distinguishing features have also been provided for 68 species so far known within the limits of Manipur State. These are represented under 2 suborders, 5 superfamilies, 8 families and 41 genera. Among these family Libellulidae of the Anisopterous Odonates is by far has the maximum number of representative species viz., 26 species under 17 genera. The Zygopterous family Coenagrionidae is next large family having representation by 21 species and 10 genera. Above two family : namely Libellulidae and Coenagrionidae together share bulk of Odonata component of Manipur. These are represented together by 47 species (26 + 21) as against total component of 68 species. This representation, though, is just a small fraction of whole Indian Odonates approximately 1 : 7 26 (68 : 494). Manipur Odonates as compared to other two states by present authors West Bengal (1993) and Meghalaya (1995) is also relatively in smaller proportion. Manipur, West Bengal and Meghalaya and India Odonates are proportionately thus 68 : 180 : 151 : 494 species (Table 1) key have been formulated for various level of taxa concerned, besides providing material, relevent synonymy and bibliography. A comprehensive classified list of Manipur. Ononates is also provided.

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Table-I : Qualitative Compositin of Odonata from India : Tripura, Meghalaya and West Bengal and Manipur

TAXA			MANIPUR		TRIPURA		MEGHALAYA		WEST BENGAL	
SF	F	SBF	Species	Genera	Species	Genera	Species	Genera	Species	Genera	Species	Genera
COE	COENAGRIIDAE	AMPHICNEMINAE	1	1	—	—	—	—	—	—	—	—
		PSEUDAGRIINAE	22	2	5	2	5	2	—	—	—	—
		COENAGRIINAE	3	2	1	1	—	—	2	2	2	2
		ISCHNURINAE	20	4	11	4	3	3	17	7	31	9
		AGRIOCNIINAE	13	2	3	2	3	1	—	—	—	—
		AGRIINAE	1	1	1	1	—	—	—	—	—	—
	PLATYSTICIIDAE	PLATYSTICTINAE	11	3	—	—	—	—	2	2	2	2
	PHOTONURIDAE	PROTONURINAE	6	2	—	—	—	—	3	2	—	—
		DISPARONEURINAe	7	1	—	—	—	—	—	—	—	—
		CACONEURINAE	10	4	—	—	—	—	—	—	1	1
		PLATYCNEMINAE	6	2	2	1	—	—	4	1	4	1
		CALCNEMINAE	10	3	4	2	—	—	10	3	4	2
Z	LES	CHLOROLESTIDAE	CHLOROLESTINAE	—	—	—	—	—	—	—	—	—	—
			MEGALESTINAE	2	1	—	—	—	—	2	1	2	1
	LESTIDAE	LESTINAE	19	3	2	1	—	—	4	2	4	4
		SYNPECMATINAE	3	1	—	—	—	—	—	—	—	—
	AMPHIPTERYGIDAE	PHILOGANGINAE	1	1	—	—	—	—	1	1	1	1
	CHLOROCYPHIDAE		29	4	5	2	1	—	10	2	9	1
	CAL	EUPHAEIDAE		9	4			—	—	6	3	4	2
	CALOPTERYGIDAE	CALIPHAENAE	1	1	—	—	—	—	1	1	1	1
		CALOPTERYGINAE	3	2	—	—	2	—	7	4	3	2

Table-I : *Contd.*

	TAXA			MANIPUR		TRIPURA		MEGHALAYA		WEST BENGAL			
	SF	F	SBF	Species	Genera	Species	Genera	Species	Genera	Species	Genera	Species	Genera
		AGRIIDAE	AGRIINAE	16	6	3	3	—	—	—		—	—
AZ		EPALLAGIDAE	—	13	5	4	4	—	—	—	—	—	—
	HET	EPIOPHLERIIDAE		1	1	—	—	—	—	—	—	—	—
	CORD	CORDULEGASTERIDAE	CORDULEGASTERINAE	6	2	—	—	—	—	—	—	—	—
			CHLOROGOMPHINAE	9	1	—	—	—	—	3	1	1	1
	AESH		GOMPHINAE	65	15	—	—	1	—	20	13	3	2
		GOMPHIDAE	EPIOGOMPHINAE	24	5	—	—	—	—	1	1	4	1
			ICTINOGOMPHINAE	10	2	—	—	—	—	1	1	23	13
			GOMOHAESHNINAE	3	1	—	—	—	—	3	1	3	2
Y			BRACHTRINAE	14	8	—	—	—	—	6	4	4	2
A		AESHNIDAE	ANACTINAE	10	3	1	1	—	—	1	1	7	5
			AESHNINAE	4	1	—	—	—	—	1	1	4	3
			GYNACANTHAGINAE	15	2	—	—	—	—	3	1	2	1
			POLYCANTHAGINAE	1	1	—	—	—	—	—	—	7	1
		CORDULIIDAE	CORDULIINAE	1	1	—	—	—	—	1	1	1	1
			MACROMIINAE	15	2	—	—	—	—	4	2	1	1
			EPOPTHALMIINAE	22	3	—	—	—	—	1	1	6	2
		LIBELLULIDAE	LIBELLULINAE	86	30	26	17	21	—	40	23	52	31
	LIB	MACRODIPLACTIDAE		4	4	—	—	—	—	—	—	3	3
3	7	19	32	496	137	68	41	36	—	154	82	189	98

A = Anisoptera, AESH = Aeshnoidea, AZ = Anisozygoptera, CAL = Calopterygoidea, COE = Coenagriona, CORD = Cordulegasteridae, F = Family, HET = Heterophlebiodea, LES = Lestoidea, LIB = Liballuloidea, SBF = Subfamily, SF = Super family, Z = Zygoptera.

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INSECTA : ORTHOPTERA : ACRIDOIDEA

M. S. SHISHODIA & S. K. TANDON
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

Short-horned grasshoppers are included in the Superfamily Acridoidea. They are moderate in size, but range from less than 10mm to 65 mm. The form of body shape of head and thorax are diverse; antennae are filiform but sometimes ensiform; tarsi three segmented; hind femora long, slender and thick towards base and adapted for leaping; wings either fully developed or reduced or absent; forewings in the form of leathery tegmina; hind wings fan-like; male external genitalia complex, symmetrical and concealed, when not in use, by the enlarged ninth abdominal sternum (subgenital plate). Male of most of these insects produce sound by different methods; female, generally, do not produce sound.

The number of known species of the group from the whole world are about 8,000. Out of these 355 species are known from India. They are economically important, as some species do considerable damage to the crops, vegetable plants, and forest plantations. The well known locust belong to this superfamily. Majority of the species are tropical and well represented in temperate climates too. Vertically they are from sea-level to high altitudes in the Himalayan Region in India.

The present paper deals with 54 species belonging to 2 families and 41 genera. Fifty two species are new records for Manipur (*), out of which four species are new records to India (**). Meinodas & Shafee (1990) have described one new species, *Odontomelus manipurensis* from Waithou, Manipur. We have not studied this species at present.

SYSTEMATIC ACCOUNT

Order ORTHOPTERA

Superfamily ACRIDOIDEA

Key to families

1. Foveolae of the vertex contiguous, superior and forming the extremity of the fastigium; stridulatory mechanism absent .... PYRGOMORPHIDAE

— Foveolae of the vertex lateral or inferior, never forming the tip of the fastigium; stridulatory mechanism presentACRIDIDAE

Family PYRGOMORPHIDAE

Key to genera

1. Antennae remote from the eyes, placed in front of the ocelli 2

— Antennae near the eyes and inserted below the ocelli 3

2. Tegmina long and narrow, body moderately slender ..... ***Atractomorpha*** Saussure

— Tegmina rather short and broader; body robust ..... ***Tagasta*** Bolivar

3. Posterior lobe of pronotum in level; abdomen without callosities; the sternal lamina margined in front ..... ***Chlorizeina*** Brunner

— Posterior lobe of pronotum convex, raised above the level of the anterior lobes, with strong rugae; abdomen with dorsal callosity ..... ***Aularches*** Stål

Genus ***Atractomorpha*** Saussure, 1862

Key to species

1. Body-form comparatively broad, stout and rather short; lateral pronotal lobe without a membranous area near posterior margin .... *burri* Bolivar

— Body-form more slender and elongate; lateral pronotal lobe often with a membranous area near posterior margin 2

2. General body-form very slender; fastigium of vertex very long; apex of male abdomen rather acute..... *psittacina* (De Haan)

— Body-form not exceptionally slender; fastigium of vertex comparatively rather shorter; male abdomen with apex more obtuse ..... *c. crenulata* (Fabricius)

1. ***Atractomorpha c. crenulata*** (Fabricius)

1793. *T [ruxalis] crenulatus* Fabricius, *Ent. Syst.*, **2** : 28.

1960. *Atractomorpha crenulata crenulata* : Banerjee & Kevan, *Treubia*, **25** : 184.

Material examined : 1 ♂, Nampalong, Tamu, Burma, 25.ii.1975, coll. P.T. Cherian; 1 ♂, 1 ♀, Loktak Lake, 20.ix.1975, coll. M. S. Shishodia; 1 ♂, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 10, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1 ♂, 3 kms west from Moreh, 25.ix.1975, coll. M.S. Shishodia; 1 ♂, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 5♂, 1♀, Hundung, Ukhrul, 2.x.1975, coll. M.S. Shishodia; 3♂, 1 ♀, Missionary school compound, Ukhrul, 3.x.1975. coll. M.S. Shishodia; 1♂, F.R.H. compound, Imphal, 6.x.1975, coll. M.S. Shishodia; 2 ♀, Mammang Leikai Farm, Churachandpur, 27.iii.1992, coll. D.K. Mondal; 2♀, Sunusupi village, Churachandpur, 2.iv.1992, coll. A.K. Sanyal; 2♂, Chajing village, Kangpopi, Imphal, 6.iv.1992, coll. A.K. Hazra; 1 ♀, Hundung, Ukhrul, 8.iv.1992, coll. A. K. Hazra; 1♂, Loktak Lake; 10.xii.1992, coll. P.H. Roy; 2 ♀, Ukhrul, 12, 14.xii. coll. P. H. Roy; 1 ♂, Lumba, Jiribam, 5.iii.1993, coll. S.K. Saha; 1 ♂, Bijang Veng, Churachandpur, 25.iii.1993, coll. D.K. Mondal; 2 ♀, Leikul, Chandel, 30.iii.1993, coll. D.K. Mondal; 1♂, Kharasom, Ukhrul, 14.vi.1993, coll. R.S. Barman.

Diagnostic characters : Body-form slender; tegmina generally longer; lateral pronotal lobe always with a well developed membranous area near the posterior margin; wings red at base.

Distribution : India : Manipur, Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Goa, Jammu & Kashmir, Karnataka, Kerala, Lakshadweep Islands, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. It is also studied from Delhi and Tripura.

Elsewhere : Bangladesh, Myanmar, Pakistan, Sri Lanka, S.W. Sumatra and S. Vietnam.

2. ****Atractomorpha burri*** Bolivar

1905. *A [tractomorpha] burri* Bolivar, *Bol. Soc. esp. Hist. nat.*, **5** : 197, 203.

1960. *Atractomorpha burri* : Banerjee & Kevan, *Treubia*, **25** : 169, 177.

Material examined : 1 ♂, Makru, Central District, 12.ii.1975, coll. P. T. Cherian; 2♂, M.E. School, Mao, 16.ix.1975, coll. M.S. Shishodia; 1♀, Bungmual, New Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 2♂, Loktak Lake, 20.ix.1975, coll. M.S. Shishodia; 5♂, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 6♂, 8♀, 3 kms west from Moreh, 25, 27.ix.1975, coll. M.S. Shishodia; 1♂, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 2♂, 3♀, Hundung Ukhrul, 2.x.1975, coll. M.S. Shishodia; 1♂, Lonkoipot, 800 m, Bishnupur District, 7.iv.1992, coll. D.K. Mondal; 1♂, Hundung, Ukhrul, 8.iv.1992, coll. A.K. Hazra; 2♂, 2♀, Uchathal, 175m, 5 kms. East of Jiribam, Imphal District, 30.xi.1992, coll. A. K. Mondal; 2♂, 2♀, Tamenglong, 6.xii.1992, coll. P.H. Roy.

Diagnostic characters : Body-form robust; fastigium of vertex short; posterior margin of pronotum angular; postocular tubercles strongly raised and regularly arranged; pronotum and tegmina without numerous dark pigment spots; hind femora strongly carinate on outer face; wings hyaline or rosy at base; dorsal ovipositor valves stout; subgenital plate blunt in profile.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Meghalaya, Orissa, Tripura and West Bengal.

Elsewhere : Bangladesh, Bhutan, S.W. China, Indo-china, Malaya, Myanmar, Mergui Archipelago and Thailand.

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 : 1 ♂, 3♀, New Churachandpur, 19, 21.ix.1975, coll. M.S. Shishodia; 1♀, Loktak Lake, 20.ix.1975, coll. M.S. Shishodia; 1♀, 3 kms West from Moreh, 25.ix.1975, coll. M.S. Shishodia; 1♀, Burma border, Moreh, 26.ix.1975, coll. M.S. Shishodia; 1♀, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♀, Hundung, Ukhrul, 2.x.1975, coll. M.S. Shishodia; 2♂, 7♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 1♂, Keibul National Park, 2.iv.1992, coll. A.K. Hazra; 1♂, Churachandpur, 25.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Body-form very slender; fastigium of vertex narrower and longer; membranous area present near the posterior margin of the pronotal lobe; hind wings normally comparatively long in relation to tegmina; colour of the wing, generally, dull magneta purple, often rather pale, at extreme base, sometimes colourless; apex of male abdomen rather acute in profile.

Distribution : India : Manipur, Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Rajasthan, Tripura and West Bengal.

Elsewhere : Bangladesh, Indo-China and South China, Indonesia, Myanmar and Philippines.

Genus ***Tagasta*** Bolivar, 1905

4. **Tagasta indica* Bolivar

1905. *Tagasta indica* Bolivar, *Bol. Soc. esp. Hist. nat.*, **5** : 112, 113.

1914. *Tagasta indica* : Kirby, *Fauna Brit. India*, Orthoptera, 180.

Material examined : 2♂, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 2♂, 1♀, Burma border, Moreh, 24, 26.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Olivaceous in colour; finely rugose-punctate; fastigium of vertex equilaterally triangular; pronotum rounded in front, obtusely angulated behind; median carina almost, and lateral carinae wholly obsolete; tegmina nearly as long as the hind femora, apex narrowly obtuse, with a brown spot at the base; wings one-fifth shorter than tegmina, rose colour at base.

Distribution : India : Manipur, Arunachal Pradesh, Tripura and West Bengal.

Elsewhere : Bhutan.

Genus ***Chlorizeina*** Brunner, 1893

5. ***Chlorizeina unicolor unicolor*** Brunner

1893. *Chlorizeina unicolor* Brunner, *Ann. Mus. Stor. nat. Genova*, **33** : 131.

1969. *Chlorizeina unicolor unicolor* : Kevan, *Trans. Amer. ent. Soc.* **94** : 369.

Material examined : 1♂, 1♀, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 3♂, 7♀, 3 kms West from Moreh, 25, 27.ix. 1975, coll. M.S. Shishodia; 1♂, 2♀, Burma border, Moreh, 26.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Size variable; fastigium of vertex parabolic; pronotum not wide posteriorly; tegmina usually not so short, extending beyond the fourth abdominal tergum; hind wings more than half as long as tegmina; hind femora usually distinctly red on the ventral and lower parts of the inner faces; hind tibiae usually darker (dark blue or sometimes dull reddish); male supra anal plate narrower, lateral margins usually slightly concave; dorso-lateral lobes of tenth abdominal tergum more acute, the median excision between them deeper; male cerci longer, more strongly incurved, less expanded apically.

Measurements (in mm.) : Body length ♂ 18-23, ♀ 25-34; pronotum length ♂ 5-6, ♀ 7-9;

tegmina length ♂ 7-10.5, ♀ 12-13.5; hind femur length ♂ 10-12.5, ♀ 14-17.

Distribution : India : Manipur, Eastern Assam hills, Manipur-Modbung near Imphal and Tripura.

Elsewhere : Laos, Upper Myanmar and Thailand.

Genus ***Aularches/*** Stål, 1873

6. ****Aularches miliaris*** (Linnaeus)

1758. *Gryllus (Locusta) miliaris* Linnaeus, *Syst. Nat.* (ed. 10) 1 : 432.

1914. *Aularches miliaris* : Kirby, *Fauna Brit. India,* Orthoptera, 168.

Material examined : 1♂, 1♀, near Churachandpur, 21.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Size large, body stout; head 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 and with variable number of large and small callous yellow spots; wings purplish brown, darker towards base; abdomen black with narrow yellow incisions.

Distribution : India : Manipur, Jammu & Kashmir, Himachal Pradesh, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Java, Nepal and Sri Lanka.

Remarks : The specimens of this species were seen in swarming condition in Kathambari Reserve Forest, West Bengal during October, 1987.

Family ACRIDIDAE

Key to Subfamilies

1. Prosternal process or tubercle absent 2
— Prosternal process or tubercle present 4
2. Stridulatory file absent in posterior femora 3
— Stridulatory file present in posterior femora ..... GOMPHOCERINAE
3. 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
4. Radial area of tegmen with a series of regular, parallel stridulatory veinlets .... HEMIACRIDINAE
— Stridulatory veinlets of radial area of tegmen absent 5
5. Lower external lobe of hind knee with spine-like apex ..... OXYINAE
— Lower external lobe of hind knee with rounded, angular or subacute apex, but not spine-like 6
6. 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. 7
7. Mesosternal lobes rounded or obtuse-anglar or acute-angular, but not rectangular 8
— Mesosternal lobes rectangular .... CYRTACANTHACRIDINAE
8. Dorsum of pronotum flat or weakly 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 above. .... CATANTOPINAE

Subfamily ACRIDINAE

Key to genera

1. Hind femur with a spine on the dorso-external and dorso-internal genicular lobes 2

— Hind femur with rounded dorso-external and dorso-internal genicular lobes 3

2. Head large, its length considerably greater than that of the pronotum; eyes situated on the anterior part of the head.... ***Acrida*** Linnaeus

— Head small, its length equal to or less than or somewhat greater than that of the pronotum; eyes situated nearly in the middle part of head. ..... ***Gelastorrhinus*** Brunner

3. Lateral carinae of pronotum present.....4

— Lateral carinae of pronotum absent .... ***Rammeacris*** Willemse

4. Lateral carinae of pronotum divergent posteriorly.....6

— Lateral carinae of pronotum straight, continuous 5

5. Body very slender; head a little long, apex of tegmina acutely sharpened....***Gonista*** Bolivar

— Body not very slender; head not as long as in preceding species; apex of tegmina obliquely truncate ..... ***Phlaeoba*** Stål

6. Body large and robust.....***Holopercna*** Karsch

— Body medium and normal...***Ceracris*** Walker

Genus ***Acrida*** Linnaeus

7. ****Acrida exaltata*** (Walker)

1859. *Truxalis exaltata* Walker, *Ann. Mag. nat. Hist.*, **4** (3) : 222.

1954. *Acrida exaltata* : Dirsh, *Bull. Soc. Fouad. Entom.*, **38** : 149.

Material examined : 1♂, Below Modhung near Imphal, 3500 ft., 1.xi.1945, Maj. M.L. Roonwal; 1 ex. (abdomen damaged), 16 miles north of Imphal on Dimapur road, -.ix. 1945, Maj. M. L. Roonwal; 5♂, New Churachandpur, 18, 20, 21.ix.1975, coll. M.S. Shishodia; 1♂, Bungmual, New Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 1♂, Churachandpur, 2.iv.1992, coll. D.K. Mondal & S.K. Ghosh; 1♂, Churachandpur 19.xii.1992, coll. A.R. Lahiri; 1♂ (nymph), Longzanmanbi, Churachandpur, 16.vi.1993, coll. R.S. Burman.

Diagnostic characters : Head conically ascending, basal part narrow, fastigium of vertex broad, laminate and truncate at apex; transverse sulcus of pronotum placed near the middle of disc; male subgenital plate, in profile, comparatively long, with more elongated part, the upper margin with a small projection; wings slightly shorter than tegmina.

Distribution : India : Manipur, Arunachal Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : W. Aden, Afghanistan, Bangladesh, Iran, Saudi Arabia, Sri Lanka, Tibet and Yemen.

Genus ***Ceracris*** Walker, 1870

8. ****Ceracris nigricornis nigricornis*** (Walker)

1870. *Ceracris nigricornis* Walker, *Cat. Derm. Salt. Br. Mus.*, **4** : 791.

1925. *Ceracris nigricornis nigricornis* : Uvarov, *Ent. Mitt. Berl.*, **14** : 13.

Material examined : 1♂, 2♀, Below Modhung near Imphal, 3,500 ft 1, 2.xi.1945, coll. Maj. M.L. Roonwal; 1♂, 3 kms. West from Moreh, 25.ix.1975, coll. M.S. Shishodia; 9♂, 2♀, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♀, Hundung, Ukhrul, 2.x.1975, coll. M.S. Shishodia; 1♂, Missionary School compound, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 2♂, Tamenglong, 1280 m, 27.xi.1992, coll. A.K. Mondal; 7♂, 4♀, Ukhrul, 11, 12, 14.xii.1992, coll. A.R. Lahiri; 2♂, Wine Bazar, Ukhrul, 13. xii.1992, coll. A.R. Lahiri.

Diagnostic characters : Olive-green in colour; black lateral fascia on the head and the upper margin of pronotal lobes, not extended on the disc of metazona; face and pronotum coarsely punctured; tegmina with the anal field green or brownish green; hind femora with a narrow pale pre-apical ring, preceded by a narrow blackish (sometimes interrupted) ring; hind knee black, but its lobes, in female, pale; hind tibiae dirty-bluish with base black, a pale posterior basal ring, followed by a blackish ring.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, S. China, Myanmar, Taiwan, Thailand and Vietnam.

Genus ***Rammearis*** Willemse, 1951

9. ****Rammeacris gracilis*** (Ramme)

1941. *Ceracris gracilis* Ramme, *Mitt. Zool. Mus. Berl.*, **25** : 30.

1951. *Rammeacris gracilis* : Willemse, *Publties natuurh. Genoot. Limburg*, **4** : 66.

Material examined : 15♂, 1♀, Burma Border, E. Moreh, 24, 26.ix.1975, coll. M.S. Shishodia; 6♂, 9♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia.

Meghalaya : 1♂, Shillong Peak, 3.x.1971, coll. R.S. Pillai; 4♂, 2♀, Songsok, East Garo Hills, 18, 19, 22.ix.1975, coll. N. Muralidharan; 1♂, Naya Bunglow, Khasi Hills, 6.v.1978, coll. S.G. Patil; 1♀, Siju, Garo Hills, 9.xi.1979, coll. K.P. Singh.

Assam : 2♂, Khanapara, Gauhati, 23.iv.1974, coll. D.C. Deka.

Tripura : 1♀, Golaghati, W. Tripura, 20.vi.1990, coll. G. N. Saha.

Diagnostic characters : General colouration yellow-brown or olivaceous-brown; size small to medium, slender in shape, finely and more coarsely puntured; antennae not reaching beyond the middle of hind femora, basal joints very slightly flattened; face, in profile, distinctly reclinate, forming with the fastigium of vertex a rounded angle; frontal ridge sulcated; pronotum with parallel sided, metazona slightly widened posteriorly, anterior margin truncately rounded, posterior margin obtusely angulate, median carina interrupted by the third sulcus; lateral carinae absent; 2nd and third sulci continuing on the lateral lobe; third sulcus placed behind the middla; tegmina and wings well developed, reaching upto the apex of hind femur; anterior margin of tegmina with a basal dilation, apex rounded; knee lobes obtusely pointed; supra-anal plate broad, triangular with lateral margin rounded, apex obtuse; cercus reaching the apex of supra-anal plate, conical, apex obtuse; subgenital plate short, curved, apex obtuse.

Female : Size bigger than the male; rest characters are same as in male; valves of ovipositor short, acute and curved at apex; subgenital plate narrow anteriorly and broader posteriorly, more or less transverse at apex with a mesial notch.

Measurements (in mm.) : Body length ♂ 16-24.5, ♀ 23-25; pronotum length ♂ 3-5, ♀ 4.5-5; tegminal length ♂ 14.5-21, ♀ 17.5-18.5; hind femur ♂ 9.5-14, ♀ 12.5-14.

Distribution : India : Manipur.

Elsewhere : Myanmar and Thailand.

Remarks : Willemse (1951) has described this species on the bases of male. At present the author has studied a large number of specimens of both sexes. This species is recorded here for the first time from India. The distribution is extended upto Tripura through Assam and Meghalaya.

Genus ***Holopercna*** Karsch, 1891

10. ****Holopercna darjeelingensis*** (Bolivar)

1914. *Sjoestedtia darjeelingensis* Bolivar, *Trab. Mus. Cienc. nat. Madr.*, **20** : 77.

1985. *Holopercna darjeelingensis* : Bhowmik, *Rec. Zool. Surv. India, Misc. Publ., Occ. Paper* No. 78 : 11.

Material examined : 1♀, M. E. School compound, Mao, 16.ix.1975, coll. M. S. Shishodia.

Diagnostic characters : General colour brown, moulted with dark and yellow spots and stripes; fastigium of vertex short, less acute, concave, foveolae absent; eyes brownish; prozona less compressed and less broader than *H. sukhadae* (Bhowmik); hind femora with whitish-yellow and dark spots on carinae.

Distribution : India : Manipur, Assam, Himachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Genus ***Phlaeoba*** Stål, 1860

Key to species of *Phlaeoba*

1. Wings hyaline at apex; pronotum very rugulose ..... *panteli* Bolivar

— Wings more or less fuscous at apex; pronotum very little or not rugulose 2

2. Antennae ringed or tipped with obscure yellow; subgenital plate of male short, obtuse at apex. ..... *antennata* Brunner

— Antennae unicolorous; subgenital plate in male with pointed apex 3

3. Fastigium about as long as broad..... ..... *sikkimensis* Ramme

— Fastigium not as long as broad .... *infumata* Brunner

11. **Phlaeoba antennate* Brunner

1914. *Phlaeoba antennata* : Kirby, *Fauna British India,* Orthopt. (Acridiidae) : 102.

Material examined : 1♂, 1♀, Moreh, 12.ii.1975, coll. P. T. Cherian; 1♀, C.R.P. Camp, New Churachandpur, 18.ix.1975, coll. M.S. Shishodia; 1 ♂, Burma Border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 9♂, 11♀, 3 kms. West of Moreh, 25, 27.ix.1975, coll. M. S. Shishodia; 2♂, 3♀, Burma Border East, 26.ix.1975, coll. M.S. Shishodia; 1♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 1♂, Lonkoipot, Bishnupur, 7.iv.1992, coll. D.K. Mondal & S.K. Ghosh; 3♂, Uchathal, 175m, 5 kms. east of Jiribam, Imphal Dist., 30.xi.1992, coll. A.K. Mondal.

Diagnostic characters : Olive-brown, with a broad yellow band running from the vertex to the end of the tegmina, at least in the male; antennae ensiform, tipped with yellow; pronotum smooth, all the three carinae well marked; tegmina narrow; wings bluish at base.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Kerala, Meghalaya, Rajasthan, Tripura and West Bengal.

Elsewhere : Bangladesh, Borneo, China, Hainan Island, Isle of Penang, Malaya Peninsula, Perak, Sumatra and Tonking.

12. **Phlaeoba infumata* Brunner

1914. *Phlaeoba infumata :* Kirby, *Fauna British India,* Orthopt. (Acridiidae) : 103.

Material examined : 4♀, 16 miles N. of Imphal on Dimapur Road, *Ca* 3,500 ft., 20-30.ix.1945, coll. Maj. M.L. Roonwal (Dry stony ground); 1♂, 16 miles N. of Imphal on Dimapur Road, Ca. 3,500 ft., 18.x.1945, coll. Maj. M.L. Roonwal; 1♂, 16 miles N. of Imphal on Dimapur Road, *Ca.* 3,500 ft., 2.xi.1945, coll. Maj. M.L. Roonwal (Every forest) 1♂, Makru, 12.ii.1975, coll. P.T. Cherian; 4♂, Shiroy East, 2.iii.1975, coll. P.T. Cherian; 1♀, Ukhrul, 4.iii.1975, coll. P.T. Cherian; 1♀, M.E. School, Mao, 16.ix.1975, coll. M.S. Shishodia; 1♂, 5♀, C.R.P. Camp, New Churachandpur, 18.ix.1975, coll. M.S. Shishodia; 3♂, Bungmual, New Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 1♂, I.B., New Churachandpur, 20.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, Burma Border, Moreh, 24.ix.1975, coll. M. S. Shishodia; 2♂, 5♀, 3 kms. West of Moreh, 25.ix.1975, coll. M.S. Shishodia; 1♂, 2♀, Burma Border East, Moreh, 26.ix.1975, coll. M.S. Shishodia; 1♀, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♀, Hundung, Ukhrul, 2.x.1975, coll. M.S. Shishodia; 2♀, Imphal, 800m, 23.iii.1992, coll. D.K. Mondal & S. K. Ghosh; 1♂, Moirang, 31.iii.1992, coll. D.K. Mondal & S.K. Ghosh; 4♂, 2♀, T. Phizol, Churachandpur, 1.iv.1992, coll. A.K. Sanyal; 3♂, 7♀, Keibul National Park, Churachandpur, 2.iv.1992, coll. A.K. Hazra; 1♀, Tuilapha, Churachandpur, 4.iv.1992, coll. A.K. Sanyal; 1♂, Saikhot, Churachandpur, 4.iv.1992, coll. D.K. Mondal & S.K. Ghosh; 2♂, 5♀, Lairo. River bed, Moreh, 12.iv.1992, coll. A.K. Hazra; 3♂, Napam, Senapati Dist., 15.iv.1992, coll. S.K. Saha; 1♂, Tamenglong, 22.xi.1992, coll. A.K. Mondal; 1♂. Uchathal, 175m, 5 kms. E. of Jiribam, 30.xi.1992, coll. A.K. Mondal; 1♂, Kakching Bazar, 1.xii.1992, P. H. Roy; 1♂, Moreh, 25.xii.1992, coll. A.R. Lahiri; 1♂, Imphal, 27.xii.1992, coll. A.R. Lahiri; 1♂. Keibul Lampjao National Park, 21.ii.1993, coll. S.K. Saha; 1♂, 1♀, Kongpokpi, Senapati Dist., 17.iii.1993, coll. D.K. Mondal; 1♂, 1♀, Tuithapi village, Churachandpur, 21.iii.1993, coll. D.K. Mondal; 1♂, Keibul Lampjao National Park, Bishnupur, 23.iii.1993, coll. D.K. Mondal; 5♂, 3♀, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal; 1♂, Tuibong, Churachandpur, 25.iii.1993,

coll. D.K. Mondal; 1♂, Loktak, Bishnupur, 26.iii.1993, coll. D.K. Mondal; 2♀, Mammang, Leikei, Churachandpur, 27.iii.1993, coll. D. K. Mondal; 2♂, 6♀, Leikul, Chandel, 30.iii.1993, coll. D.K. Mondal; 1♀, Litan, Ukhrul, 12.vi.1993, coll. R. S. Barman; 1♀, Churachandpur, 16.vi.1993, coll. R.S. Barman.

Diagnostic characters : Brownish testaceous in colour; fastigium of vertex above with a continuous median carina extending along the head and pronotum; antennae ensiform, as long as the head and pronotum together; pronotum with a rudimentary carina on each side between median and lateral carinae; wings fusco-hyaline, infumated towards apex; subgenital plate acute at apex.

Distribution : India : Manipur, Arunachal Pradesh, Bihar, Delhi, Haryana, Himachal Pradesh, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Bangladesh, S. China, Hainan Island, S. & N. Kuangtung, Kuangsi, Malacca, Tennasserim and Yunna.

13. **Phlaeoba panteli* Bolivar

1902. *Phlaeoba panteli* Bolivar, *Annls. Soc. ent. Fr.*, **70** : 589.

1914. *Phlaeoba panteli* : Kirby, *Fauna British India,* Orthopt., (Acridiidae) : 104.

Material examined : 1♀, Churachandpur, 17.ii.1975, coll. P. T. Cherian; 1♂, Shiroy, East Dist., coll. P. T. Cherian.

Diagnostic characters : Ferruginous brown, with scattered black dots; 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 hyline, with many nerrures greenish.

Distribution : India : Manipur, Andhra Pradesh, Bihar, Himachal Pradesh, Madhya Pradesh, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Afghanistan.

14. **Phlaeoba sikkimensis* Ramme

1941. .*Phlaeoba sikkimensis* Ramme, *Mitt. Zool. Mus. Berl.*, **25**(1) : 13.

Material examined : 1♀, Litan, Ukhrul, 12.vi.1993, coll. R.S. Barman; 1♂, Kharasom, Churachandpur, 14.vi.1993, coll. R.S. Barman; 1♂, Cheklabhai forest, Churachandpur, 17.vi.1993, coll. R.S. Barman.

Diagnostic characters : A little larger in size, male some what larger than female; fastigium as long as broad, with longitudinal ridge in the middle; antennae broad at base, narrowed apically; pronotum with sharp middle and lateral carinae; lateral carinae parallel; posterior margin of pronotum obtuse; tegmina reaching 1/3rd of the posterior femur; anal plate, in male, deeply grooved at basal half; subgenital plate tapering.

Distribution : India : Manipur, Sikkim.

Elsewhere : E. Nepal.

Genus *Gelastorrhinus* Brunner, 1893

15. **Gelastorrhinus* sp.

Material examined : 1♀, Moreh, 26.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Body long and slender; vertex short; antennae long, ensiform; eyes situated almost on the central part of head; tegmina and wings long, narrow and pointed at apex; pronotum smooth, tricarinate; anterior and middle legs short, hind legs long; hind knees produced from above on both sides into spines or lobes, the inner spine distinctly longer than the outer one.

Distribution : India : Manipur, Southeastern Asia, Eastern Africa, India and Madagascar.

Remarks : The specimen could not be identified upto the specific level.

Genus *Gonista* Bolivar, 1898

Key to species of *Gonista*

1. Vertex in both sexes not narrowed towards the fastigium, with nearly parallel inner carinae; tegmina narrow; wings in both sexes narrow ..... *bicolor* (Haan)

— Vertex in both sexes distinctly narrowed towards the fastigium, its inner carinae converging towards fastigium; male tegmina wider; wings in both sexes wider..... ..... *sagitta* (Uvarov)

16. ***Gonista bicolor*** (Haan)

1951. *Gonista bicolor* : Willemse, *Publtiës naturrh Genoot. Limburg,* Reeks **4** : 108.

Material examined : 1♂, Imphal Valley, 2,000 ft., 10-13.ix.1945, coll. Maj. M.L. Roonwal; 2♂, 1♀, Longzenmanbi, Churachandpur, 16, 17.vi.1993, coll. R.S. Barman.

Diagnostic characters : Body elongated; head small, much shorter than pronotum; vertex concave, with distinct median carina; foveolae strongly impressed, distinct, smooth; median ocellus situated at the beginning of the ventral third of the frontal ridge; mesosternum with lobes contiguous; tegmina 12-13 times more than the greatest width; wings length 3.25 mm times more than its greatest width, shorter than tegmina.

Distribution : India : Manipur, Tripura.

Elsewhere : China, Japan, Islands of Malayan Archipelago.

17. ***Gonista sagitta*** (Uvarov)

1912. *Gelastorrhinus sagitta* Uvarov, *Horae. Soc. Ent. Ross.,* **40** (3) : 10.

1933. *Gonista sagitta* : Uvarov, *Trudy Zool. Inst., Leningr.* **1** : 189.

Material examined : 1♀, Churachandpur, 20.xi.1983, coll. S. K. Gupta; 1♂, 27 kms. from Moreh on way to Tongaupal, 13.vi.1992, coll. R. Mathew.

Diagnostic characters : Commonly known as arrow grasshopper; body long and slender; head small, much shorter than pronotum; vertex in both sexes distinctly narrowed towards the fastigium, its inner carinae converging towards the fastigium; antennae sword-shaped; length of tegmina 10-11 times more than their greatest width; wings 2.5-2.75 times more than its greatest width, shorter than tegmina; female mesosternum in the median part with distinctly separated lobes.

Distribution : India : Manipur, Karnataka, Sikkim and Tamil Nadu.

Elsewhere : North Afghanistan, Azerbaijan, Middle Asia, northern Iran, Myanmar and Sri Lanka.

Subfamily GOMPHOCERINAE

Genus ***Dnopherula*** Karsch, 1896

18. ****Dnopherula (Aulacobothrus) svenhedini*** (Sjöstedt)

1933. *Aulacobothrus sven-hedini* Sjöstedt, *Ark. Zool.,* **25**A : 23.

1993. *Dnopherula (Aulacobothrus) svenhedini* : Ingrisch, *Ent. Scand.,* **24** : 331.

Material examined : 1♂, Sielmat, Churachandpur, 30.iii.1992, coll. D.K. Mondal & S.K. Ghosh; 1♀, Imphal, 30.xi.1992, coll. P.H. Roy.

Diagnostic characters : Antennae longer than (male) or as long as (female) head and pronotum together; foveolae shallow; frontal ridge with parallel margins, hardly furrowed between lateral margins, punctured.

Disc of pronotum cut by sulci 2-4, distinctly diverging in front of the 2nd sulcus, diverging posteriorly behind the 3rd sulcus; tegmen slightly surpassing apex of stretched postfemur, costal area slightly expanded in male; postfemur moderately stout, inner side with a row of stridulatory pegs; posttibia with internal apical spurs of unequal length; supra-anal plate ovoid-triangular in male, lingulate in female.

Distribution : India : Manipur.

Elsewhere : China, northern Thailand.

Remarks : Recorded here for the first time from India.

Subfamily OEDIPODINAE

Key to genera of OEDIPODINAE

1. Median carina of pronotum complete or cut by one transverse groove 3

— Median carina of pronotum distinctly interrupted in the prozona by 2-3 transverse grooves 2

2. Pronotum without very distinct crest, constricted in prozona, intersected by 3 grooves; posterior margin obtuse-angular with almost rounded apex ... ***Sphingonotus*** Fieber

— Pronotum with well marked crest, slightly constricted in prozona, intersected by 2 grooves; posterior margin acute-angular with obtuse apex ..... ***Trilophidia*** Stål

3. Transverse veins in apical part of tegmina erect, the cells square or oblong.....4

— Transverse veins in apical part oblique, arranged zig-zag..... ***Pternoscirta*** Saussure

4. Wings without well marked fascia 5

— Wings with well marked fascia (Pronotum with pale marks arranged so as to form x-shaped)..... ***Oedaleus*** Fieber

5. Internal calcaria of posterior tibiae not greatly unequal, normal 6

— Internal calcaria of posterior tibiae greatly unequal, lower one much longer than the other, abruptly hooked at apex, very acute.. ..... ***Heteropternis*** Stål

6. Wings hyaline, yellow at the base, with an curved band beyond... ***Dittopternis*** Saussure

— Wings generally subhyaline, without curved band beyond the middle..... ***Aiolopus*** Fieber

Genus ***Aiolopus*** Fieber, 1853

19. ****Aiolopus thalassinus tamulus*** (Fabricius)

1798. *Gryllus tamulus* Fabricius, *Ent. Syst. Suppl.*, : 195.

1968. *Aiolopus thalassinus tamulus* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.) **22** (7) : 347.

Material examined : 1♀ Inspection Bunglow and around, New Churachandpur, 20.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, E. New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 1♂, Burma Border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, F.R.H. Compound, Imphal, 6.x.1975, coll. M.S. Shishodia.

Diagnostic characters : Medium in size; fastigium with forward angle more acute; foveolae narrowly trapezoid, about twice as long as wide; frontal ridge gradually narrowing and almost angular towards fastigial end, sharply punctured; hind femur unicoloured, without any oblique fascia; posterior tibiae usually with red colouration in apical part and broadly separated from black band by a wide bluish grey band.

Distribution : India : Manipur, Andaman and Nicobar Islands, Bihar, Delhi, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tripura and West Bengal.

Elsewhere : Australia, Bangladesh, Borneo, China, Hainan, Japan, Java, Malaya, Myanmar, New Guinea, Singapore, Sri Lanka, Sumatra and Taiwan.

Genus ***Dittopternis*** Saussure, 1884

20. ****Dittopternis venusta*** (Walker)

1870. *Oedipoda venusta* Walker, *Cat. Derm. Salt. Br. Mus.*, **4** : 740.

1914. *Dittopternis venusta* : Kirby, *Fauna British India,* Orth., : 140.

Material examined : 1♂, 1♀, Churachandpur, 22.iii.1992, coll. D.K. Mondal; 1♂, Sielmat, Churachandpur, 24.iii.1992, coll. D.K. Mondal; 1♀, Chandel, 900 m, 28.iii.1992, coll. D.K. Mondal; 1♀, Moirang, 31.iii.1992, coll. D.K. Mondal; 1♂, 2♀, Tuibong, Churachandpur, 25.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Medium in size; vertex with four diverging rows of pale granules running backwards from between the eyes; a blackish band runs backwards from each eye over the occiput and part of pronotum, bordered above and below by a faint line of yellow colour; pronotum strongly carinated, cut by principal sulcus before the middle, obtusely angulated behind; tegmina with a basal half brown; wings hyaline, without well-marked fascia; hind tibiae blue at base, followed by a light yellow band, than blue.

Distribution : India : Manipur, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Sri Lanka.

Genus ***Heteropternis*** Stål, 1873

21. ****Heteropternis respondens*** (Walker)

1859. *Acrydium respondens* Walker, *Ann. mag. nat. Hist.*, 4(3) : 223.

1914. *Heteropternis respondens* : Kirby, *Fauna British India,* Orth., 141.

Material examined : 1♂, 1♀, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 3♂, Burma Border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♀, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 1♂, Hundung, Ukhrul, 2.x.1975, coll. M.S. Shishodia; 2♂, 2♀, Churachandpur, 22.iii.1993, coll. D.K. Mondal; 2♂, Keibul Lampjao National Park, Bishnupur Dist., 23.iii.1993, coll. D.K. Mondal; 1♂, Chandel, 900m, 28.iii.1993. coll. D.K. Mondal.

Diagnostic characters : Medium in size; head smooth; antennae filiform; hind margin of pronotum rectangular, rounded at apex in the middle;basal half of tegmina opaque, transverse veins in apical part erect, the cells square or oblong; wings without well-marked fascia : hind tibiae red, with 9-10 small black tipped spines.

Distribution : India : Manipur, Arunachal Pradesh, Bihar, Karnataka, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : China, Java, Malacca, Myanmar, Nepal, Sri Lanka, Sumatra etc.

Genus ***Pternoscirta*** Saussure, 1884

22. ****Pternoscirta cinctifemur*** (Walker)

1859. *Acridium cinctifemur* Walker, *Ann. Mag. nat. Hist.*, 4 (3) : 223.

1914. *Pternoscirta cinctifemur* : Kirby, *Fauna British India,* Orth., : 134.

Material examined : 1♂, 1♀, Churachandpur, 22.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Medium in size; head short and somewhat rugose; antennae filiform; tegmina brown, varied with paler markings on the basal half, then with a subhyaline patch, and more or less varied with brown and subhyaline beyond, the cells being arranged in oblique, quadrilaterals, angulated towards each other at the longitudinal nervures; wings often rose coloured at base, with no central black band; hind tibiae black, banded with yellow at base and blue beyond.

Distribution : India : Manipur, Goa, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal.

Elsewhere : Nepal and Sri Lanka.

Genus ***Oedaleus*** Fieber, 1853

23. ****Oedaleus abruptus*** (Thunberg)

1815. *Gryllus abruptus* Thunberg, *Mem. Acad. Sci. St.-Petersb.*, 5 : 233.

1981. *Oedaleus abruptus* : Ritchie, *Bull. Br. Mus. nat. Hist.* (Ent.), 42 (3) : 104.

Material examined : 1♀, 3 kms West of Moreh, 27.ix.1975, Coll. M.S. Shishodia.

Diagnostic characters : Small in size; fastigium of head almost flat; pronotum short, with incomplete white cruciform marks, strongly carinated and entire, posterior margin pointed; wings with a broad black transverse band curving inwards to anal angle; hind tibiae red, with a yellow ring at the base.

Distribution : India : Manipur, Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh. China, Indo-China, E. Nepal, Pakistan, Sri Lanka and Thailand.

Genus ***Trilophidia*** Stål, 1873

24. ****Trilophidia annulata*** (Thunberg)

1815. *Gryllus annulatus* Thunberg, *Mem. Acad. Sci. St.-Petersb.* 5 : 234.

1965. *Trilophidia annulata* : Hollis, *Trans. R. ent. Soc.*, 117 (8) : 251.

Material examined : 1♂, Gulabithal, W. District, 8.ii.1975, coll. P.T. Cherian; 1♀, Jiribam river bank, 13.ii.1975, coll. P.T. Cherian; 1♂, Moreh, 21.ii.1975, coll. P.T. Cherian; 1♀, Ukhrul, 6200 ft., E. District, 4.iii.1975, coll. P.T. Cherian;

2♂, 4♀, Song Sang area, Mao, 13.ix.1975, coll. M.S. Shishodia; 1♂, Bungmual, New Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♂, 1♀, 3 kms. West of Moreh, 25.ix.1975, coll. M.S. Shishodia; 1♂, 1♀, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, Missionary School compound, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 1♂, 1♀, F.R.H. compound, 2600 ft., Imphal, 6.x.1975, coll. M.S. Shishodia; 1♀, Leikul, Chandel, 900 m, 29.iii.1992, coll. D.K. Mondal; 2♀, Moirang, 31.iii.1992, coll. D.K. Mondal; 1♂, 2♀, Khaivaren, Ukhrul, 11.xii.1992, coll. A.R. Lahiri; 1♂, Churachandpur,19.xii.1992, coll. A.R. Lahiri; 1♂, Moreh, 25.xii.1992, coll. A.R. Lahiri; 1♂, Tphizol, Churachandpur, 1.iv.1992, coll. A.K. Sanyal; 1♀, Keibul National Park, 2.iv.1992, coll. A.K. Mondal, 1♂, Kangpokpi, Senapati, 17.iii.1993, coll. D.K. Mondal; 1♀, Tuibong, Churachandpur, 25.iii.1973, coll. D.K. Mondal; 1♀, Loktak, Bishnupur District, 26.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Medium in size; brown or dark-brown or grey with black markings, pubescent beneath; pronotum rugose, with a high median carina, forming two teeth in front, and with lateral carinae; tegmina normal; wings yellow at base and black beyond; hind tibiae brown, with a pale band towards the base, and with a faint narrow pale band beyond the middle.

Distribution : India : Manipur, Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Kerala, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Tripura and West Bengal.

Elsewhere : Bangladesh, Borneo, Hongkong, Japan, Korea, Malaya, Mongolia, Myanmar, Pakistan, Sarawak, Singapore, Sri Lanka, Sumatra and Taiwan.

Genus ***Sphingonotus*** Fieber, 1852

25. ****Sphingonotus longipennis*** Saussure

1884. *Sphingonotus longipennis* Saussure, *Mem. Soc. Phys. nat. Geneve,* **28** (9) : 197.

1914. *Sphingonotus longipennis* : Kirby, *Fauna British India,* Orthopt. : 156.

Material examined : 1♀, Tipaimuk Dam area and around, 16.iv. 1989, coll. Y.P. Sinha.

Diagnostic characters : Size a bit large (32-35 mm); wing blue upto the middle, followed by a black band, which is curved in the middle and extending to the hind margin; apex of wing hyaline; hind femora blue, inner surface black with a pale band before the tip, and with black bands above; hind tibiae alternately banded with blue and black.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Africa, Asia, Europe. (Afghanistan, north India to the Himalayas, Bangladesh, N. Nepal, S.E. Tibet).

Subfamily HEMIACRIDINAE

Key to genera of HEMIACRIDINAE

1. Mesosternal interspace open 2
— Mesosternal interspace closed 3
2. Prosternal process spathulate..... .....***Spathosternum*** Krauss
— Prosternal process conical .... ***Gesonula*** Uvarov
3. Fastigium of vertex from angular to elongate, head conical or acutely conical; body strongly elongate, stick-like; stridulatorv veinlets only in radial area of tegmina.. ***Leptacris*** Walker
— Fastigium of vertex short, moderately projecting in front of eyes, rounded or trapezoidal; body not stick-like or not strongly elongate, but robust; stridulatory veinlets present in radial and subcostal areas of tegmina ..... ***Hieroglyphus*** Krauss

Genus ***Gesonula*** Uvarov, 1940

26. ****Gesonula punctifrons*** (Stål)

1860. *Acridium (Oxya) punctifrons* Stål, *Kongl. Freg. Eug.* Resa. *Omkring Jorden,* Insects : 336.

1965. *Gesonula punctifrons* : Mishchenko, *Locusts and grasshoppers of U.S.S.R. and adjacent countries, Catantopinae,* Leningrad, : 172.

Material examined : 1♀, Gulabithal, W. District, 8.ii.1975, coll. P.T. Cherian; 2♂, Makru, C. District, 12.ii.1975, coll. P.T. Cherian; 1♀, Lockechou river bank, Moreh, 22.ii.1975, coll. P.T. Cherian; 1♂, 1♀, Imphal, 800 m, 23.iii.1992, coll. D.K. Mondal; 2♀, Churachandpur, 1.iv.1992, coll. A.K. Hazra; 6♂, 2♀, Keibul National Park, 2.iv.1992, coll. A.K. Hazra; 1♀, Loktak Lake, 2.iv.1992, coll. A.K. Hazra; 1♂, Loktak Lake, 800 m, 8.iv.1992, coll. D.K. Mondal & S.K. Ghosh; 1♂, W. Imphal, 30.xi.1992, coll. P.H. Roy; 1♀, Lumba, Jiribam, 5.iii.1993, coll. S.K. Saha.

Diagnostic characters : Medium in size; antennae longer than head and pronotum together; pronotum narrow, long and rugose; prosternal tubercle conical, lateral lobes of pronotum wide, anterior margin oblique, antero-ventral angles rounded; supra-anal plate spoon-shaped; hind tibiae at apex modified for swimming.

Distribution : India : Manipur, Andaman Islands, Arunachal Pradesh, Assam, Goa, Kerala, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Bangladesh, Borneo, China, Hainan, Japan, Java, Malacca, Myanmar, Philippines, Sri Lanka, Taiwan, Tongking and Thailand.

Genus ***Spathosternum*** Krauss, 1877

27. ****Spathosternum pr. prasiniferum*** (Walker)

1871. *Heteracris* (?) *prasinifera* Walker, *Cat. Derm. Salt. Br. Mus.*, **5** Suppl. : 69.

1936. *Spathosternum pr. prasiniferum* : Tinkham, *Lingn. Sci. Journ., Canton,* **15** : 51.

Material examined : 2♀, 16 miles N. of Imphal on Dimapur Road, 3500 ft., 1.x.1945, coll. Maj. M.L. Roonwal; 4♂, 4♀, 16 miles N. of Imphal on Dimapur Road, 3500 ft., 3, 8, 18, 23.x.1945, coll. Maj. M.L. Roonwal; 1♂, Gulabithal, W. District. 8.ii.1975, coll. P.T. Cherian; 2♀, Jiribam, C. District, 11.ii.1975, coll. P.T. Cherian; 1♂, Shiroy, E. District, 2.iii.1975, coll. P.T. Cherian, 1♂, 1♀, M.E. School, Mao, 16.ix.1975, coll. M.S. Shishodia; 1♂, Bungmual, Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 1♂, 1♀, 3 kms. West of Moreh, 25.ix.1975, coll. M.S. Shishodia; 4♂, 4♀, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 2♂, 2♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 2♂, 2♀, F.R.H. compound, Imphal, 5.x.1975, coll. M.S. Shishodia; 2♀, Keibul National Park, 2.iii.1992, coll. A.K. Hazra; 1♂, Churachandpur, 4.iv.1992, coll. A.K. Hazra;1♀, Napam, Senapati, 15.iv.1992, coll. S.K. Saha; 1♂, Kakching bazar, 1.xii.1992, coll. P.H. Roy; 4♂, 1♀, Moirang, Bishnupur, 10.xii.1992, coll. P.H. Roy; 1♂, 1♀, Ukhrul, 12.xii.1992, coll. A.R. Lahiri; 1♂, Imphal, 27.xii.1992, coll. A.R. Lahiri; 1♂, 1♀, Tuithapi vill., Churachandpur, 21.iii.1993, coll. D.K. Mondal; 1♂, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal; 1♂, 2♀, Leikul, Chandel, 30.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Small in size; a dark brown stripe runs behind the lower part of eye and below the lateral carinae of pronotum on each side; central area of tegmen with a longitudinal black streak, generally almost obsolete in male, and well marked in female, but very variable, sometimes being entire; tegmina reaching distal end of hind femora or slightly beyond it; wings well developed.

Distribution : This species is found throughout in India. It is also occur in S.E. China, Myanmar, Thailand and Vietnam.

Genus ***Leptacris*** Walker, 1870

28. ****Leptacris vittata*** (Fabricius)

1787. *Truxalis vittatus* Fabricius, *Mantissa Ins.*, **1** : 231.

1955. *Leptacris vittata* : Willemse, *Publtiës natuurh. Genoot. Limburg,* **8** : 29.

Material examined : 1♀, Reserve Forest Area, Churachandpur, 11.xii.1992, coll. P.H. Roy.

Diagnostic characters : Size large (53-65 mm); body slender; antennae ensiform; fastigium of vertex acute, somewhat longer or as long as its outer width at the base; head and pronotum dorsally, and lateral lobes with some longitudinal, darker coloured stripes in the middle and on the sides; prosternal process more or less pointed,

knob at apex; hind femora reaching upto the apical third of abdomen; inner and outer knee lobes terminating into an obtusely rounded projection; female supra-anal plate triangular with a median sulcus from base to apex; cerci short, conical, apex obtusely pointed; valves of ovipositor elongated, hooked at tip.

Distribution : India : Manipur, N. India (North Bengal).

Elsewhere : China, Java, Myanmar, Pakistan, Philippines, Tongking etc.

Genus ***Hieroglyphus*** Krauss, 1877

29. ****Hieroglyphus banian*** (Fabricius)

1798. *Gryllus banian* Fabricius, *Ent. Syst. Suppl.*, : 194.

1973. *Hieroglyphus banian* : Mason, *Bull. Br. Mus. nat. Hist.* (Ent.). **28** (7) : 540.

Material examined : 1♂, 3 kms West of Moreh, 27.ix.1975, Coll. M.S. Shishodia.

Diagnostic characters : Medium in size (31.3 mm); integument finely rugose and pitted; prozona of pronotum longer than metazona; median carina weak, crossed by three sulci, first sulcus present only laterally, second only centrally, third and posterior sulci entire, 2nd and third slightly wavy; posterior margin of metazona obtuse-angular; prosternal process conical; cercus bifurcate, upper branch recurved anteriorly towards head, and lower branch elongate and acute.

Distribution : India : Manipur, Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Subfamily OXYINAE

Key to genera of OXYINAE

1. Prosternal tubercle with apex broadened, transverse, trilobate ..... ***Tauchira*** Stål

— Prosternal tubercle simple, conical with subacute or rounded apex, rarely with bulbous apex 2

2. Epiphallus with one pair of outer and two pair of inner lophi ..... ***Caryanda*** Stål

— Epiphallus with one pair of inner lophi, outer pair short, boot-shaped ..... ***Oxyo*** Audinet-serville

Genus ***Oxya*** Audinet-Serville, 1831

Key to species of *Oxya*

Male

1. Supra-anal plate with a tubercle on each side of a median apical process 2

_ Supra-anal plate without lateral tubercles .. 4

2. Cercus laterally compressed, hardly narrowing towards apex, which is weakly bifurcate .... *fuscovittata* (Marschall)

— Cercus conical or if compressed than narrowing towards apex, which is obtuse or truncate 3

3. Inner tooth-like pair or lophi of epiphallus usually well developed .... *hyla hyla* Serville

— Inner tooth-like pair of lophi of epiphallus usually poorly developed .... *hyla intricata* (Stål)

4. Supra-anal plate without basal folds .... *velox* (Fabricius)

— Supra-anal plate with well developed basal folds ..... *nitidula* (Walker)

Female

1. Anterior margin of tegmen with a dense row of short bristles extending from costal bulge almost to apex of tegmen; ovipositor valves with long teeth, the apical one curved 2

— Anterior margin of tegmen only weakly or not at all spined or bristled; valves of ovipositor with short teeth 4

2. Ventral surface of subgenital plate almost completely flat or weakly concave, appearing widen posteriorly .... *fuscovittata* (Marschall)

— Ventral surface of subgenital plate flate or concave only in median posterior half, not widening posteriorly 3

3. Ventral surface of subgenital plate with two longitudinal ridges extending forwards from

posterior margin, these ridges often toothed ..... *hyla hyla* Serville

Ventral surface of subgenital plate without longitudinal ridges or with only slight traces of them apically and they are not at all spined ..... *hyla intricata* (Stål)

4. Posterior ventral basivalvular sclerite of ovipositor with spines on inner ventral margin ..... *nitidula* (Walker)

— Posterior ventral basivalvular sclerite of ovipositor without spines on inner ventral margin ..... *velox* (Fabricius)

30. **Oxya hyla hyla* Serville

1831. *Oxya hyla* Serville, Annls Sci. nat. (Zool.), **22** : 287.

1971. *Oxya hyla hyla* Serville, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 282.

Material examined : 5♂, 2 kms north of Mao, 14.ix.1975, coll. M.S. Shishodia; 1♀, Bungmual, Churachandpur, 19.ix.1975, coll. M.S. Shishodia; 1♀, Burma border, Moreh, 2.x.1975, coll. M.S. Shishodia; 1♂, 1♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 1♂, Imphal, 28.xi.1992, coll. P.H. Roy; 2♂, 2♀, Churachandpur, 11.xii.1992, coll. P.H. Roy; 2♂, Moreh, 24.xii.1992, coll. A.R. Lahiri.

Diagnostic characters : Medium in size; body finely rugulose, shiny; antennae longer than head and pronotum together; supra-anal plate trapezoidal with triangular apical projection, a small tubercle present on both sides of supra-anal plate; cercus subacute; subgenital plate, in female, with two longitudinal ridges extending forwards from posterior margin.

Distribution : India : Manipur, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal.

Elsewhere : Afghanistan, Africa, Bangladesh, Madagascar, Nepal, Pakistan, Persia and Sri Lanka.

31. **Oxya hyla intricatai* (Stål)

1861. *Acridium (Oxya) intricatum stål, Kong. Sven. Freg. Eug. Resa omk. Jorden. Zool.* : Insecta : Orthop. : 335

1971. *Oxya hyla intricata* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 287.

Material examined : 1♂, Napen, Senapati, 15.iv.1993, coll. S.K. Saha; 1♀, Churachandpur, 18.vi.1993, coll. R.S. Barman.

Diagnostic characters : Very similar to the preceding species, except the inner tooth-like pair of lophi of epiphallus usually poorly developed in case of male, and ventral surface of subgenital plate without longitudinal ridges or with only slight traces of them apically and they are not all spined in case of female.

Distribution : This species is distributed in Oriental region, east of Indo-Burmese border. It is also available in eastern part of India, specially near the Bangladesh and Burma (now Myanmar) border.

32. **Oxya fuscovittata* (Marschall)

1836. *Gryllus fuscovittatus* Marschall, *Annln. Wien. Mus. Naturg.* **1** : 211.

1971. *Oxya fuscovittata* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 289.

Material examined : 1♀, 2 kms. north of Mao, 14.ix.1975, coll. M.S. Shishodia; 3♀, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♂, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 2♂, 1♀, Kakching bazar, 1.xii.1992, coll. P.H. Roy.

Diagnostic characters : Female specimen larger than male; integument finely pitted and shiny; supra-anal plate of male similar to that of *Oxya hyla* but the lateral tubercles are more pronounced and the posterior lobe slightly less developed; male cercus strongly compressed, apex strongly truncate or almost bifid; subgenital plate, in female, with very broadly flattened ventral surface; posterior margin emarginate medially, straight, or with two very small medial spines.

Distribution : India : Manipur, Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. It is also recorded from Meghalaya.

Elsewhere : Afghanistan, Pakistan and U.S.S.R. (South West).

33. **Oxya velox* (Fabricius)

1787. *Gryllus velox* Fabricius, *Mantissa Ins.*, **1** : 239.

1971. *Oxya velox* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 297.

Material examined : 1♂, Keibul National Park, 2.iv.1992, coll. A.K. Hazra.

Diagnostic characters : Size small than the preceding species, supra-anal plate of male with rounded triangular posterior projection; cercus, in male, conical with subaute apex; subgenital plate of female, in posterior half, ventrally with a median longitudinal cavity bordered on each side by a lateral longitudinal ridge.

Distribution : India : Manipur, Jammu & Kashmir, Rajasthan, Tripura and West Bengal. It is also recorded from Meghalaya.

Elsewhere : Bengladesh, China, Myanmar, Pakistan and Thailand.

34. **Oxya nitidula* (Walker)

1870. *Acridium nitidulum* Walker, *Cat. Derm. Salt. Brit. Mus.*, **4** : 631.

1971. *Oxya nitidula* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 315.

Material examined : 1♂, Uchathal, 175m, 5 kms E. of Jiribam, 30.xi.1992, coll. A.K. Mondal.

Diagnostic characters : Medium in size; tegmina reaching the apex of hind femora; supra-anal plate rounded, triangular with basal folds; cercus conical with truncate apex; ventral surface of subgenital plate with a pair of well developed submargino-lateral spines, posterior margin with a single medial spine and a pair of lateral spines.

Distribution : India : Manipur, Andhra Pradesh, Goa, Karnataka, Kerala, Orissa, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Sri Lanka.

Genus *Caryanda* Stål, 1878

35. **Caryanda paravicina* (Willemse)

1925. *Oxya paravicina* Willemse, *Tidjschr. Ent.*, **68** : 55.

1975. *Caryanda paravicina* : Hollis *Bull. Br. Mus. nat. Hist.* (Ent.), **31** (6) : 218.

Material examined : 1♀, Mao, 14.ix.1975, coll. M.S. Shishodia; 3♂, 2♀, M.E. School, Mao, 16.ix.1975, coll. M.S. Shishodia; 1♀, Moreh, 25.ix.1975, coll. M.S. Shishodia; 2♂, 4♀, Horticulture farm, Ukhrul, 30.ix.1975, coll. M.S. Shishodia; 25♂, 28♀, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♀, Reserve forest area, Churachandpur, 11.xii.1992, coll. P.H. Roy.

Diagnostic characters : Integument finely pitted and shiny; antennae longer than combined length of head and pronotum; dorsum of pronotum almost cylindrical, with parallel sides; posterior margin of metazona rounded; tegmina strongly reduced, extending to the posterior margin of 3rd abdominal tergite; hind wing stripe-like, shorter than tegmina; posterior margin of 10th abdominal tergite with a rhomboidal projection on either side of mid line.

Female larger and robust than male; ventral surface of subgenital plate convex or flat, with two widely spaced spines on posterior margin.

Distribution : India : North-East India. Recently recorded by the author from Sikkim.

Genus *Tauchira* Stål, 1878

36. ***Tauchira* sp.

1878. *Tauchira* Stål, *Bih. K. Svensk. Akad. Handl.*, **15** : 48.

Material examined : 1♀, Litan, Ukhrul, 12.vi.1993, coll. R.S. Barman.

Diagnostic characters : Head conical; fastigium of vertex parabolic, wider than long, median longitudinal carinula weakly present; frontal ridge sulcated; antennae longer than combined length of head and pronotum; prosternal process transverse, antero-posteriorly flattened, apex trilobate; dorsum of pronotum rugose, median carina weak; lateral carinae absent, crossed by three transverse sulci; tegmina and hind wings fully developed.

Female ovipositor valves long.

Measurements (in mm.) : Body length 18.0; head length 3.0; pronotum length 5.0; tegmen 10.5; hind femur 11.0.

Distribution : It is recorded for the first time from India.

Elsewhere : China, W. Malaysia, W. Indonesia.

Subfamily COPTACRIDINAE

Key to genera of COPTACRIDINAE

1. Median carina of pronotum cut by all the three sulci; dorsum not tectiform.....2
— Median carina of pronotum cut by third sulcus only; dorsum tectiform .. ***Epistaurus*** Bolivar
2. Antennae nearly 3 times as long as the head and pronotum together; eyes rather prominent .....***Apalacris*** Walker
— Antennae less than twice the length of the head and pronotum together 3
3. Frontal ridge in profile strongly projecting anteriorly between antennae; vertex wide than frontal ridge between antennae .... ***Traulia*** Stål
— Frontal ridge in profile not projecting anteriorly between antennae; vertex narrow than frontal ridge between antennae..... ..... ***Eucoptacra*** Bolivar

Genus ***Epistaurus*** Bolivar, 1889

37. ****Epistaurus sinetyi*** Bolivar

1902. *Epistaurus sinetyi* Bolivar, *Annls. Soc. ent. Fr.*, **70** : 623.

1914. *Epistaurus sinetyi* : Kirby, *Fauna British India,* Orthopt., : 242.

Material examined : 1♂, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Small in size; median carina of vertex indistinct; pronotum roof-like; median carinae of pronotum cut by 3rd sulcus only; lateral carina absent; abdomen red, with a row of spots on the back interrupted by the median line.

Distribution : India : Manipur, Orissa, Tamil Nadu, Tripura and West Bengal.

Genus ***Eucoptacra*** Bolivar, 1902

Key to species of *Eucoptacra*

1. Tegmina with an oblique, narrow, callous whitish fascia, formed by irregular venules, a little beyond the middle ... *binghami* Uvarov
— Tegmina with only a faint indication of a white callous stripe near the middle 2
2. Hind femur without distinct black spot in or near the externo-superior area (small species 17-20 mm)..... *saturata* (Walker)
— Hind femur with faint brown spot in or near the middle of area supero-externa (large species 17-25 mm)..... *praemorsa* (Stål)

38. ****Eucoptacra binghami*** Uvarov

1921. *Eucoptacra binghami* Uvarov, *Ann. Mag. nat. Hist.*, (9) **7** : 503.

1957. *Eucoptacra binghami* : Willemse, *Publtiës, natuurh. Genoot.* Limburg, **10** : 443, 444.

Material examined : 1♀, Churachandpur, 17.ii.1975, coll. P.T. Cherian; 1♂, 5 kms north of Moreh, S. District, 26.ii.1975, coll. P.T. Cherian; 1♂, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♀, Churachandpur, 12.xii.1992, coll. P.H. Roy.

Diagnostic characters : Frontal ridge flat, wider between the antennae than vertex between eyes; principal sulcus placed in the middle of pronotum; subgenital plate of female with the hind margin more or less triangularly expanded.

Distribution : It is recorded from Meghalaya and Tripura in India.

Elsewhere : Myanmar, Thailand and Tonking.

39. ****Eucoptacra saturata*** (Walker)

1870. *Acridium saturatum* Walker, *Cat. Derm. Salt. Brit. Mus.*, **4** : 628.

1921. *Eucoptacra saturata* : Uvarov, *Ann. Mag. nat. Hist.*, (9) **7** : 503.

Material examined : 1♂, 1♀, 3 kms. West of Moreh, 25, 27.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Medium in size; body rusty red brown; head short, smooth; tip of vertex flat, punctured; prosternal tubercle, stout, slightly acute; hind femur black beneath; hind tibiae red, as long as the hind femora; tegmina a little

shorter than the body, with numerous small marks; wings hyaline.

Distribution : India : Manipur, Assam, Madhya Pradesh, Orissa, Uttar Pradesh and West Bengal. It is also recorded from Meghalaya, Sikkim and Tripura.

40. **Eucoptacra praemorsa* (Stål)

1860. *Acridium (Catantops) praemorsum* Stål, *Kong. Svens. Freg. Eugenies Resa Omkring Jorden,* **3** : 330.

1957. *Eucoptacra praemorsa* : Willemse, *Publtiës. natuurh. Genoot.* Limburg, **10** : 444.

Material examined : 3♂, 4♀, Christian village, Churachandpur, 22, 24.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Frontal ridge between antennae about twice as broad as the interocular distance; principal sulcus of pronotum a little before the middle; tegmina with a faint indication of whitish callous fascia near the middle of median area; hind femur yellowish brown or dark-brown, area supera with two indefinite, faintly indicated, dark, transverse spots and one at the base; inner area red; hind tibiae red.

Distribution : Manipur, Arunachal Pradesh, Kerala, Maharashtra, Rajasthan, Sikkim, Tamil Nadu and West Bengal. It is also recorded from Meghalaya

Elsewhere : China, Myanmar, Taiwan and Tenasserim.

Genus *Traulia* Stål, 1873

41. ***Traulia azureipennis* (Serville)

1839. *Xiphicera azureipennis* Serville, *Ins. Orth.,* : 616.

1957. *Traulia azueipennis* : Willemse, *Publtiës. natuurh. Gennot.* Limburg, **10** : 378.

Material examined : 3♂, 3 kms. West of Moreh, 25.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : General colouration brown to dark-broad; medium in size (20-22 mm); pronotum with a brown dark-brown median band on disc, bordered with lighter brown band; below this band another dark-brown band run from behind the head and extending upto the posterior margin of pronotum followed by brown band; tegmina and wings well developed; tegmina dark-brown, anal area with a yellowish-brown stripe; prosternal process conical, wide at base; supra-anal plate conical, with a projection medially; cerci long, wide at base, narrow in middle, flattened, curved downward at apex; hind femora blackish-brown, with a brown pregenicular ring, external face with an oblique brown stripe; hind tibiae dark-brown at base, with a yellow ring towards base, red towards apex, apex dark-brown.

Distribution : It is recorded for the first time from India.

Elsewhere : Borneo, Java, Malacca, Lower Myanmar, Sarawak and Sumatra.

Genus *Apalacris* Walker, 1870

42. **Apalacris varicornis* Walker

1870. *Apalacris varicornis* Walker, *Cat. Derm. Salt. Brit. Mus.,* **4** : 642.

1914. *Apalacris varicornis* : Kirby, *Fauna British India,* Orth., : 238.

Material examined : 1♂, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Frontal ridge narrow, sulcated, with straight parallel margins; antennae very long, filiform, apex yellowish; pronotum punctately granulate, with 3 transverse grooves; posterior transverse groove placed beyond the middle; hind femur dorsally with 3 black bands.

Distribution : India : Manipur, Arunachal Pradesh, Assam and West Bengal. It is also recorded from Sikkim and Tripura.

Elsewhere : Annam, Bangladesh, Borneo, S.E. China, Japan, Malacca Peninsula, Sumatra and Vietnam.

Subfamily TROPIDOPOLINAE

Genus *Oxyrrhepes* Stål, 1873

43. **Oxyrrhepes obtusa* (de Haan)

1842. *Acridium (Oxya) obtusum* Haan, *Verh. Ned. Overz. Bezit. Orth.,* : 155, 156.

1929. *Oxyrrhepes obtusa* : Willemse, *Treubia,* **10** : 463.

Material examined : 2♂, Bijangveng, Churachandpur, 25.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Medium in size (35-43 mm); body slender; antennae filiform, joints slightly flattened; head reclinate; fastigium of vertex short with an elongate median concavity; vertex convex with fine median keel; median carina of pronotum well developed; lateral keel indistinct, parallel, principal sulcus placed behind the middle; prosternal tubercle compressed laterally, apex slightly bent backwards, conical; hind femur knee lobes rounded; tegmina and wings reaching behind the apex of hind femora; supra-anal plate long, triangular, apex pointed; cercus only reaching a little behind the supra-anal plate, slightly curved, apex pointed.

Distribution : India : Manipur, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Sikkim and Tamil Nadu. It is also recorded from Meghalaya.

Elsewhere : Celebes, China, Indo-China, Indonesia, Java, Lombok, Myanmar, Sri Lanka, Sumatra and Taiwan.

Subfamily EYPREPOCNEMIDINAE

Key to genera of EYPREPOCNEMIDINAE

1. Body very large (42-65 mm) : abdomen in male inflated posteriorly, anal segments very large; cercus very large and strongly compressed laterally .. ***Choroedocus*** Bolivar

— Body much smaller (16-34 mm); abdomen in male normal; cercus normal ..... ***Eyprepocnemis*** Fieber

Genus ***Eyprepocnemis*** Fieber, 1853

44. ****Eyprepocnemis alacris alacris*** (Serville)

1839. *Acridium alacre* Serville, *Hist. Nat. Ins. Orth.*, : 682.

1958. *Eyprepocnemis alacris alacris* : Dirsh, *Proc. R. ent. Soc. Lond.*, (B) **27** (3-4) : 40.

Material examined : 1♀, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 1♂, Awungtong, Ukhrul, 1.x.1975, coll. M.S. Shishodia; 1♀, Missionary School, Ukhrul, 3.x.1975, coll. M.S. Shishodia; 1♂, 1♀, Churachadpur, 16.vi.1993, coll. R.S. Barman.

Diagnostic characters : Concavity of fastigium of vertex distinct, without median carinula; pronotum above with a characteristic narrow dark spot; lateral carinae of pronotum converging forwards; prozona about as long as metazona; prosternal spine cylindrical, apex obtusely rounded, slightly bent backwards; tegmina reaching upto or beyond the top of hind femur, without or with numerous brown spots; wings well developed; cercus in the male reaching a little beyond the supra-anal plate, flattened, gradually narrowed apically, slightly bent inwards, apex pointed; subgenital plate in female longer than broad, posterior margin triangularly expanded in the middle, on both sides slightly concavely excised; hind tibiae bluish-grey, with two whitish rings at the base and reddish apex and tarsus.

Distribution : India : Manipur, Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. It is also recorded from Meghalaya.

Elsewhere : Afghanistan, Bangladesh, E. Persia, Pakistan and Sri Lanka.

Genus ***Choroedocus*** Bolivar,

45. ****Choroedocus robustus*** (Serville)

1839. *Acridium robustum* Serville, *Hist. Nat. Ins. Orth.*, : 647.

1921. *Choroedocus robustus* : Uvarov, *Trans. ent. Soc. Lond.*, : 109.

Material examined : 2♂, 16 miles N. of Imphal on Dimapur Road, *Ca* 3500 ft., Nov. 1945, coll. Maj. M.L. Roonwal; 1♂, 1♀, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 3♂, 1♀, 3 kms. West of Moreh, 25.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Moderately large in size; greenish-brown and with yellow stripes; antennae filiform, reddish, longer than head and pronotum together, median segments almost twice as long as wide; head with a broad brown band running down beneath the eyes, bordered in front by a yellow stripe; vertex bordered with yellow on each side; fastigium of vertex short, slightly concave, obtusely rounded in front, curving into

frontal ridge; pronotum dark-brown, finely rugose-punctate, yellow-bordered band of vertex continued to the extremity; tegmina yellowish-subhyaline, and without spots; wings hyaline, with blusih iridescence towards base; hind tibiae and tarsi red; cercus wide, thick, strongly compressed, incurved and downcurved.

Distribution : India : Manipur, Arunachal Pradesh, Assam, and West Bengal. It is also recorded from Meghalaya, Sikkim and Tripura (in press).

Elsewhere : Bangladesh.

Subfamily CATANTOPINAE

Key to genera of CATANTOPINAE

1. Tegmina lateral, lobiform, extending beyond first abdominal segment ..... ***Paraconophyma*** Uvarov
— Tegmina and wing well developed, reaching upto or beyond the apex of abdomen 2
2. Prosternal tubercle cylindrical and rounded at apex; pronotum subcylindrical ..... ***Catantops*** Schaum
— Prosternal tubercle neither cylindrical nor with rounded apex; pronotum not subcylindrical 3
3. Pronotum constricted; prosternal tubercle conical ..... *Xenocatantops* Dirsh & Uvarov
— Pronotum not constricted; prosternal tubercle laterally compressed ..... ***Stenocatantops*** Dirsh & Uvarov

Genus ***Catantops*** Schaum, 1853

Key to species of *Catantops*

1. Male cercus simple, with subacute apex..... *pulchellus* (Walker)
— Male cercus with widened or truncate apex ..... *pinguis* (Stål)

46. ***Catantops pinguis pinguis*** (Stål)

1860. *Acridium (Catantops) pingue* Stål, *Eugen. Resa, Orth.*, : 330.

1956. *Catantops pinguis pinguis* : Dirsh, *Publções cult Co. Diam. Angola,* **28** : 103.

Material examined : 1♂, 1♀, 3 kms West of Moreh, 25.27, ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Prosternal tubercle short, subcylindrical with rounded apex; lateral lobe of pronotum without pattern; tegmina exceeds the hind knee by almost half the length of pronotum; external disc of hind femur with a black median spot below the upper carinula, reaching the middle of disc; male cercus less upcurved, with less broadened apex and less projecting upper apical angle.

Distribution : India : Manipur, Kerala, Sikkim and Tamil Nadu,

Elsewhere : Cambodia, China, Hainan, Myanmar and Taiwan.

47. ***Catantops pulchellus*** (Walker)

1870. *Cyrtacanthacris pulchella* Walker, *Cat. Derm. Salt.Brit. Mus.*, **3** : 574.

1943. *Catantops Pulchellus* : *Uvarov, Ann. Mag.* nat. Hist. (II) **10** : 127.

Material examined : 1♀, Sirohi, East District, 2.iii.1975, coll. P.T. Cherian; 1♂, New Churachandpur, 21.ix.1975, coll. M.S. Shishodia; 2♀, 1♂, Christian village, Churachandpur, 22.iii.1993, coll. D.K. Mondal; 2♀, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal; 1♀, Tuibong, Churachandpur, 25.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Prosternal tubercle subcylidrical, inclined backwards, with rounded and slightly broadened apex; lateral lobe of pronotum, in the upper half, with a narrow longitudinal stripe, the lower edge of which indistinct; external disc of hind femur with two longitudinal black stripes below the upper carinula, one in the middle, another in the apical third, and with a small irregular black spot at the base of knee; male cercus simple, broadened at the base, gradually narrowing towards apical part, and with rounded apex.

Measurements (in mm) : Body length ♂ 25-26.0, ♀ 27.0; pronotum ♂ 5.5-6.0, ♀ 6.5; tegmen ♂ 23.0, ♀ 24.4; hind femur ♂ 14.0, ♀ 15.5; hind tibiae ♂ 11-11.5, ♀ 13.0.

Distribution : Manipur, Andaman Islands & Karnataka. It is also recorded from Sikkim.

Genus ***Stenocatantops*** Dirsh & Uvarov

48. ***Stenocatantops splendens*** (Thunberg)

1815. *Gryllus splendens* Thunberg, *Mem. Acad. Sci. St.-Peterb.*, **5** : 236.

1953. *Stenocatantops splendens* : Dirsh & Uvarov, *Tijdschr. Ent.*, **96 (3)** : 237.

Material examined : 2♀, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♂, 1♀, 3 kms. West of Moreh, 27.ix.1975, coll. M.S. Shishodia; 1♀, Kongpokpi, Senapati Dist., 17.iii.1993, coll. D.K. Mondal; 1♂, 1♀, Christian village, Churachandpur, 22.iii.1993, coll. D.K. Mondal; 1♂, 3♀, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal; 1♂, 1♀, Tuibong, Churachandpur, 25.iii.1993, coll. D.K. Mondal; 2♂, Moirang, Bishnupur. 26.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Pronotum slightly narrowing forwards, posterior margin of metazona obtuse-angulate; prosternal tubercle strongly compressed laterally, apical three quarters strongly broadened and curved backwards; tegmina extending beyond the hind knee by more than the length of pronotum; hind femur slender; subgenital plate acutely conical; cercus slightly broadened at the base and slightly narrowing and incurved towards apex.

Distribution : Widely distributed species in India. It is also available in Andaman Islands.

Elsewhere : Borneo, Celebes, China, Hainan, Java, Korea, Malaya, Moluccas, Myanmar, Nepal, Philippines, Sri Lanka, Sumatra, Taiwan and Vietnam.

Genus ***Xenocatantops*** Dirsh & Uvarov

49. ***Xenocatantops humilis humilis*** (Serville)

1839. *Acridium humile* Serville, *Ins. Orth.*, : 622.

1953. Xenocatantops humilis humilis : Dirsh & Uvarov, *Tijdschr. Ent.*, **96**(3) : 237.

Material examined : 1♀, 16 kms North of Imphal on Dimapur road, *Ca* 3500 ft., 23.xi.1945, coll. Maj. M. L. Roonwal; 1♀, 5 kms. North of Moreh tea plantation, 26.ii.1975, coll. P.T. Cherian; 1♂, 1♀, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♀, Forest Rest House complex, Churachandpur, 11.xii.1992, coll. P.H. Roy; 1♀, Keibul Lamjao National Park, Bishnupur, 23.iii.1993, coll. D.K. Mondal; 1♀, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal.

Diagnostic characters : Prosternal tubercle slightly inclined backwards, conical with obtuse apex; pronotum slightly constricted, metazona divergent posteriorly; tegmina projecting hind knee for more than half pronotal length; external disc of hind femur yellowish with two brown fasciae, broadening towards the lower margin and fused with the brown lower margin of femur; male cercus simple with rounded apex.

Distribution : Widely distributed species in India. It is also available in Bangladesh, Borneo, Indo-China, Java, Kei Island, Lombok, Malaya, Myanmar, Nepal, New Guinea, Philippines, Sri Lanka, Sumatra, Thailand, S. Tibet, Vietnam and Yunnan.

Genus ***Paraconophyma*** Uvarov, 1921

50. ***Paraconophyma scabra*** (Walker)

1870. *Caloptenus scaber* Walker, *Cat. Derm. Salt. Brit. Mus.*, **4** : 707.

1921. *Paraconophyma scabra* : Uvarov, *Ann. Mag. nat. Hist.*, (9) **7** : 500, 501.

Material examined : 1♂, Song Sang area, Mao, 13.ix.1975. coll. M.S. Shishodia; 1♂, Ukhrul, 3.x.1975, coll. M.S. Shishodia.

Diagnostic characters : Median carina of pronotum interrupted by two or even three 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 strong; hind tibiae muddy green, with a pale sub-basal ring; supra-anal plate of male with hind angle straight, sharp.

Distribution : India : Manipur, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Subfamily CYRTACANTHACRIDINAE

Key to genera of CYRTACANTHACRIDINAE

1. Prosternal tubercle strongly curved backwards, touching or almost touching the mesosternum, inflated in middle, with conical apex 2

— Prosternal tubercle straight, vertical or slightly incurved backwards but far from reaching the mesosternum, conical or compressed 3

2. Pronotum strongly tectoform, 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 or dotted; costal area of tegmina with coarse net-like reticulations; male cercus with subacute apex ..... ***Cyrtacanthacris*** Walker

3. Tegmina with oblique venation in apical part, transverse veins situated obliquely to principal veins; hind tibiae with 7 spines on outer dorsal margin; prosternal tubercle conical; male cercus conical with acuminate apex; male subgenital plate acuminate, apex pointed ..... ***Pachyacris*** Uvarov

— Tegmina with straight venation in apical part, transverse veins forming almost right angle with principal veins; hind tibiae with 8 spines on outer dorsal margin; prosternal tubercle almost cylindrical with rounded apex; male subgenital plate long, curved, apex pointed. ..... ***Patanga*** Uvarov

Genus ***Cyrtacanthacris*** Walker, 1870

51. ****Cyrtacanthacris tatarica*** (Linnaeus)

1758. *Gryllus Locusta tataricus* Linnaeus, *Syst. Nat.* (**10th** ed) : 432.

1923. *Cyrtacanthacris tatarica* : Uvarov, *Bull. ent. Res.*, **14** : 39.

Material examined : 1♀, Burma border, E. Moreh, 26.ix.1975, coll. M.S. Shishodia.

Diagnostic characters : Frontal ridge smooth, slightly sulcated; pronotum thickly punctured, expanded and rounded behind; prosternal tubercle curved backward, almost touching mesbsternum, inflated in middle, with conical apex; tegmina long, subhyaline, covered with irregularly transverse brown reticulate spots; costal area with coarse net-like reticulations; wings more than twice as long as broad, hyaline, often stained with yellow or red at base.

Distribution : India : Manipur, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and West Bengal.

Elsewhere : Africa and Sahara, Bangladesh, Hainan, Indonesia, Myanmar, Madagascar, Nepal, Pakistan, Philippines, Saudi Arabia, Seychelles, Sri Lanka, Sumatra and Thailand.

Genus ***Chondracris*** Uvarov, 1923

52. ***Chondracris rosea*** (de Geer)

1773. *Acrydium roseum* de Geer, *Mem. Ins.*, **3** : 488.

1923. *Chondracris rosea* : Uvarov, *Bull. ent. Res.*, **14** : 39.

Material examined : 2♂, 1♀, New Churachandpur, 19, 21.ix.1975, coll. M.S. Shishodia; 1♀, Loktak lake, 20.ix.1975, coll. M.S. Shishodia; 2♀, 3 kms. West of Moreh, 25, 27.ix.1975, coll. M.S. Shishodia; 1♀, Imphal, 23.iii.1992, coll. D.K. Mondal & S.K. Ghosh.

Diagnostic characters : Large in size, body robust, coarsely punctured, uniformely green in colour; fastigium of vertex strongly sloping; median carina of pronotum moderately raised in prozona, straight in metazona; metazona feebly tectiform, disc forming distinct angles with the lateral lobes; tegmina exceeding the hind knee by one fourth of their total length; wings hyaline, with the base rose colour; hind tibiae and tarsi red.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. It is also recorded from Meghalaya.

Elsewhere : Bangladesh, Bhutan, China, Hainan Islands, Indonesia, Japan, Java, Korea,

Manchuria, Philippines, Taiwan, Thailand and Vietnam.

Genus ***Pachyacris*** Uvarov, 1923

53. ****Pachyacris vinosa*** (Walker)

1870. *Acridium vinosum* Walker, *Cat. Derm. Salt. Brit. Mus.*, **3** : 588.

1923. *Pachyacris vinosa* : Uvarov, *Ann. Mag. nat. Hist.*, (9) **11** : 478.

Material examined : 1♀, Tea plantation, 5 kms. North of Moreh, 26.ii.1975, coll. P.T. Cherian; 3♂, 3♀, Burma border, Moreh, 24.ix.1975, coll. M.S. Shishodia; 1♂, 3 kms West of Moreh, 25.ix.1975, coll. M.S. Shishodia; 1♂, Keibul Lamjao National Park, Bishnupur, 23.iii.1993, coll. D.K. Mondal; 2♂, 1♀, Sielmat, Churachandpur, 24.iii.1993, coll. D.K. Mondal.

Diagnostic characters : 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 principal veins; wings infumate, rosy at base;male cercus elongate conical with acuminate apex.

Measurements (In mm.) : Body length ♂ 30-33.5, ♀ 44-47; pronotum ♂ 7.5-9, ♀ 11; tegmen ♂ 30-33, ♀ 41; hind femur ♂ 18-20, ♀ 26.

Distribution : India : Manipur, Assam, Bihar, Goa, Himachal Prades, Mizoram, Orissa, Uttar Pradesh and West Bengal. It is also recorded from Meghalaya and Tripura.

Elsewhere : China, Myanmar and Nepal, Thailand and Tonking.

Genus ***Patanga*** Uvarov, 1923

54. ****Patanga succincta*** (Johansson)

1763. *Gryllus Locusta succinctus* Johansson, *Amoen. Acad. VI, Centr. Ins. rarior.*, : 398.

1923. *Patanga succincta* : Uvarov, *Ann. Mag. nat. Hist.*, (9) **12** : 364.

Material examined : 1♂, Ukhrul, 2.x.1975, coll. M.S. Shishodia.

Diagnostic characters : Size large; general colouration pale with grey, brown or more or less uniformly greyish or brownish; vertex in the middle with a broad yellow or reddish brown band continuing on pronotum; pronotum obtuse to rectangular at hind margin; supero-median carina of hind femur with fewer and more spaced serrulations; cerci in male stouter and broader, incrassately compressed.

Distribution : India : Manipur, Arunachal Pradesh, Delhi, Goa, Himachal Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. It is also recorded from Sikkim and Tripura.

Elsewhere : S. Arabian Desert, China, Hainan Islands, Japan, S.E. Asia, Myanmar, Sri Lanka and Taiwan.

SUMMARY

The present paper deals with 54 species of grasshoppers distributed under 2 families and 41 genera collected from the districts of Manipur. 52 species are recorded for the first time from the State. Four species are recorded for the first time from India. Key to the identification of families, subfamilies, genera and species of Acridoidea have been provided. Diagnostic characters are given for species. The distribution maps are also provided for each species known from various districts of Manipur.

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Table 1. Showing the distributional records of species of Acridoidea in the districts of Manipur

Name of species	Districts							
	Senapati	Tamenglong	Imphal	Ukhrul	Chandel	Bishnupur	Thoubal	Churachandpur
1. *Atractomorpha c. crenulata*	–	–	+	+	+	+	–	+
2. *Atractomorpha burri*	–	+	+	+	+	+	–	+
3. *Atractomorpha psittacina*	–	–	–	+	+	+	–	+
4. *Tagasta indica*	–	–	–	–	+	–	–	+
5. *Chlorizeina u. unicolor*	–	–	–	–	–	–	–	+
6. *Aularches miliaris*	–	–	–	–	–	–	–	+
7. *Acrida exaltata*	–	–	–	+	–	–	–	+
8. *Ceracris n. nigricornis*	–	+	+	+	–	–	–	–
9. *Rammeacris gracilis*	–	–	–	+	+	–	–	–
10. *Holopercna darjeelingensis*	+	–	–	–	–	–	–	–
11. *Phlaeoba antennata*	–	–	+	+	+	+	–	+
12. *Phlaeoba infumata*	+	+	+	+	+	+	+	+
13. *Phlaeoba panteli*	–	–	–	–	+	–	–	+
14. *Phlaeoba sikkimensis*	–	–	–	+	–	–	–	+
15. *Gelastorrhinus* sp.	–	–	–	–	+	–	–	–
16. *Gonista bicolor*	–	–	+	–	–	–	–	+
17. *Gonista sagitta*	–	–	–	–	+	–	–	+
18. *Dnopherula (Aulacobothrus) svenhedini*	–	–	+	–	–	–	–	+
19 *Aiolopus thalassinus tamulus*	–	–	–	–	+	–	–	+
20. *Dittopternis venusta*	–	–	–	–	+	–	–	+
21. *Heteropternis respondens*	–	–	–	+	+	+	–	+
22. *Pternoscirta cinctifemur*	–	–	–	–	–	–	–	+
23. *Oedaleus abruptus*	–	–	–	–	+	–	–	–
24. *Trilophidia annulata*	+	–	+	+	+	+	–	+
25. *Sphingonotus longipennis*	–	–	–	–	–	+	–	–
26. *Gesonula punctifrons*	–	–	+	–	+	+	–	+
27. *Spathosternum p. prasiniferum*	+	–	+	+	+	+	+	+
28. *Leptacris vittata*	–	–	–	–	–	–	–	+

Table 1. *Contd.*

Name of species	Districts							
	Senapati	Tamenglong	Imphal	Ukhrul	Chandel	Bishnupur	Thoubal	Churachandpur
29. *Hieroglyphus banian*	–	–	–	–	+	–	–	–
30. *Oxya h. hyla*	–	–	+	+	+	–	–	+
31. *Oxya hyla intricata*	+	–	–	–	–	–	–	+
32. *Oxya fuscovittata*	+	–	–	+	–	–	+	–
33. *Oxya velox*	–	–	–	–	–	+	–	–
34. *Oxya nitidula*	–	–	+	–	–	–	–	–
35. *Caryanda paravicina*	+	–	–	+	+	–	–	+
36. *Tauchira* sp.	–	–	–	+	–	–	–	–
37. *Epistaurus sinetyi*	–	–	–	–	+	–	–	–
38. *Eucoptacra binghami*	–	–	–	–	+	–	–	+
39. *Eucoptacra saturata*	–	–	–	–	+	–	–	–
40. *Eucoptacra praemorsa*	–	–	–	–	–	–	–	+
41. *Traulia azureipennis*	–	–	–	–	+	–	–	–
42. *Apalacris varicornis*	–	–	–	–	–	–	–	+
43. *Oxyrrhepes obtusa*	–	–	–	–	–	–	–	+
44. *Eyprepocnemis a. alacris*	–	–	–	+	–	–	–	+
45. *Choroedocus robustus*	–	–	+	–	+	–	–	+
46. *Catantops p. pinguis*	–	–	–	–	+	–	–	–
47. *Catantops pulchellus*	–	–	–	+	–	–	–	+
48. *Stenocatantops splendens*	+	–	–	–	+	+	–	+
49. *Xenocatantops h. humilis*	–	–	+	–	+	+	–	+
50. *Paraconophyma scabra*	+	–	–	+	–	–	–	–
51. *Cyrtacanthacris tatarica*	–	–	–	–	+	–	–	–
52. *Chondracris rosea*	–	–	+	–	+	+	–	+
53. *Pachyacris vinosa*	–	–	–	–	+	+	–	+
54. *Patanga succincta*	–	–	–	+	–	–	–	–

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INSECTA : ORTHOPTERA : TETTIGONIIDAE

M. S. SHISHODIA and R. S. BARMAN
Zoological Survey of India, M Block, New Alipore, Kolkata 700 053

INTRODUCTION

Manipur is a small hilly State in the extreme east of India. It has two distinct regions, the plains and the hills. Manipur presents salubrious climate, natural beauty of forests, lakes waterfalls, green meadows and bustling life of the plains.

The superfamily Tettigonioidea includes long-horned grasshoppers. They are characterised by the long antennae, four segmented tarsi, much enlarged and long antennae, four segmented tarsi, much enlarged and long hind legs, lateral auditory organs not present at the base of abdomen and the ovipositor sickle-, dagger-, sword- or neddle-like. These insects are found throughout the habitat range of Orthoptera, but are more predominantly tropical and arboreal and less well represented at higher altitudes and latitudes. There are about 4765 species under 860 genera throughout the World (Kevan, 1982). Out of these only 80 species under 72 genera are reported from India (Barman, 1991). Generally these insects are phytophagous, and few species have been reported to damage agricultural crops.

Recently Ingrisch and Shishodia (1998) reported 3 and described one new species from Manipur. The present paper includes 17 species under 15 genera. Species marked with an asterisk (*) are newly recorded from Manipur. Intensive Survey may reveal many more species.

The classification is followed here after Rentz (1979).

SYSTEMATIC ACCOUNTANT

Order	ORTHOPTERA
Sub-order	ENSIFERA
Family	TETTIGONIIDAE
Sub-Family	TETTIGONIOIDEA

Key to the Subfamilies

1. Head globose, not usually slanted or frontally flattened ; dorsal surface of fore tibiae flat or slightly concave ; proximal tarsomere cylindrical, not laterally sulcate ; ovipositor usually short and upturned, flattened laterally, margins usually crenulate ; prosternum unarmed ..... PHANEROPTERINAE

— Without above combination of characters 2

2. Antennal sockets strongly margined, produced especially on internal dorsal margins ; thoracic auditory spiracle small, not hidden by pronotum ..... PSEUDOPHYLLINAE

— Antennal sockets not strongly margined and especially not on internal dorsal margins ; thoracic auditory spiracle large, elongate, and in most species, often wholly or partially concealed by pronotum 3

3. Tibial auditory structure typically open, if closed on one side or both sides then slit directed laterally, the opening broad and its margins undulate ; prosternum armed with a pair of prominent spike-like processes ..... MECOPODINAE

— Tibial auditory structure with foramina (either open or closed) directed distinctly dorsally in relation to position on tibia, if open, the opening of nearly uniform width.....4

4. Prosternum unarmed ; small, delicate, usually arboreal species, greenish or greenish yellow in colour (tibial auditory structure of most species open) ..... MECONEMATINAE

— Prosternum armed or not ; combination of characters not as above 5

5. Fore tibia usually bearing 5-7 long, movable outwardly bowed opposing spines ; fastigium of vertex narrow, strongly laterally compressed, its greatest width less than that of its antennal articles in most species, usually sulcate (fore and middle femora of many species bear heavy teeth) ..... LISTROSCELIDINAE

— Fore tibia of most species with spines not usually lengthened and not as long as or longer than the ist 2 tarsomeres combined ; fastigium of vertex variable in width and not sulcate ..... CONOCEPHALINAE

Subfamily PHANEROPTERINAE

Genus *Letana* Walker, 1869

1. * *Letana linearis* Walker

1869. *Letana linearis* Walker, *Cat. Derm. Salt. Brit. Mus.*, **2** : 278.

1990. *Letana linearis* : Ingrisch, *Ent. Scand.* **21** (3) : 267.

Material examined : 1♂, M. E. School, Mao, Senapati Dist., 16. ix. 1975, coll. *M. S. Shishodia* ; 1♂, Tamenglong, 20. ix. 1975, coll. *A. K. Mondal.*

Diagnosis : Tegmina slightly surpassing hind knees ; ninth tergite considerably projecting behind, with a shallow depression in the middle of dorsum ; supra-anal plate with a shallow depression in middle ; subgenital plate's lateral lobes with apico-internal angle bulging and apico-external angle prolonged into a short finger-shaped.

Distribution : India : Manipur, Sikkim and Nepal.

2. * *Letana gracilis* Ingrisch

1990. *Letana gracilis* Ingrisch, *Ent. Scand.*, **21** (3) : 272.

Material examined : 1♂, Hundung, Ukhrul, 2. x. 1975, coll. M. S. Shishodia.

Diagnosis : Antennae green, annulated with black in basal part, black with sparse white annulation in apical part ; pronotum normal ; stridulatory field longer than broad ; supra-anal plate with a shallow, irregular, longitudinal groove, apex subtruncate ; cerci substraight ; subgenital plate lateral lobes with apex rounded ; phallus sclerite large, shining black, apical part in dorsal view spathulated with numerous small teeth ; tegmina with dark brown spot on anal field, and without longitudinal band on dorsal field.

Distribution : India : Manipur, Assam and Mizoram.

Genus *Elimaea* Stål, 1874

Subgenus *Orthelimaea* Karny, 1926

3. *Elimaea (Orthelimaea) insignis* (Walker)

1869. *Phaneroptera insignis* Walker, *Cat. Derm. Salt. Brit. Mus.*, **2** : 344.

1990. *Elimaea (Orthelimaea) insignis* : Ingrisch, *Spixiana*, **13** (2) : 157.

Material examined : 1♀, Sang Song, Mao, 13. ix. 1975, coll. M. S. Shishodia ; 1♂, Bungmual, Churachandpur, 19. ix. 1975, coll. M. S. Shishodia.

Diagnosis : Antennae with black and white rings ; radial sector of tegmina usually with 3 or 4 branches ; stridulatory file moderately produced ; cerci with apex excurved. dorsal apex with a long appendages.

Distribution : India : Manipur and Assam.

Elsewhere : China and Nepal.

4. * *Elimaea (Elimaea) subcarinata* (Stål)

1998. *Elimaea (Elimaea) subcarinata* Ingrisch, *Tijdschr. Ent.*, **141** : 73, 83.

Material examined : 1♂, Awungtang, Ukhrul, 1. x. 1975, coll. M. S. Shishodia.

Diagnosis : Vertex subcaudate at apex ;

fastigium furrowed dorsally ; anterior femur compressed, phasmid-like curved ; radius sector of tegmen branching before the middle ; stridulatory file with 9 - 17 teeth ; cerci strongly curved, apex subacute on dorso-cranial side ; subgenital plate split into two subacute to subobtuse lobes in apical third.

Distribution : India : Manipur and Mizoram.

Elsewhere : Hongkong and Thailand.

Genus ***Ducetia*** Stål, 1874

5. * ***Ducetia japonica*** (Thunberg)

1815. *Locusta japonica* : Thunberg, *Mem. Acad. Sci. St. Petersb. (Sci. Phys.)*,**5** : 282.

1961. *Locusta japonica* : Ragge, *Bull. Br. Mus. nat. Hist.* (Ent.), **10** (5) : 182.

Material examined : 1♂, Sang Song, Mao, 13. ix. 1975, coll. M. S. Shishodia ; 1♂, Churachandpur, 21. ix. 1975, coll. M. S. Shishodia.

Diagnosis : Tegmina less than 35 mm. in length, posterior radial sector with 5-6 branches ; hind wings well developed ; cerci with interno-ventral ridge at apex ; subgenital plate deeply bifurcate with contiguous lobes and without apical teeth.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Jammu & Kashmir, Sikkim, Tamil Nadu and West Bengal. It is also studied from Madhya Pradesh and Meghalaya.

Elsewhere : Ragge (1961) stated that this species is found throughout Indonesia, extending eastwards to Solomon Island and southwards to Australia.

Genus ***Phaneroptera*** Serville, 1831

6. * ***Phaneroptera gracilis*** Burmeister

1838. *Phaneroptera gracilis* Burmeister, *Handb, Entomal.*, : 690.

1956. *Phaneroptera gracilis* : Ragge, *Proc. Zool. Soc. Lond.*, **127** : 250.

Material examined : 1♂, Mouviphai, Churachandpur, 2. iv. 1992, coll. D. K. Mondal ; 1♀, Longjmanbhai, Churachandpur, 16. vi. 1993, coll. R. S. Barman.

Diagnosis : Lateral pronotal lobes longer than deep ; hind femora very slender ; cerci very long, widen subapically before suddenly tapering to a point ; supra-anal plate longer than broad and obtusely rounded at apex ; subgenital plate elongate, bifurcated at apical part as shown by Ragge (1956).

Distribution : India : Manipur, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Maldive Islands, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : It is distributed in Australian, Ethiopian and Oriental regions.

Genus ***Isopsera*** Brunner, 1878

7. ***Isopsera spinosa*** Ingrisch

1990. *Isopsera spinosa* Ingrisch, *Spixiana*, **13** (2) : 159.

Material examined : 1♂, 2 kms. north from Mao, 14. ix. 1975, coll. M. S. Shishodia.

Diagnosis : Very similar to *I. stylata* Brunner, but differs from it in the possession of spines on the ventral margin of anterior and middle femora ; apex of cerci with a small tooth ; and subgenital plate not tricarinate.

Measurements (in mm.) : Body length 25.5 ; pronotum 6.5 ; tegmen 49.0 and hind femur 27.0.

Distribution : India : Manipur, Arunachal Pradesh and West Bengal.

Elsewhere : China and Nepal.

Genus ***Khaoyaiana*** Ingrisch, 1990

8. * ***Khaoyaiana nitens*** Ingrisch

1990. *Khaoyaiana nitens* Ingrisch, *Senckenbergiana biol.*, **70** (1989) (1/3) : 106.

Material examined : 1♂, Lathampuveng, Churachandpur, 3. iii. 1992, coll. D. K. Mondal.

Diagnosis : Very similar to the identified specimen of Ingrisch and Shishodia (1998). Eyes rounded ; antennae not surpassing the tegmina ;

pronotum more or less straight infront, convex posteriorly ; apical tergite convex ; supra-anal plate long, tongue-shaped ; cerci long, symmetrical ; subgenital plate long, wide at baso-laterally.

Measurements (in mm.) : Body length 21.0 ; pronotum 7.0 ; tegmen 42.5 ; hind femur 25.0 ; hind tibia 29.0 and hind wing 47.0.

Distribution : India : Manipur and Mizoram.

Elsewhere : China and Central Thailand.

Subfamily MECOPODINAE

Genus ***Mecopoda*** Serville, 1831

9. * ***Mecopoda elongata*** (Linnaeus)

1758. *Gryllus elongatus* Linnaeus, *Sys. Nat.* (10 ed.), **1** : 429.

1922. *Mecopoda elongata* : Hebard, *Proc. Acad. nat. Sci. Philad.*, **74** : 182.

Material examined : 2 ♀, Tamenglong, 24. xi. 1992, coll. A. K. Mondal.

Diagnosis : Fastigium wide ; pronotum almost double the width than the anterior region ; subcosta sharply sinuate just behind the middle ; ovipositor straight, slightly narrowed at apex.

Distribution : India : Manipur, Andaman & Nicobar Islands, Assam, Karnataka, Maharashtra, Meghalaya, Orissa, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Australia ; Borneo ; Aru-Ina ; Burn-Ina ; China ; Japan ; Malacca ; New Guinea ; Philippines ; Singapore ; Sunda Islands ; Sulawesi ; Taiwan and Tonkin.

Subfamily LISTROSCELIDINAE

Genus ***Hexacentrus*** Serville, 1831

10. * ***Hexacentrus unicolor*** Serville

1831. *Hexacentrus unicolor* Serville, *Ann. Sci., Nat.*, **22** : 146.

1912. *Hexacentrus unicolor* : Karny, *Gen. Ins.*, Fasc. **131** : 16.

Material examined : 2 ♀, Moreh, 25.ix. 1975 coll. M. S. Shishodia ; 1 ♀, Uchathal, 30.xi.1992, coll. A. K. Mondal.

Diagnosis : Colour brownish-yellow or greenish-yellow ; a special dark-brown coloured band covers the pro, meso and metanotum ; left anterior tibia with 6 external and 5 internal and right anterior tibia with 5 external and 6 internal spines ; hind knee lobes with a spine on each side ; hind femora with widely spaced big spines and between them lie small spines ; hind tibiae with small spines on dorsal and ventral face externally and internally.

Measurements (in mm.) : Body length 20.0 ; pronotum 6-6.5 ; tegmen 37-40 ; anterior tibia 7.5-8.5 ; anterior femur 8.5 ; hind femur 22.0 ; hind tibia 21.0 ; ovipositor length 10-11.9 ; ovipositor width 3.0.

Distribution : Oriental region. In India it is distributed in Manipur and Mizoram.

Subfamily CONOCEPHALINAE

Genus ***Conocephalus*** Thunberg, 1815

11. * ***Conocephalus maculatus*** (Le Guillou)

1841. *Xiphidion maculatum* Le Guillou, *Rev. Zool.*, : 294.

1980. *Conocephalus maculatus* : Pitkin, *Bull. Br. Mus. nat. Hist.* (Ent.), **41** (5) : 344.

Material examined : 2 ♂, Shiroy, East Ukhrul, 2. iii. 1975, coll. P. T. Cherian ; 5 ♂, E. Ukhrul, 4. iii. 1975, coll. P. T. Cherian ; 1 ♂, Sang Song area, Mao, 13. ix. 1975, coll. M. S. Shishodia ; 1 ♂, Burma border, East Moreh, 29. ix. 1975, coll. M. S. Shishodia ; 1 ♂, Missionary School, Ukhrul, 3. x. 1975, coll. M. S. Shishodia ; 1 ♂, F. R. H. Compound, Imphal, 6. x. 1975, coll. M. S. Shishodia ; 1 ♂, 1 ♀, Vaipai, Churachandpur, 900m, 3. iii. 1992, coll. A. K. Mondal ; 2 ♂, Santipur, Churachandpur, 3. iv. 1992, coll. A. K. Hazra ; 1 ♂, Kangpokpi, Senapati, 14. iv. 1992, coll. S. K. Saha ; 1 ♀, Kakching bazar, 1. xii. 1992, coll. P. H. Roy ; 1 ♂, 1 ♀, Shiroy, Ukhrul, 13. xii. coll. A. R. Lahiri ; 3 ♂, 1 ♀, Mamangleikei, Churachandpur, 27. iii. 1993, coll. D. K. Mondal ; 1 ♂, 3 ♀, Churachandpur, 18. vi. 1993, coll. R. S. Barman.

Diagnosis : Prosternum bispinose ; hind femora

unarmed ventrally ; tegmina pigmented with large dark spots ; no markings in the costal or precostal area ; male cerci with one internal spine ; ovipositor short and relatively straight.

Distribution : India : Manipur, Sikkim and Tripura. It is also recorded from Jammu & Kashmir, Kerala and Tamil Nadu in India.

Elsewhere : Australia ; Papua New Guinea and Nepal.

Genus ***Euconocephalus*** Karny, 1907

12. **** Euconocephalus indicus*** Redtenbacher

1891. *Conocephalus indicus* Redtenbacher, *Verh. Zool.-bot. Ges. Wien,* **41** : 408.

1992. *Euconocephalus indicus* : Hebard, *Proc. Acad. nat. Sci. Philad.,* **74** : 238.

Material examined : 1 ♀, Tamenglong, 24. xi. 1992, coll. A. K. Mondal.

Diagnosis : General colouration yellowish brown ; fastigium of vertex short, about as long as broad ; antennae not annulated ; mandibles and hind femur unicolorous.

Measurements (in mm.) : Body length 29.0 ; head 7.0 ; fastigium 2.2 ; pronotum 6.2 ; tegmen 43.0 ; hind femur 19.0; hind tibia 17.0 and ovipositor 19.0.

Distribution : It is distributed in Oriental region. In India, it is recorded from Mizoram. Redtenbacher (1891) described this species from Himalaya (Mountains), without giving precise locality. Hebard (1922) mentioned its record from China, Borneo, Java, Myanmar (British Straits settlements), Peak Downs, Sumatra and Australia. Ingrisch & Shishodia have also mentioned its record from Thailand.

Genus ***Pseudorhynchus*** Serville, 1838

13. ****Pseudorhynchus*** sp.

1838. *Pseudorhynchus* Serville, *Histoire naturelle des Insectes, Orthopteres,* : 509.

Material examined : 1 ♂, Sielmat, Churachandpur, 20. iii. 1993, coll. D. K. Mondal.

Diagnosis : Fastigium of vertex sharply pointed, bearing ventral tooth at base ; pronotum without lateral carinae ; prostarnum with two well developed spines ; meso and metasternum with paired lobes, not produced into spines ; fore coxae with well developed spines ; fore tibiae with slit-like tympanal opening on each side ; hind femora with ventral spines.

Distribution : The genus is distributed in Old World tropics, including most of Oriental Region, Japan and Australia. Its range in Africa extends from northern limit to the eastern part of Cape provinces in the South.

Genus ***Pseudosubria*** Karny, 1925

14. ****Pseudosubria hastata*** Ingrisch & Shishodia

1997. *Pseudosubria hastata* Ingrisch & Shishodia, *Entomol. Z,* **107** (12) : 510.

Material examined : 1 ♂, Churachandpur, 3. iv. 1992, coll. A. K. Hazra.

Diagnosis : Fastigium of vertex conical, apex obtuse ; pronotum disc narrow, flattened, lateral angles rounded, anterior and posterior margins broadly rounded, transverse sulcus interrupted in the middle ; tegmina reach upto the hind knee ; cerci compressed, wide towards apex, apex obliquely subtruncate with dorsal angle, ventral angle projecting, area in between slightly sinuate, ventral margin with a short obtuse projection behind middle, another projection long, curved, finger-shaped and with obtuse apex inserting in ventral area of internal surface ; subgenital plate with lateral area sloping with one medial and two lateral rounded carinae ; titillates completely fuseed.

General colouration yellowish—brown, dorsum of fastigum, vertex and pronotum with a dark-brown longitudinal band.

Measurements (in mm.) : Body length 21.0 ; pronotum length 6.5 ; tegmen length 14.5 ; hind femur 11.0 ; hind tibia 10.0.

Distribution : India : Manipur and Mizoram.

Remarks : This specimen is shorter than Holotype of Mizoram.

Subfamily PSEUDOPHYLLINAE

Genus ***Sathrophyllia*** Stål, 1874

15. * ***Sathrophyllia rugosa*** (Linnaeus)

1758. *Gryllus (Tettignonia) rugosa* Linnaeus, *Syst. Nat.* (10th ed.) **1** : 430.

1962. *Sathrophyllia rogosa* : Beier, *Das Tierreich,* **73** : 199-200.

Material examined : 1 ♀, Churachandpur, 18. v. 1993, coll. R. S. Barman.

Diagnosis : Colour ash-brown ; middle crest of pronotum large, often swollen on the basal part of pronotum ; body rugose ; tegmina convex ; femora with semi-rounded grooves ventrally ; all the tibiae spotted ; ovipositor blade-like.

Distribution : India : Manipur, Karnataka, Meghalaya, Sikkim, Tamil Nadu and West Bengal.

Elsewhere : Java (?) ; Sri Lanka and Sumatra.

Genus ***Hemigyrus*** Brunner, 1893

16. ***Hemigyrus amplus*** Brunner

1893. *Hemigyrus amplus* Brunner, *Ann. Mus. civ. Stor. nat. Genova,* (2) **13** : 175.

1963. *Hemigyrus amplus* : Beier, *Orthopt, Catalog,*, part **5** : 40.

Material examined : 1 ♂, New Churachandpur, 21. ix. 1975, coll. M. S. Shishodia.

Diagnosis : This species is slightly more slender than the description given by Beier (1954, 1962).

Measurements (in mm.) Body length 38.5 ; pronotum length 10.0 ; tegmen length 58.5 ; hind femur length 26.0 and ovipositor 20.5.

Distribution : Previously known from Myanmar. Ingrisch and Shishodia (1998) have reported it from Manipur.

Subfamily MECONEMATINAE

Genus ***Kuzicus*** Gorochov, 1993

Subgenus ***Kuzicus*** Gorochov, 1993

17. ***Kuzicus (Kuzicus) megaterminatus*** Ingrisch & Shishodia

1998. *Kuzicus (Kuzicus) megaterminatus* Ingrisch & Shishodia, *Mitt. schweiz. ent. Ges.,* **71** : 367.

Material examined : 1 ♂, Mamang Leikei, Churachandpur, 27. iii. 1993, coll. D. K. Mondal.

Diagnosis : This species is near to *K. denticulatus* (Karny, 1926) from Malaysia. It differs by the tenth abdominal tergite fissing to almost base, by the shape of the subgenital plate, the phallus sclerites and by the cerci possessing an internal tooth. The abdominal terminalia is also similar to *Xiphidiopsis denticuloides* Kevan, 1993.

Measurements (in mm.) : Body length 14–15 ; pronotum 3.8–4 ; tegmen 16–17 ; hind wing 4.5 ; hind femur 11.0.

Distribution : India : Manipur and West Bengal.

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INSECTA : BLATTARIA (DICTYOPTERA)

S. K. MANDAL
Zoological Survey of India, 'M' Block, New Alipore, Kolkata 700 053

INTRODUCTION

Cockroaches are placed under the order Dictyoptera. Most of the cockroaches are of moderate to large size though some species measure only 4 mm. in length. They are brown or brownish-black in colour. The body is strongly depressed, head is covered by a shield-like structure of pronotum. Both the pair of wings differ in size and structure. Fore wings, generally, strong, tough, with marginal costal vein whereas the hind wings broad and membranous. Legs similar to each other, coxae large and colsely approximated and tarsi 5-segmented. Male genitalia asymmetrical and largely concealed by 9th sturnum which bears a pair of styles. Females with reduced ovipositor which is concealed by enlarged 7th abdominal sternum.

Majority of the members of the group are terestrial occuring predominently in tropical and sub-tropical regions. These insects do not fly well as the wings of many species are reduced or absent, specially in females. The majority of blattids are nocturnal, but the tree and bush species are diurgnal in habital.

Earlier workers, like Kirby (1904), Shelford (1906, 1909), Hanitsch (1915, 1923, 1929) did work on taxonomy of Blattaria. Later on Princis (1960-1971) and Roth (1967, 1990) have done notable work on this group. So far, nobody has studied the cockroaches of Manipur. The present paper will deal exclusively Blattaria of Manipur. It deals with 8 species under 6 genera and 5 families. All the species are recorded here for the first time from Manipur. The classification is followed here after Richards & Davis (1977).

SYSTEMATIC ACCOUNT

Order DICTYOPTERA

Suborder BLATTARIA

Family BLATTIDAE

Genus ***Periplaneta*** Burmeister, 1838

Body large and stout ; antennae long and slender ; eyes close together than antennal sockets ; tegmina leathery, extending beyond the abdomen in both sexes ; subgenital plate of male symmetrical.

1. ***Periplaneta americana*** (Linnaeus)

1758. *Blatta americana* Linnaeus, *Syst. Nat.* (10th ed.) **1** : 424.

1966. *Periplaneta americana* : Princis, *Orthopt. Catalog.*, part **8** : 404-456.

Material examined : 1, ♂, Lairo river bed, Moreh, 12. iv. 1992, coll. *A. K. Hazra*, 1♂, Churachandpur, 17. iv. 1993, coll. *R. S. Burman* ; 1 nymph, Mairang, 13. iv. 1998, coll. *P. H. Roy* and *S. K. Mandal.*

Diagnostic characters : Male : Large sized ; head with vertex exposed ; antennae long, surpassing by about 1.5 times of the body length ; pronotum smooth, flattened sides deflexed, wider behind the middle and narrowed in front ; tegmina extending beyond the apex of abdomen by 4 to 7 mm ; wings with anal fan ; supra-anal plate

deeply excised ; subgenital plate with weakly rounded at posterior margin ; femora and tibiae strongly spined ; posterior metatarsus longer than the remaining joints.

Measurements (in mm.) Body length 28-33 ; pronotum length 7.4-9 ; pronotum width 9-10.8 ; tegmen length 27.2-29.5.

Distribution : Cosmopolitan.

Remarks : This species thrives in tropical and subtropical climates all over the world. It is easily recognised by its remarkable pronotal design.

Genus ***Homalosilpha*** Stal, 1874

Closely resemble to *Periplaneta* Burmeistar, but the pronotum is discoidal, sides not deflexed and the greatest width in the middle.

2. ***Homalosilpha ustulata*** (Burmeister)

1836. *Periplaneta ustulata* Burmeister, *Handb. Ent. Berlin.* **2** (2) : 503.

1915. *Homalosilpha ustulata* : Hanitsch, *J. Straits Br. R. Asiat. Soc.*, **69** : 108.

1966. *Homalosilpha ustulata : Princis,* Orthopt. Catalog., part **8** : 458-459.

Material examined : 1 ♀ nymph, Ukhrul, 8. vi. 1992, coll. *A. K. Hazra.*

Diagnostic characters : Male : Size medium ; head with vertex exposed, ocelli small ; pronotum discoidal, greatest width before the middle, all angles broadly rounded, anterior margin transverse and posterior margin a little convex in shape ; abdomen with postero-lateral corners of all segments with tooth-like appearance ; supra-anal plate small, a deep emarginate at apex ; subgenital plate short with concave apex ; styles elongate and slender ; antero-ventral margin of front femur with a row of stout and large spines near the middle.

Colour : Reddish dark ; pronotum yellow in all sides, disc with two black curved longitudinal stripes medially ; tegmen uniformly brown.

Distribution : India : Manipur, Andaman Islands, Arunachal Pradesh, Assam, Orissa, Sikkim, Tripura and West Bengal.

Elsewhere : Borneo ; Celebes ; Java ; Malaysia and Sumatra.

Remarks : It is easily recognised by its remarkable pronotal design.

Genus ***Neostylopyga*** Shelford, 1911

3. ***Neostylopyga rhombifolia*** (Stal)

1813. *Blatta rhombifolia* Stal, *Repres. exact. Colores depre's natured. spectes etc.*, **2** : 5.

1915. *Stylopyga rhombifolia* : Hanitsch, *J. straits Br. R. Asiat. Soc.*, **69** : 105, 163.

1966. *Neostylopyga rhombifolia* : Princis, *Orthopt. Catalog.*, part **8** : 534-536.

Material examined : 1 ♂, Lairo river bed, Moreh, 13. iv. 1992, coll. *A. K. Hazra.*

Diagnostic characters : Male : Large sized ; head with the vertex a little exposed ; pronotum with anterior margin a little convex or entire, posterior margin transverse, lateral margin rounded and maximum width at the posterior margin ; tegmina reduced ; wings absent ; posterior lateral tergite a little indented ; supra-anal plate triangular with deeply notched medially ; subgenital plate compressed with obtuse apex ; style thin and slender.

Colour : Vertex black at the anterior margin ; reddish-yellow spots present from 1st to 5th terga laterally and 6th to last terga black.

Measurements (in mm.) : Body length 24-32 ; pronotum length 8-9 ; pronotum width 9-10.5 ; tegmen length .5-.7.

Distribution : India : Manipur, Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Madhya Pradesh, Orissa, Uttar Pradesh and West Bengal.

Elsewhere : Borneo ; Celebes ; Java ; Malaysia ; Sarawak and Sumatra.

Remarks : It is easily recognised by the rudiment tegmina with variegated markings. It is found in humus and decaying wood.

Family BLATTELLIDAE

Head with vertex a little exposed ; tegmina and wings present or absent ; legs long, slender ; anterior femur with a row of spines followed by a row of short spines or spine-like setae at apex, tarsal claws symmetrical ; cerci short not projecting beyond the supra-anal plate.

Genus ***Blattella*** Caudell, 1903

Key to the species

1. Supra-anal plate with posterior margin weakly convex ..... *germanica* (Linnaeus)

— Supra-anal plate with posterior margin broadly convex ..... *humbertiana* (Saussure)

4. ***Blattella germanica*** (Linnaeus)

1767. *Blatta germanica* Linnaeus *Sys. Naturae* (10th ed.) **1** (2) : 688.

1895. *Phylodromia germanica* : Tepper, *Trans. Re. S. Austral.*, **19** : 150.

1969. *Blattella germanica* : Princis, *Orthopt. Catalog., part* **13** : 807.

Material examined : 1♂, 1♀, Dimapur Road, Imphal, 20-30. ix. 1945, coll. *M. L. Roonwal* ; 1♂, Imphal, near forest office, 24. ii. 1975, coll. *P. T. Cherian* ; 1♂, Imphal, 31. iii. 1992, coll. *S. K. Gupta* ; 2♂♂, 2♀♀, Churachandpur, 2. iv. 1992, coll. *A. K. Hazra* ; 2♀♀, Churachandpur, 2. iv. 1992, coll. *D. K. Mondal* ; 1♂, Chandel, 1. xii. 1992, coll. *P. H. Roy* ; 1♂, Mairang, 13. iv. 1998, coll. *P. H. Roy* and *S. K. Mandal.*

Diagnostic characters : Male : Small sized ; head with vertex exposed ; eyes a little shorter than the twice of width between eyes ; pronotum transverse ; tegmen elongated, subcosta shorter than anal field, discoidal vein forked before the middle ; supra-anal plate semicircular or subtriangular ; subgenital plate with a large broad rounded lobe at the posterior margin ; styles symmetrical ; anteroventral margin of front femur armed with long spines on basal half, followed by short spines apically except three long unequal at apex.

Female : Supra-anal plate moderately traingular, apex obtusely emarginate ; subgenital plate large.

Colour : Testaceus.

Measurements (in mm.) : Male and Female : Body length 10.5-11.5, 10-12.2; pronotum length .3, .3 ; tegmen length 10.6-10.8, 11.4-12.2.

Distribution : Cosmoplitan.

5. ***Blattella humbertiana*** (Saussure)

1863. *Polyzosteria humbertiana* Saussure, *Mem. Soc. Geneve,* **17** : 131.

1969. *Blattella humbertiana* : Princis, *Orthopt. Catalog.,* part **13** : 842.

Material examined : 1♀, Moreh, 24. ix. 1975, coll. *M. S. Shishodia* ; 1♀, Imphal, Forest Campus, 11. x. 1975, coll. *M. S. Shishodia* ; 1♀, Churachandpur, 1. iv. 1992, coll. *A. K. Hazra* ; 1♂, Churachandpur, 19. xii. 1992, coll. *A. R. Lahiri.*

Diagnostic characters : Small sized ; head with vertex exposed ; supra-anal plate strongly transverse, distal margin broadly convex ; subgenital plate symmetrical ; female subgenital plate simple, free margin broadly convex but suddently and distinctly concave below the cerci.

Colour : General body colour brown ; head and frontal region yellowish brown.

Measurements (in mm.) : Male and female : Body length 9.5-10, 10-10.3.

Distribution : Widely distributed.

Remarks : This species is closely resembles to *Blattella germanica.*

Genus ***Symploce*** Hebard, 1916

6. ***Symploce biligata*** (Walker)

1868. *Ischnoptera biligata* Walker, *Cat. Blatt. Brit. Mus.* London : 123.

1924. *Ischnoptera fulvastra* : Chopard, *Rec. Indian. Mus.,* **26** : 168.

1969. *Symploce biligata* : Princis, *Orthopt. Catalog.*, Part **13** : 886.

Material examined : 1♂, 1♀, Keibul Nationa Park, 16. iv. 1998, coll. P. H. Roy.

Diagnostic characters : Male : Medium sized ; head free, vertex exposed, ocelli large and rounded ; tegmina and wings fully developed ; subgenital plate with hind margin indented on left side ; front femur with anteroventral margin with a row of heavy spines, they decrease in length distad and terminate into 1 or 2 large spines ; tarsal claws symmetrical, simple ; 7th tergite at the base with two big, rounded tubercles before glandular depression.

Measurements (in mm.) : Male and female ; Body length 11.5-13, 11-13 ; pronotum length 3-3.5, 3-3.5 ; tegmen length 13.5-15, 13-15.

Distribution : India : Manipur, Delhi, Maharashtra, Meghalay, Orissa and West Bengal.

Elsewhere : Celebes ; Indonesia ; Malaysia ; Sumatra and Sri Lanka.

Remarks : It is very close to *Gislenia himalyica* (Br.)

Family EPILAMPRIDAE

Antennae setaceous, never plumose, occassionally slightly incrassate ; pronotum variable in shape ; tegmina coriaceous, fully developed, reduced or absent ; supra-anal plate of male more or less quadrate with obtuse angles ; sub-bilobed in female ; femora with sparsely or strongly spined beneath ; middle metatarsus with long tarsal joints.

Genus ***Rhabdoblatta*** Kirby, 1903

Pronotum and anterior pair of wings always with distinct and less darker punctations ; anterior pair of wings flat, subcosta provided.

7. ***Rhabdoblatta excelsa*** (Navas)

1904. *Epilampra excelsa* Navas, *Bol. Soc. aragen. Cienc.* **3** : 131.

1967. *Rhabdoblatta excelsa* : Princis, *Orthopt. Catalog.*, Part **11** : 673.

Material examined : 1♀, Ukhrul, coll. *Revd. W. Pettigrew* (No date of collection).

Diagnostic characters : Female : Large sized ; head exposed ; eyes widely apart; pronotum elliptical, broader than long ; tegmina and wings fully developed, extending about one-third beyond the abdomen ; supra-anal plate quadrate ; subgenital plate equal, with a little notch in the middle ; femora with sparsely spined beneath ; tarsal claws symmetrical and very small arolia.

Colour : Deep brown : tegmina varies from testaceous and with casteneous dots.

Measurements (in mm.) : Female : Body length 44 ; pronotum length 12 ; pronotum width 14 ; tegmen length 50.

Distribution : India : Manipur, Sikkim.

Family PYCNOSCELIDAE

Genus ***Pycnoscelus*** Linnaeus, 1758

8. ***Pycnoscelus surinamensis*** (Linnaeus)

1758. *Blatta surinamensis* Linnaeus, *Syst. Naturae* (10th ed.) **1** : 424.

1964. *Pycnoscelus surinamensis* : Princis, *Orthopt. Catalog.*, part **6** : 264.

Material examined : 1♀, Imphal Valley, 3-5. vii. 1945, coll. *M. L. Roonwal* ; 1♀, 18 miles north of Imphal, 20-30. ix. 1945, coll. *M. L. Roonwal* ; 1 nymph, St. Thomas School, 8. iv. 1992, coll. *A. K. Hazra.*

Diagnostic characters : Female : Medium sized ; vertex exposed ; ocelli large, close to eyes ; pronotum rounded laterally, posterior margin convex ; tegmina and wings scarcely extending upto the apex of abdomen ; subgenital plate unequally rounded at apex.

Colour : Shiny, blackish-brown with buff lateral margin of the translucent tegmina ; anterior and lateral edge of pronotum also of buff colour.

Measurements (in mm.) : Female : Body length 16-20 ; pronotum length 4.5-5.4 ; pronotum width 6.5-7 ; tegmen length 18-20.

Distribution : Cosmopolitan.

Remarks : This species is normally exists in female sex. Occassionally parthenogenetic males

occur in the culture of *surinamensis*, but they are nonfunctional when mated to parthenogenetic females (Roth, 1967).

SUMMARY

This paper deals with 8 species, distributed over 6 genera and 5 families. All the species are recorded here for the first time from Manipur.

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INSECTA : ISOPTERA

P. K. MAITI*, N. SAHA and P. H. ROY
Zoological Survey of India, M Block, New Alipore, Kolkata–700 053

INTRODUCTION

General : The State of Manipur (22,347 sq. km with population of 7,80,037) constitutes the central part of Purbanchal Hills Tracts of the north-eastern India. The central plain of the State known as Imphal or Manipur Valley occupies about 80% of the total area which supports 65% of the total population. As such, Manipur Valley is over populated and resulted into the removal of natural vegetation to a large extent. The surrounding hill tract covers with evergreen tropical forest still remains undisturbed in part. These portions are abound with animal life including the occurrence of the vast magnitude of insects.

History : The termite fauna of Manipur is expected to be very rich, but poorly known so far due to lack of proper exploration. The first records of termites from the State are *Odontotermes horni* (Wasmann) and *Microtermes imphalensis* Roonwal and Chhotani dealt in the termite monograph of the Assam Region (Roonwal and Chhotani, 1962).

After a long gap, altogether nine species were added by Lahiri and Ghosh (1980), all of which are new records to the fauna of the Manipur State. The species are *Microcerotermes crassus* Synder, *Pericapritermes durga* (Roonwal & Chhotani), *Pseudocapritermes tikadari* (Roonwal & Chhotani), *Macrotermes annandalei* Silvestri, *Odontotermes feae* (Wasmann), *O. obesus* (Rambur), *O. parvidens* Holmgren and Holmgren, *Hypotermes obscuriceps* (Wasmann), *H. xenotermitis* (Wasmann) (= *H. nongpriangi* Roonwal & Sen-Sarma) and *Nasutitermes gardneri* Snyder. One more species, namely, *Odontotermes giriensis* Roonwal and Chhotani was added by Chhotani (1997). Two more species, namely, *Odontotermes assmuthi* Holmgren and *O. paralatigula* Chatterjee and Sen-Sarma, and a new species, namely, *Odontotermes singsiti* Bose was further added to the existing fauna of Manipur by Bose (1999) in her recent contribution dealing with the fauna of the north eastern India. As such, the total number of termites from the State stands to a total of 16 species altogether. She had further reported the occurrence of a species of *Indotermes* represented by workers only, on which species could hardly be identified.

Recently, a fairly good collection has been accumulated in the Isoptera Section, Z.S.I., made mostly through surveys by the Sectional staff members led by Sri P. H. Roy. This collection has been further augmented by some small collections made by other survey parties of the Z.S.I. from 1993-1995. The study of these collections have resulted to the recognision of 13 species, of which six species, namely, *Reticulitermes assamensis* Gardner, *Pericapritermes assamensis* Mathur and Thapa, *Pericapritermes tetraphilus* (Silvestri), *Macrotermes hopini* Roonwal and Sen-Sarma, *Odontotermes profeae* Akhtar and *O. kapuri* Roonwal and Chhotani were real addition to the existing fauna.

Thus, to sum up the number of species occurring in the State stands to a total of 22 species.

* Emeritus Scientist, Zoological Survey of India, Kolkata

SYSTEMATIC ACCOUNT

General Morphology : Termites have three major castes, namely, imago, soldier and worker. The general morphology has been dealt recently by Roonwal and Chhotani (1989) in "Fauna of India" including the characters of taxonomic importance. Identification of termite species is mostly based on these characteristic features of soldier caste. In addition, the measurements of the characters of the soldiers used for the preparation of keys are as follows : Length and width of head, length of mandibles (except in nasute forms) and distance of tooth (if present) from the tip of the mandible, length and width of pronotum and postmentum, number of antennal segments, etc. Since such characters are illustrated and defined in numerous papers, these are not incorporated here just to avoid repetition.

Best method of collection of soil termites is with the help of a shovel pushing it into the soil, putting the material on a tray and ultimately picking them up with the help of a scissor. Wood-eating forms are collected by the forceps after cutting the wood with the help of a hand axe. All the collections are preserved in 70% alcohol kept in small vials. Collection of queen from the soil nest needs caution to trace the royal chamber wherein the queen lives.

LIST OF TAXA

List of species already known

Family TERMITIDAE

Subfamily AMITERMITINAE

Genus ***Microcerotermes*** Silvestri

1. *Microcerotermes* ***crassus*** Snyder

Subfamily (ii) TERMITINAE

Genus ***Pericapritermes*** Silvestri

2. *Pericapritermes durga* (Roonwal and Chhotani)

Genus ***Pseudocapritermes*** Kemner

3. *Pseudocapritermes tikadari* (Roonwal and Chhotani)

Subfamily (iii) MACROTERMITINAE

Genus ***Macrotermes*** Holmgren

4. *Macrotermes annandalei* Silvestri

Genus ***Odontotermes*** Holmgren

5. *Odontotermes assmuthi* Holmgren
6. *O. feae* (Wasmann)
7. *O. giriensis* Roonwal and Chhotani
8. *O. horni* (Wasmann)
9. *O. obesus* (Rambur)
10. *O. paralatigula* Chatterjee and Thakur
11. *O. parvidens* Holmgren and Holmgren
14. *O. singsiti* Bose

Genus ***Hypotermes*** Holmgren

13. *Hypotermes obscuriceps* (Wasmann)
14. *H. xenotermitis* (Wasmann)

Genus ***Microtermes*** Wasmann

15. *Microtermes imphalensis* Roonwal and Chhotani

Subfamily (iv) NASUTITERMITINAE

Genus ***Nasutitermes*** Bank

16. *Nasutitermes gardneri* Snyder

List of species recorded for the first time

Family I. RHINOTERMITIDAE

Genus ***Reticulitermes*** Holmgren

1. *Reticulitermes assamensis* Gardner

Family II. TERMITIDAE

Subfamily (i) TERMITINAE

Genus ***Pericapritermes*** Silvestri

2. *Pericapritermes assamensis* (Mathur and Thapa)
3. *P. tetraphilus* (Silvestri)

Subfamily (ii) MACROTERMITINAE

Genus ***Macrotermes*** Holmgren

4. *Macrotermes hopini* Roonwal and Sen-Sarma

Genus ***Odontotermes*** Holmgren

5. *Odontotermes profeae* Akhtar
6. *O. kapuri* Roonwal and Chhotani

Key to the families of ISOPTERA (Soldiers)

1 (2) Pronotum flat; mandibles without serration on inner margin or almost with a few at base..... Family RHINOTERMITIDAE

2 (1) Pronotum saddle-shaped; mandibles either with serration or with a distinct teeth.... ..... Family TERMITIDAE

Key to genera of TERMITIDAE (Soldiers)

1. Head projected infront into a nasus; mandibles degenerated and non-functional ....***Nasutitermes*** Bank

– Head not projected in front into a nasus; mandibles well developed and functional 2

2. Mandibles asymmetrical, long and slender; left mandible strongly twisted 3

– Mandibles symmetrical and moderately long; left mandible not exactly straight but without any lateral projection 4

3. Distal tip of the left mandible bent like a beak; anterior margin of labrum deeply concave with antero-lateral corners distinctly projected .....***Pseudocapritermes*** Kemner

– Distal tip of the left mandible not bent like a beak, rather thick and blunt; anterior margin of labrum substraight and antero-lateral corners almost absent, if present very small ..... ***Pericapritermes*** Silvestri

4. Head subrectangular; postmentum narrow, not strongly arched at the middle; mandibles with inner margins serrated, without any definite dentition .... ***Microcerotermes*** Silvestri

– Head broadly to rectangularly oval, narrowed anteriorly; postmentum broad, strongly arched at the middle; mandibles with inner margins either with a minute teeth or with 3-5 crenulations or definite dentition on left mandible 5

5. Mandibles short, thin and delicate, each with a minute denticle at the middle; small species, soldiers smaller than worker..... ..... ***Microtermes*** Wasmann

– Mandibles large and strong, with 3-5 crenulations or with a definite teeth on left mandible; comparatively larger species, generally soldiers larger than workers 6

6. Left mandible without tooth but with 3-5 crenulations at basal half .... ***Hypotermes*** Holmgren

– Left mandible with a tooth placed at different positions on its inner margin, without any crenulation ..... ***Odontotermes*** Holmgren

TAXONOMIC ACCOUNT OF SPECIES

Family RHINOTERMITIDAE

Genus ***Reticulitermes*** Holmgren

1. ***Reticulitermes assamensis*** Gardner

1944. *Reticulitermes assamensis* Gardner, *Indian J. Ent.*, **6** : 105-106, *S., Type-locality* : Sadiya, Assam, India.

1999. *Reticulitermes assamensis* : Bose, *Rec. Zool. Surv. India, Occ. Paper* No. **171** : 47-49, fig. 12.

2000. *Reticulitermes assamensis* : Maiti *et al., State Fauna Series* : *Fauna of Sikkim,* Part :

Material examined : (i) 5 S and sev. W Ukrul, coll. *P. H. Roy and party,* 16.4.1998, ex. gallery on the fallen tree; (ii) 5 S and sev. W Ukrul, coll. *P.H. Roy and party.* 16.4.1998, ex. gallery on the fencing pole.

Measurements (in mm) : Head length to lateral base of mandible, 2.07 2.10; max. head width 1.23 1.25; mandible length 1.07 1.10; Head height, 1.11; pronotal length 0.43 0.48; pronotal width 0.77 0.80; no. of antennal segments, 15 16.

Distribution : India : Manipur : Ukrul; Assam, Arunachal Pradesh, Meghalaya, Sikkim, West Bengal. Elsewhere : Bhutan and China.

Remarks : It is predominently a species of the temparate region in India, especially in the Himalayan tract. The species is sparsely occurs in the State of Manipur and is found in the gallery on felled logs and fence posts.

Family TERMITIDAE

Subfamily AMITERMITINAE

Genus *Microcerotermes* Silvestri

2. ***Microcerotermes crassus*** Snyder

1934. *Microcerotermes crassus* Synder, *Indian For. Rec.*, **20** (11) : 22-23, S. *Type-locality* : Meitkyina, Myanmar.

1997. *Microcerotermes crassus*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 166-169.

1999. *Microcerotermes crassus*, Maiti, *et al.*, *State Fauna Series* : **7** *Fauna of Tripura*, Part 2 : 301.

Material examined : 2 S and sev. W, Moreh, 85 km. NE. of Chandel, coll. *P.H. Roy and party*, 3.xii.1992, ex. "Under log in saw mill."

Measurements (in mm) : Head length to base of mandible 1.80; max. head width 1.15; max. mandible length 1.23; length of pronotum 0.34; width of pronotum 0.57; no. of antennal segments 13.

Distribution : India : Manipur : Chandel dist. : Moreh; Tripura.

Elsewhere : Bangladesh, Myanmar, Thailand, Vietnam and China.

Remarks : The characteristics of the species is marked by its long sickle-shaped mandibles with minute uniform crenulations throughout and its length exceeds two-thirds of the head length.

Subfamily TERMITINAE

Genus ***Pericapritermes*** Silvestri

Key to the species of *Pericapritermes*

(Soldiers)

1. Smaller species, head length less than 2.50 mm, head-width upto 1.30 mm; median suture not extending upto fontanelle .... *assamensis* (Mathur and Thapa)

– Larger species, head length more than 2.60 mm, head-width 1.50-1.60 mm; median suture extending upto fontanelle 2

2. Body sparsely hairy with scattered long erect hairs; antennae with segment 4 subequal to 2 ..... *tetraphilus* (Silvestri)

– Body densely hairy; antennae with segment 4 shorter than 2 .... *durga* (Roonwal and Chhotani)

3. ***Pericapritermes assamensis*** (Mathur and Thapa)

1965. *Capritermes assamensis* Mathur and Thapa, *Bull. Ent.* No. **6** : 10-12, S., *Type-locality* : Polo Block, Central Range, Goalpara Div., Assam.

1968. *Pericapritermes assamensis*, Krishna, *Bull. Am. Mus. nat. Hist.*, **138** (5) : 293.

2001. *Pericapritermes assamensis*, Maiti, *et al.*, *State Fauna Series* : *Fauna of Sikkim*, Part : 2.

Material examined : 2 S and sev. W Keibul, National Park, near Moirang, coll. *P.H. Roy and party*, 13.iv.1998.

Measurements (in mm) : Head length to lateral base of mandible, 2.50 max. head width 1.30; mandible length 1.46; length of pronotum 0.38; width of pronotum, 0.76; no. of antennal segments, 13.

Distribution : India : Manipur : Bishnupur district : Kaibul Lamjo National Park, near Moirang; Assam, Sikkim, West Bengal.

Elsewhere : None.

Remarks : This soil inhabiting species is so far known to confine in the eastern India only.

4. ***Pericapritermes durga*** Roonwal and Chhotani

1962. *Capritermes latignathus durga* Roonwal and Chhotani, *Proc. nat. Inst. Sci. India*, (B) **28** (4) : 325-329, S and W, *Type-locality* : Cherrapunji, Meghalaya, India.

1977. *Pericapritermes durga*, Roonwal and Chhotani, *Ent. Basil.*, **2** : 64, 66, 68.

1999. *Pericapritermes durga*, Bose, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 68-69.

Material examined : 1 S. and sev. W. Keibul, Lamjo National Park, near Moirang, coll. *P.H. Roy and party*, 14.iv.1998, ex. "Mound"

Measurements (in mm) : Head length to base of mandible 2.61-2.65; max. head width, 1.53-1.60; length of pronotum, 0.38-0.40 width of pronotum 0.73-0.75; length of mandible 1.65-1.73; no. of antennal segments 14.

Distribution : India : Manipur : Chandal dist. : Moreh Reserve Forest (Lahiri and Ghosh, 1980); Bishnupur dist. : Kaibul Lamjo National Park (present record); Arunachal Pradesh, Meghalaya, Tripura.

Elsewhere : Bhutan.

Remarks : This soil inhabiting species is frequently found in the felled logs in contact with soil in Manipur (Lahiri and Ghosh 1980). It's record from the mound as mentioned above seems to be doubtful, since the members of the genus are unknown to constract mound in India.

5. ***Pericapritermes tetraphilus*** (Silvestri)

1922. *Capritermes tetraphilus* Silvestri, *Rec. Indian Mus.*, **24** (4) : 543-545, S and W. *Type-locality* : Rangamati, Chittagong Hill Tracts, Bangladesh.

1965. *Pericapritermes tetraphilus*, Krishna, *Am. Mus. Novit.* No. **2210** : 15-16.

2001. *Pericapritermes tetraphilus*, Maiti, *et al.*, *State Fauna Series* : *Fauna of Sikkim*, Part :

Material examined : 1 S and sev. W, Moirang, Bishnupur dist., coll. *D.K. Mondal and party*, 26.iii.1993.

Measurements (in mm) : Head length to base of mandible, 2.72-2.75; max. head width, 1.42-1.46; length of mandible 1.69-1.72; length of pronotum 0.38-0.40; width of pronotum, 0.75-0.77; no. of antennal segments, 14.

Distribution : India : Manipur : Bishnupur district : Moirang; Assam, Madhya Pradesh, West Bengal.

Elsewhere : Bangladesh, Myanmar and China.

Remarks : This soil inhabiting termite is reported for the first time from Manipur, although it is quite common in the eastern India and adjoining foreign territories.

Genus ***Pseudocapritermes*** Kemner

6. ***Pseudocapritermes tikadari*** Roonwal and Chhotani

1962. *Pseudocapritermes tikadari* Roonwal and Chhotani. *Proc. natn. Inst. Sci. India*, (B) **28** (4) : 319-323, S and W. *Type-locality* : Cherrapunji, Meghalaya.

1968. *Procapritermes tikadari*, Krishna, *Bull. Am. Mus. nat. Hist.*, **138** (Art 5) : 298, 300 and 304.

1980. *Procapritermes tikadari*, Lahiri and Ghosh, *Rec. zool. Surv. India*, **76** : 66.

1997. *Psedocapritermes tikadari*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 405-408.

Distribution : India : Manipur : 2 km from Kongpokpi Imphal Dist. (Lahiri and Ghosh, 1980); Assam, Meghalaya and Arunachal Pradesh.

Elsewhere : Bhutan.

Remarks : The species has been reported by Lahiri and Ghosh (1980). No material is available for the present study.

Subfamily MACROTERMITINAE

Genus ***Macrotermes*** Holmgren

Key to the species of *Macrotermes* Holmgren (Soldiers Major)

1. Mandibles longer in comparison to head-length, longer than half the head; postmentum comparatively much shorter than half the head length; meso-and meta-nota not with incurved postero-lateral margins .... *annandalei* Silvestri

– Mandibles shorter in comparison to head-length, shorter than half the head; postmentum longer than half the head-length; meso-and meta-nota with concave postero-lateral margins .... *hopini* Roonwal and Sen Sarma

7. ***Macrotermes annandalei*** (Silvestri)

1914. *Termes annandalei* Silvestri, *Rec. Indian Mus.*, **8** : 427-428, S. maj., S. min., W maj. and W min. *Type-locality* : Moulmein, Lower Myanmar.

1949. *Macrotermes annandalei*, Snyder, *Smiths. misc. Colls.*, **112** : 208.

1997. *Macrotermes annandalei*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 405-408.

Distribution : India : Manipur : Morah, Chandel dist. (Lahiri and Ghosh, 1980); Meghalaya.

Elsewhere : Myanmar (Lower and Upper), Thailand and Southern China (Yunnan).

Remarks : Although the species has been reported earlier (Lahiri and Ghosh, 1980), no material is available for the present study.

8. ***Macrotermes hopini*** Roonwal and Sen Sarma

1956. *Macrotermes serrulatus hopini* Roonwal and Sen-Sarma, *Indian J. agric. Sci.*, **26** (1) : 15-21, S maj., *Type-locality* : Hopin, Mytkyina Dist., Myanmar.

1997. *Macrotermes hopini*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 418-421.

Material examined : (A) District Bishnupur : (i) 7 S (minor), sev. W (maj. and min.), Keibul Lamjo National Park, near Moirang, coll. *P.H. Roy and party*, 10.xii.1992, ex. "under pine log"; (ii) 2 S (min.) and 4 W (2 maj and 2 min.) Moirang, coll. *P.H. Roy and party*, 10.xii.1992, ex. "gallery in pine log" (B) District Chandel : a. 6 vials from Moreh, near Indo-Burma boarder, coll. *P.H. Roy and party*, 3.xii.1992-(i) 2 S (min.), sev. W. (maj. and min.), (ii) 2 S (min.) 7 S (maj.), sev. W (maj. and min.), ex. "under log", (iii) 1 S (maj.), 1 S (min.), 18 W (maj. and min.), (iv) 3 S (min.), sev. W (maj. and min.), 3 S (min.) sev. W (maj. and min.), (vi) 3 S (maj.) 3 S (min.) and 5 W (maj. and min.) b. 2 S (maj.) 3 W (min.), Pallel Bazar, coll. *P.H. Roy*, 4.xi.1992. (C) District Churachandpur : 1 S (maj.) sev. W (maj. and min.) Saikhot, coll. *D.K. Mondal and S.K. Ghosh*, 26.iii.1993. (D) District Imphal : 3 vials, Longol complex, near forest Range Office, *ca*, 10 km from Imphal, coll. *P.H. Roy and party*, 28.xi.1992, (i) 3 S (maj.) and 5 W (maj. and min.), ex. "dead stump", (ii) 1 S (maj.) 5 S (min.), 15 W (maj. and min.), (iii) 3 S (maj.) 5 S (min.), sev. W (maj. and min), ex. "dead stump"

Measurements (in mm) : Head length to base of mandible, 4.45-4.60; max. head width, 3.46-3.54; max. mandible length, 2.20-2.30; length of pronotum, 1.20-1.30, width of pronotum 2.50-2.60; no. of antennal segments, 17.

Distribution : India : Manipur : Bishnupur district : Keibul Lamjo National Park and Moirang; Chandel dist. : Moreh and Pallel Bazar; Churachandpur dist. : Saikhot; Imphal dist. : Langol complex; Tripura.

Elsewhere : Myanmar.

Remarks : The species is recorded for the first time from the State of Manipur, although it is already known from Tripura in the eastern India as well as from Myanmar. It is quite common in the State mostly occurring in the mud-plastered logs.

Genus ***Odontotermes*** Holmgren

Key to the species of *Odontotermes* (Soldiers)

1. Tooth on left mandible placed either at the middle or slightly below 2
– Tooth on left mandible placed in distal half, from distal third to further in front 6
2. Tooth on left mandible minute and situated at basal third of the mandible .... *parvidens* Holmgren and Holmgren
– Tooth on left mandible prominent and large, and placed at about the middle 3
3. Smaller species, head length to base of mandibles, 1.96-2.39 mm; maximum width of head 1.73-2.50 mm 4
– Larger species, head length to base of mandibles, 2.15-2.67 mm; maximum width of head, 1.90-2.60 mm 5
4. Head wider than long, head index (max. width/length to base of mandible) 0.83 and less converging in front, head convergence index (width at base of maidibles/max. width) 0.68; tooth on left mandible placed slightly below the middle ..... *profeae* Akhtar
– Head narrower than long, head index 0.75-0.78 and more converging in front, head-convergence index 0.64-0.66), tooth on the left mandible placed more backwardly .... *singsiti* Bose
5. Labrum tongue-shaped, rounded at anterior margin and with a short point or tip sometimes; head sides straighter, widest medially and less convergent anteriorly (head length 2.47-3.00 mm, maximum head width 1.80-2.30 mm) ..... *horni* (Wasmann)

- Labrum triangular, with a sharp tip; head sides widest near posterior margin and more convergent anteriorly (head length, 2.25-3.10; maximum head width, 1.80-2.50 mm) .... *feae* (Wasmann)

6. Antennae uniformly coloured; inner margin anterior to tooth on left mandible wavy, parrot's beak-like..... *assmuthi* Holmgren

- Antennae not uniformly coloured, distal segments distinctly darker than proximal segments 7

7. Tooth on left mandible placed anterior to distal third (tooth-index less than 0.28); mandible feebly built.....8

- Tooth on left mandible placed near the apical third; mandible strongly built 9

8. Larger species, head broadly oval, lateral sides sharply converging anteriorly, head length to base of mandible 1.40-1.46; width of head 1.32-1.34; mandibles comparison to head shorter (head mandibular index 0.51-0.52)..... *kapuri* Roonwal and Chhotani

- Smaller species, head not broadly oval, widest near the middle, lateral sides weakly arched, converging both anteriorly and posteriorly; head length to base of mandible 1.20; width of head 1.11; head mandibular index, 0.56-0.60 ..... *giriensis* Roonwal and Chhotani

9. Head broadly oval (head length to base of mandibles 1.45-1.50; max. width, 1.40-1.43; mandibles in comparison to head length shorter (head mandibular index 0.53); postmentum much wider and swollen..... ..... *paralatigula* Chatterjee and Sen-Sarma

- Head not broadly oval (head-length to base of mandibles 1.20-1.67, width 1.10-1.38 mm); mandibles comparative to head-length longer (head-mandibular index 0.59-0.72); postmentum less wider and swollen..... ..... *obesus* *(Rambur)

* Measurements after Bose (1999).

9. ***Odontotermes assmuthi*** Holmgren

1913. *Odontotermes (Odontotermes) assmuthi* Holmgren, *J. Bombay nat. Hist. Soc.*, **32** (1) : 112-113, S and W. *Type-locality* : Borivilli Jungles, Bombay, India.

1997. *Odontotermes assmuthi*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 449-453.

1999. *Odontotermes assmuthi*, Bose, *Rec. zool. Surv. India, Occ. Paper* No. 171 : 83-84.

Material examined : Sev. S and W. from near Moreh Forest Office *(det. G. Bose).*

Measurements (in mm) : Total body length, 4.48; head length to lateral base of mandibles, 1.50; max. head width, 1.25; length of pronotum 0.40 mm; max. width of pronotum, 0.72 (Bose, 1999).

Distribution : India : Manipur : Chandel dist. : Moreh Forest. Also widely distributed in India, Pakistan and Bangladesh.

Remarks : The species was first recorded from the north-eastern India by Bose (1999). It is a widely distributed species in India and is also recorded from Pakistan and Bangladesh.

10. ***Odontotermes feae*** (Wasmann)

1896. *Termes feae* Wasmann, *Ann. Mus. Stor. nat. Genova*, (2) **16** : 625-626, *Type-locality* : Korim Cheba, Myanmar.

1985. *Odontotermes feas*, Chhotani and Bose, *Rec. Zool. Surv. India*, **82** : 58.

1999. *Odontotermes feae*, Bose *Rec. zool. Surv. India, Occ. Paper* No. **171** : 84-86.

Material studied : (A) Bishnupur district : Sev. S and W coll. *P.H. Roy and party* 1992 as follows : (1) (i) 3 vials from Keibul Lamjao National Park, 5 km from Moirang. (i) Sev. S and W, 10.xii.1992, ex. "Under Soil, (ii) 3 S and S W, 10.xii.1992, ex. "mound" (iii) 1 S and 6 W, ex. "under leaves", (2) Sev. S and W, coll. *D.K. Mondal and S.K. Ghosh,* 23.iii.1993. (3) 2 vials from Loktak lake near Moirang, (i) 6 S and sev. W, coll. *A.R. Lahiri and party,* 20.xi.1992, (ii) 7 S and sev. W, coll. *P.H. Roy and party,* 10.xii.1992, ex. "Under soil", (4) 1 vial from Moirang, S.W., coll. *P.H. Roy and party,* 12.iv.1998, (5) 1 vial from Namibal, 2 S and sev. W, coll. *S.K. Saha*

and party, 19.11.1993. (B) Chandel district : Sev. S and W. coll. *P.H. Roy and party* 1992 as follows : (1) 2 vials from Moreh, Indo Burma boarder, 85 km from Chandel (i) 4S and 7 W, 3.xii.1992, ex. "under soil in gallery. (ii) 6 S, ex. "Under soil in gallery. (ii) 6 S, ex. "under wooden plank", (C) Churachandpur district : (i) Sev. S and W from Sangang, coll. *A.R. Lahiri and party,* 21.xii.1992. (ii) 1 S and 7 W from Singhat, ca, 30 km S. of Churachandpur, coll. *A.R. Lahiri and party,* 18.xii.1992, (iii) Sev. S and sev. W from Reserve Forest near Churachandpur, coll. *P.H. Roy and party,* 11.xii.1992, (iv) 1 S and 6 W and 1 1m from Mouviphri, coll. *D.K. Mondal and party.* (v) 6 S and 6 W from Bijangvenga, coll. *D.K. Mondal and party.* (D) Imphal district : (i) 3 S and 8 W from Iroishemba coll. *P.H. Roy and party,* 30.xi.1992, ex. "under log" and "dead wood stump" (ii) 6 S and 10 W from Langol forest area, 10 km W of Imphal, coll. *P.H. Roy and party,* 28.ii.92, ex. "under wood stump" and "under rotten leaves mixed with soil" (E) Temenglong dist : (i) Sev. S and W from Dianamoing, coll. *S.K. Saha and party,* 6.iii.1993, (ii) Sev. S and W from Sundru Hill, coll. *R.S. Burman and party,* 1993, ex. "under soil"

Measurements (in mm) : Head length to lateral base of mandibles, 2.15-2.53; max. head width, 1.75-1.95; mandible length, 1.23-1.53; pronotum length, 0.70-0.80; max. pronotum width, 1.41-1.60; No. of antennal segments 17.

Distribution : India : Manipur : Bishnupur district : Moirang and Namibul; Chandel Dist. : Moreh, Churachandpur Dist. : Sangang, Singhat and Churachandpur; Imphal Dist. : Iroishemba and Langol Forest area; Tamenglong Dist. : Dianmoing and Sundru Hills; Assam, Arunachal Pradesh, Nagaland, Mizoram, Tripura, West Bengal, Bihar, Karnataka.

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

Remarks : This species greatly resembles to *O. horni* a widely distributed species in India. It is quite frequently found in soil under logs, mud plaster, on felled logs, mound, etc. in Manipur. It rarely builds mounds which are of very flat type unlike that of other built by *O. obesus* and *O. redemanni.* The species extends to the south-eastern Asian countries and throughout India.

11. ***Odontotermes giriensis*** Roonwal and Chhotani

1962. *Odontotermes giriensis* Roonwal and Chhotani, *Proc. natn. Inst. Sci. India,* (B) **28** (4) : 296, 341-345, S and W. *Type-locality* :Rongrengiri, Garo Hills, Meghalaya.

1997. *Odontotermes giriensis,* Chhotani, *Fauna of India, Isoptera (Termites),* **2** : 478-482.

1999. *Odontotermes giriensis,* Bose, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 89.

Material examined : Sev. S and W from Chandel, 2 km. E. of Chandel, coll. *P.H. Roy and party,* 9.xii.1992, ex. "under stump of pine"

Measurements : Head length to base of mandible 1.20, max. head width 1.11; mandible length 0.72; mandibular tooth distance 0.20; pronotum length 0.42; max. pronotum width 0.80; no. of antennal segments 15.

Distribution : India : Manipur : Churachandpur (Bose, 1999) and Chandel dist. : Chandel (present record). Assam, Meghalaya, Arunachal Pradesh, Tripura, Orissa and Uttar Pradesh.

Elsewhere : Bangladesh

Remarks : The species is well represented in the eastern India including Bangladesh. Imago of the species had recently been described from Shillong by Bose (1999).

12. ***Odontotermes horni*** (Wasmann)

1992. *Termes horni* Wasmann, *Zool. Jb.,* **17** (1) : 111, S and W. *Type-locality* : Nalanda, Sri Lanka.

1949. *Odontotermes (O.) horni,* Snyder, *Smiths misc. Coll.,* **112** : 229.

1983. *Odontotermes horni* Maiti, *Rec. zool. Surv. India, Occ. Pap.* No. **42** : 2, 19, 26, 102-106.

1997. *Odontotermes horni,* Chhotani, *Fauna of India Isoptera (Termites),* **2** : 498-502.

Material examined : Dist. Bishnupur : 2 vials from Keibul Lamjo National Park, 5 km. from

Moirang, coll. *P.H. Roy and party;* (i) 10. xii. 1992, sev. S and W, (ii) 14.iv.1998, 3 S and 3 W, 1 voial from Keinya Bazar, 4 km. from Moirang, coll. *P.H. Roy and party,* 10.xii.1992, sev. S; sev. W. ex. "under soil" Dist. Imphal : 1 vial from Isoishemba, 10 km. S.W. of Imphal, coll. *P.H. Roy and party,* 30.xi.1992, sev. S. & W. ex. "under log"

Measurements (in mm) : Head length 2.50-2.67; max. head-width 2.60-2.09; mandible length 1.45-1.50; mandibular tooth distance from the tip 0.84-0.85; pronotum length 0.90-0.92; pronotum width 1.65-1.67; no. of antennal segments 17.

Distribution : India : Manipur : Bishnupur district : Kaibul Lamjo National Park, Moirang. Imphal Dist : Oroishemba. Also in Meghalaya, Tripura, West Bengal, South India.

Elsewhere : Bhutan, Sri Lanka, Vietnam and Cambodia.

Remarks : The species hardly be separated from its most allied species, *O. feae,* except in its head shape and other minor characters. It is also widely distributed species found in the south-east Asian countries, mostly in the plains.

13. ***Odontotermes kapuri*** Roonwal and Chhotani

1962. *Odontotermes kapuri* Roonwal and Chhotani, *Proc. natn. Inst. Sci.* India, (B) 28 (4) : 296, 352-356, S and W. *Type-locality* : Cherrapunji, Meghalaya.

1997. *Odontotermes Kapuri,* Chhotani, *Fauna of India, Isoptera (Termites)* **2** : 503-505.

1999. *Odontotermes kapuri,* Bose, *Rec. zool. Surv. India, Occ. paper* No. **171** : 94-95.

Material studied : 3 S and sev. W Saikhot, *ca.* 11 km from Churachandpur, coll. *A.R. Lahiri and party,* 19.xii.1992.

Measurements (in mm) : Head-length 1.40-1.46; max. head-width 1.32-1.34; mandible length 0.82-0.84; mandibular tooth distance from tip 0.20-0.22; pronotum length 0.55-0.56; pronotum width 1.00-1.03; no. of antennal segments-17.

Distribution : India : Manipur : Churachandpur dist. : Saikhot; Meghalaya and Tripura.

14. ***Odontotermes obesus*** (Rambur)

1842. *Termes obesus* Rambur. *Historie naturelle des insects Neuroptera* : 304.

1949. *Odontotermes (Odontotermes) obesus,* Snyder, *Smith. Misc. coll.,* **112** : 185.

1999. *Odontotermes obesus,* Bose, *Rec. zool. Surv. India, Occ. Paper* No. 171 : 95-98.

Distribution : India : Manipur : Moreh Forest (Lahiri and Ghosh, 1980); all over India. ELSEWHERE : Bangladesh, Bhutan, Myanmar and Pakistan.

15. ***Odontotermes paralatigula*** Chatterjee and Sen-Sarma

1963. *Odontotermes paralatigula* Chatterjee and Sen-Sarma, *J. Bombay nat. Hist. Soc.,* **59** (3) : 822-826, S, *Type-locality* : Hlegu Range, Insein Forest division, Myanmar.

1999. *Odontotermes paralatigula,* Bose, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 107-110.

Material studied : Sev. S and W from Moreh, Lockchou River Bank, Manipur, coll. *P.T. Cherian,* 22.11.1975 *(det.* G. Bose).

Measurements (in mm) : Head length 1.45-1.50; Head width 1.40-1.43; mandible length 0.76-0.80; pronotum length 0.62-0.63; pronotum width 0.98-1.00; no. of antennal segments 17.

Distribution : India : Manipur : Chandel dist. : Moreh.

Elsewhere : Myanmar.

Remarks : The species was so far known only from Myanmar. Recently it had been recorded from the study area by Bose (1999).

16. ***Odontotermes parvidens*** Holmgren and Holmgren

1917. *Odontotermes (Odontotermes) parvidens* Holmgren and Holmgren, *Mem. Dept. agric. Sci.,* **5** (3) : 154, S and W, *Type-locality* : Mysore to Mercara Road, Karnataka.

1997. *Odontotermes parvidens,* Chhotani, *Fauna of India, Isoptera (Termites),* **2** : 526-530, Figs. 258, 259.

Material studied : (i) 2 S and sev. W, Churachandpur Reserves Forest, F.C. No. R/1,

coll. *P.H. Roy and party,* 11.xii.1992, ex. "under bark of a log on ground" (ii) 2 S and 22 W from Singnghat, Checklaphai Reserve Forest, coll. *A.K. Sanyal and party,* 3.iv.1992, ex. wild vegetation.

Measurements (in mm) : Head length 1.90-1.93; head width, 1.50-1.54, mandible length, 1.20-1.23; tooth distance from tip, 0.70-0.71; pronotum length, 0.58-0.60; pronotum width, 0.98-1.00; no. of antennal segments, 16-17.

Distribution : India : Manipur : Churachandpur and Singnghat; Northern, eastern and north-eastern India.

Elsewhere : Bangladesh, Bhutan and Pakistan.

Remarks : This is a very variable species and very common in the hilly tracts of the countries of its occurrence. The very minute tooth on the basal third of the left mandible is its distinguishing feature. Otherwise, apparently, it looks like *O. horni* to a large extent.

17. ***Odontotermes profeae*** Akhtar

1972. *Odontotermes profeae* Chaudhury, et al. *Termites of Pakistan* (First Tech. Rep. PL-480, project No. A 17-FS-12) : 33 (Nom. nud.).

1975. *Odontotermes profeae* : Akhtar, *Bull. Dept. of Zool. Univ. Punjab* (NB.), Art. 7 : 90-93, S. *Type-locality* : Singara, Bangladesh.

Material studied : 2 S and sev. W, Moreh, Chandel dist., coll. *P.H. Roy and party,* 3.xii.1992, ex. "under soil gallery"

Measurements (in mm) : Head length, 1.96-2.39; max. width, 1.73-2.00; mandible-length, 1.19-1.35; pronotum length, 0.60-0.77, width 1.25-1.33; no. of antennal segments 17.

Distribution : India : Manipur.

Elsewhere : Bangladesh.

Remarks : In original description, the presence of minute tooth on the right mandible at the level of tooth on left mandible is not indicated in our material from Manipur. But in all other character the material is identical with typical *O. profeae.*

18. ***Odontotermes singsiti*** Bose

1999. *Odontotermes singsiti* Bose, *Rec. zool. Surv. India, Occ. Paper,* No. 171 : 107-110, S and W, *Type locality* : Langor, 3 km from Imphal, Manipur.

Measurements (in mm) : Head length, 3.20; head width 1.58 mandible length (left), 1.20; pronotum length 0.63; pronotum width 1.08; no. of antennal segments 17.

Distribution : India : Manipur : Langor, 3 km from Imphal (Type-locality)

Elsewhere : None.

Remarks : The species has recently been described by Bose (1999) collected from a piece of wood from Langor area.

Genus ***Microtermes*** Wasmann

19. ***Microtermes imphalensis*** Roonwal and Chhotani

1962. *Microtermes imphalensis* Roonwal and Chhotani, *Proc. natn. Inst. Sci. India,* (B) **28** (4) : 364-369, *Type-locality* : Imphal valley, Manipur.

1980. *Microtermes imphalensis,* Lahiri and Ghosh, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 113-116.

1999. *Microtermes imphalensis,* Bose, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 113-116.

Material studied : Sev. S and W, Tea plantation, 5 km. North of Moreh, coll. *P.T. Cherian,* 26.ii.1995. *(det,* G. Bose).

Distribution : India : Manipur : Chandal dist. : Moreh Forest (Bose, 1999) and Imphal; Arunachal Pradesh.

Remarks : The species was established by Roonwal and Chhotani (1962) from Imphal based on Imago caste only. Recently, while studying the termites of north eastern India, Bose (1999) described soldier and worker (major and minor) for the first time based on the collection from Manipur and Arunachal Pradesh.

The species restricts itself in the eastern India, occuring mostly in the soil near bamboo fence or on embankment of forest path in the Arunachal Pradesh (Bose, 1999).

Genus ***Hypotermes*** Holmgren

Key to the species of *Hypotermes* (Soldiers)

1. Head sides convex, gradually narrowing in front; max. width at middle .... *obscuriceps* (Wasmann)

– Head sides rounded, narrowing in front and appear more strongly converging; max. width somewhat posteriorly ....*xenotermitis* (Wasmann)

20. ***Hypotermes obscuriceps*** (Wasmann)

1902. *Termes obscuriceps* Wasmann. *Zool. Jb. Syst.*, **17** : 113-114, S and W *Type-locality* : Trincomalee, Sri Lanka.

1956. *Hypotermes obscuriceps*, Roonwal and Sen-Sarma, *Indian J. agric. Sci.*, **26**(1) : 25.

1997. *Hypotermes obscuriceps*, Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 557-561.

Material studied : (A) Sev. S and W collected by *P.H. Roy and party* from Tamenglong dist. (i) 1 S and 32 W, 6.xii.1992, ex. "dead stump"; (ii) 1 S and 12 W, Babro Bazar area, 6.xii.1992, ex. "gallery under leaves"; (iii) 2 S and 10 W, 6.xii.1992, "under a log." (B) Sev. S and W collected by *P.H. Roy and party* from Imphal dist. (i) 2 S and 14 W, Kairengei Old Airport, 29.xi.1992, ex. "under bark of a log"; (ii) 2 S and 12 W, Iroishemba, 30.xi.1992, ex. "under soil"; (iii) 2 S and 8 W from Iroishemba, 30.xi.1992, ex. "under barks"; (iv) 4 S and 6 W, Kairengei, 29.xi.1992, ex. "under a log; (v) 3 S and 1 W, Iroishemba, 30.xi.1992, ex. "under soil"; (vi) 10 S and 20 W, Langol Forest Office, Imphal, 28.xi.1992, ex. "under rotten leaves mixed with soil"; (vii) 4 S and 24 W, Langol complex, Imphal, 28.xi.1992, ex. "wooden pole"; (viii) 4 S and 25 W Forest Range Office, Langol (10 km W. of Imphal), 28.xi.1992, ex. "dead tree trunk" (C) Sev. S and W, collected by *P.H. Roy and party* from Bishnupur dist. (i) 1 S and 4 W, Moirang Lake area, 10.xii.1992, ex. "under leaves in soil"; (ii) 9 S and 10 W, Moirang, 10.xii.1992, ex. "under soil"; (iii) 10 S and 10 W, Moirang, 14.iv.1998. (D) Sev. S and W, collected by *P.H. Roy and party* from Churachandpur dist. (i) 4 S and 7 W, Manipur Reserve Forest, Churachandpur, 11.xii.1992; (ii) 1 S and 7 W, Reserve Forest, Churachandpur, 11.xi.1992; (iii) 1 S and 6 W, Churachandpur, 10.xii.1992, ex. "road side"

Measurements (in mm) : Head length to base of mandible, 1.35-1.40; max. head width, 1.14-1.25; mandible length, 0.65-0.69; pronotum length, 0.50-0.54; pronotum width 0.80; no. of antennal segments, 15-16.

Distribution : India : Manipur : Chandal dist. : Moreh Reserve Forest (Lahiri and Ghosh, 1980); Bishnupur dist. : Moirang; Churachandpur dist. : Churachandpur and Manipur Reserve Forest; Imphal dist. : Kairengei, Iroishemba, Tamenglong dist. : Tamenglong and vicinity (present records); Mizoram, Meghalaya, Tamil Nadu, Tripura, West Bengal and Sikkim.

Elsewhere : Sri Lanka and Vietnam.

21. ***Hypotermes xenotermitis*** (Wasmann)

1896. *Termes xenotermitis* Wasmann, *Ann. Mus. Civ. Stor. Nat.*, (2) **16** (36) : 628, S and W, *Type-locality* : Palon (Pegu), Myanmar.

1956. *Hypotermes xenotermities*, Roonwal and Sen-Sarma, *Indian J. agric. Sci.*, **26**(1) : 25.

1997. *Hypotermes xenotermities*, Chhotani, *Fauna of India, Isoptera (Termites)* **2** : 557-561.

1999. *Hypotermes xenotermities*, Bose, *Rec. zool. Surv. India, Occ. Paper* No. **171** : 110-112.

Distribution : India : Manipur : Chandal dist. : Moreh Reserve Forest and Imphal dist. : Kangpokpi (near Imphal) (Lahiri and Ghosh, 1980) ; Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tripura and West Bengal.

Elsewhere : Bhutan, Bangladesh, Myanmar and Thailand.

Subfamily NASUTITERMITINAE

Genus ***Nasutitermes*** Banks

22. ***Nasutitermes gardneri*** Snyder

1933. *Nasutitermes (Subulitermes) gardneri* Snyder, *Proc. U.S. natn. Mus.*, **82** (Art. 16) : 12.

1999. *Nasutitermes gardneri Bose Rec. zool. Surv. India, Occ. Pap.*, **171** : 125-128.

Material examined : Dist. Tamenglong : 1 vial from Nauny, coll. *P.H. Roy and party,* 7.12.1992, Sev. S and W, ex. "stump" 1 vial from Road side towards Naumi, coll. *P.H. Roy and party,* 7.xii.1992, 9 S, sev. W, ex. "stump"; 4 vials from Lower Bazar near Tamehglong, coll. *P.H. Roy and party,* 7.xii.1992, (i) sev. S and W, ex. "stump; (ii) ex. "log", (iii) ex. "under a log", (iv) ex. "stump"

Measurements (in mm) : Head length with rostrum, 1.53-1.60; length without rostrum, 0.95-1.00; max. head-width, 0.88-1.00; pronotum length, 0.20-0.22; pronotum width 0.50-0.54; no. of antennal segments, 13.

Distribution : India : Manipur : Tamenglong Dist. : Nauny and Lower Bazar (near Tamenglong); Assam, Arunachal Pradesh and West Bengal.

Elsewhere : Bhutan.

Remarks : This is a very variable species in its shape, size of head, creating confusing for its correct identity. It is a very common species in the north-eastern India including Bhutan occurring mostly in dead and decaying wood, stumps, posts, tree trunks, etc.

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INSECTA : PSOCOPTERA

V. D. SRIVASTAVA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Psocopteran insects are commonly known as booklice and have much of economic importance. They are minute in size, subglobular in shape, whitish to brownish in colour, and damage our valuable books, manuscripts, dry preserved specimens of insects and plants. These, sometimes, disseminate plant diseases by feeding pathogenic fungi. They are generally found among old books, journals, leaf-litter, straws, in foliage and under bark.

Perusal of literature reveals that these insects are represented in India by over 85 species (Enderlein, 1903; Menon, 1938, 1942; Pearman, 1942; Datta, 1963, 1965, 1966, 1969; Thornton & Wong, 1966; Ray, 1979 and Badonnel, 1981) and from the world by over 2,500 species, whereas the representation in Manipur is only by 7 species till date.

A detailed account of the species, material of which were collected from the districts of Manipur are deposited in Zoological Survey of India, account, is furnished, with synonymy, key, diagonistic characters, illustrations and distribution.

MATERIAL AND METHOD

These small insects (psocids) can be collected from old books (domestic) and in the field from foliage, bushes and straws, specially from semi-dry and dry leaves by beating them with a stick and by placing a white enamel tray beneath.

The collected insects can then be put inside the glass tubes filled with alcohol by a fine brush, soaked in alcohol, for preservation. The preserved specimens can then be observed under microscope as such or stained or in dissected forms for study and drawing. The sclerotised parts can be dissected from musculature by KOH solution and then by dehydration in alcoholic strength.

The measurements of the specimens studied, were all in mm. (in alcohol).

MORPHOLOGY AND TERMINOLOGY

General Morphology

The psocids generally have a subglobular body, two pairs of thin, membranous wings (The bigger forewings normally in the pterostigma and smaller hindwings). The wings possess veins in most of the cases, a few may be apterous (where hind femora of the leg is swollen). Head is small with long, filiform antennae; legs are mostly mediam-sized, in few these may be longer than body-length. Thorax is proportionate to the body and abdomen is generally sub-globular, in few cases it may be oblong also. The genital armature lodged at the last abdominal segment (VII to IX), is well-sclerotised both in male and in female, and is furnished with gonapophyses, hypandrium, subgenital plate, epiproct and paraproct.

Terms and explanation used in key and text

Pterostigma	The black or opaque spot, present in subcostal region of forewing.
Ctenidiobothria	These structures are found in tarsal segment of the leg.

Gonapophyses — These are the modified sclerotised rod-like processes associated with the 7th and 8th abdominal sternites in female specimen.

Subgenital plate — The modified sclerotised forms in female genitalic armature, which bears lobes and setae.

Hypandrium — This is formed by 9th sternite in male specimen, in shape of claspers and separates the penis from rest of the genitalic contents.

Epiproct — The sclerotised structure with short spurs or hooks found both in male and female genital armature.

Paraproct — The modified and sclerotised bulbous form found both in male and female genitalic contents, possessing trichobothria.

Redula — Strongly sclerotised organ of penis frame.

Spur-vein — A thick seta, attached to the mid-region of pterostigma.

AP — Areola Postica of forewing.

SYSTEMATIC ACCOUNT

Systematic list of the species of Psocoptera

Family PSYLLIPSOCIDAE

1. *Granthakita cuttackae* Behura & Dash

Family LIPOSCELIDAE

2. *Liposcelis bengalensis* Badonnel

Family CAECILIIDAE

3. *Dypsocus fucosus* Thornton & Wong

Family ECTOPSOCIDAE

4. *Ectopsocus bengalensis* Datta

Family PSOCIDAE

5. *Amphigerontia nubila* Enderlein
6. *Psococerastis nilae* Datta
7. *Trichadenotecnum distinctum* Datta

Key to the families

1. Winged forms 2
— Non-winged forms; hind femora of leg swollen ..... LIPOSCELIDAE
2. Tarsal joint 3-segmented ..... PSYLLIPSOCIDAE
— Tarsal joint 2-segmented 3
3. Forewing : veins with one row of setae ..... CAECILIIDAE
— Forewing : veins with more than one row of setae 4
4. Pterostigma, without spur vein ..... ECTOPSOCIDAE
— Pterostigma with spur vein ..... PSOCIDAE

Family PSYLLIPSOCIDAE

Genus ***Granthakita*** Behura & Dash

1968. *Granthakita* Behura & Dash, *Prak. Utkal univ. J. (Sci.),* 5(2) : 47-51.

1. ***Granthakita cuttackae*** Behura & Dash

1968. *Granthakita cuttackae* Behura & Dash, *Prak. Utkal univ. J. (Sci.),* 5(2) : 47-51.

Material : 2 exs., Near Forest office, Moreh, Manipur, 24.ii.1975, coll. P. T. Cherian.

Diagnosis : The veins of the wings are variable.

Distribution : India : Manipur (Moreh), West Bengal (Calcutta), Orissa (Cuttack) and Tripura (Agartala).

Remarks : This species is very common in human habitations. It is recorded for the first time from Manipur.

Family LIPOSCELIDAE

Genus ***Liposcelis*** Mostschulsky

1976. *Termes* Muller, *Zool. Danicae prod.*, p. 184.

1967. *Loposcelis* Motschulsky, Smithers, *Austr. Zool.* 14(1) : 24.

2. *Liposcelis bengalensis* Badonnel

1981. *Liposcelis bengalensis* Badonnel, *Rev. Suisse Zool.*, **88**(2) : 384-386.

Material : 1 ex., Near Forest Office, Moreh, Manipur, 24.ii.1995, coll. P.T. Cherian.

Distribution : India : Manipur (Moreh), West Bengal (Darjeeling) and Tripura (Shiphaijoli).

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

Family CAECILIIDAE

Genus *Dypsocus* Hagen

1866. *Dypsocus* Hagen, *Verh. Zool. bot. Ges. Wien.*, **16** : 207.

1969. *Dypsocus* Hagen, Smithers, *Austr. Zool.*, **14**(1) : 36.

3. *Dypsocus fucosus* Th. & Wong

1966. *Dypsocus fucosus* Thornton & Wong. *Trans. R. ent. Soc. Lond.*, **118**(1) : 10-13.

Material : 2 exs., Locchou River bank, Moreh, Manipur, 22.ii.1977, coll. P.T. Cherian.

Distribution : India : Manipur (Moreh), West Bengal (Darjeeling) and Tripura (Udaipur).

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

Family ECTOPSOCIDAE

Genus *Ectopsocus* Maclachlan

1899. *Ectopsocus* Mclachlan, *Ent. month Mag.*, **35** : 277.

1967. *Ectopsocus* Mclachlan, Smithers, *Austr. Zool.*, **14** (1) : 64.

4. *Ectopsocus bengalensis* Datta

1965. *Ectopsocus bengalensis* Datta, *J. Beng. nat. Hist. Soc.*, **34**(1) : 58-60.

1979. *Ectopsocus bengalensis* Datta, *Rec. zool. Surv. India*, **75** : 356.

Material : 1 ex., Ukhrul, Manipur, 1.iii.1975, coll. P.T. Cherian.

Diagnosis : Apical region of subgenital plate with 8 setae in ♂ and in ♀, penis frame with a pair of sagital plate.

Distribution : India : Manipur (Ukhrul), West Bengal (North 24-Parganas and Calcutta) and Tripura (Agartala).

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

Family PSOCIDAE

Key to the genera of family PSOCIDAE

1. Forewings thickly patterned .... ***Trichadenotecnum*** Enderlein

— Forewings simple 2

2. Antenna, about twice the length of forewing ..... ***Psococerastis*** Pearman

— Antenna, relatively shorter than the length of forewing..... ***Amphigerontia*** Kolbe

Genus *Amphigerontia* Kolbe

1880. *Amphigerontia* Kolbe, *Jber, Westf. Prov. Ver. Wiss.* Kunst, **8** : 104.

1967. *Amphigerontia* Kolbe; Smithers, *Austr. Zool.*, **14** : 90.

5. *Amphigerontia nubila* Enderlein

1906. *Amphigerontia nubila* Enderlein, *Zool. Jb. abt. Syst.*, **23** : 247.

1969. *Amphigerontia nubila* Enderlein, Datta, *Zool. Anz.*, **182** : 291.

Material : 1 ex., Ukhrul, Manipur, 1.iii.1975, coll. P.T. Cherian.

Diagnosis : Large specimen with pictured forewings and light brown pterostigma.

Distribution : India : Manipur (Ukhrul), West Bengal (North Bengal).

Genus *Psococerastis* Pearman

1932. *Psococerastis* Pearman, *Ent. month. Mag.*, **68** : 202.

1967. *Psococerastis* Pearman, Smithers, *Austr. Zool.*, **14** : 98.

6. *Psococerastis nilae* Datta

1966. *Psococerastis nilae* Datta, *J. Bengal Nat. Hist. Soc.*, **35** : 24.

Material : 2 exs., Near Forest Office, Moreh, Manipur, 24.ii.1975, coll. P.T. Cherian.

Diagnosis : This species can be differentiated from other members of the genus by brown colouration on its wings.

Distribution : India : Manipur (Moreh) and Meghalaya.

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

Genus ***Trichadenotecnum*** Enderlein

1908. *Trichadenotecnum* Enderlein, *Bull. Lab. zool. Portici.*, **3** : 329.

1967. *Trichadenotecnum* Enderlein, Smithers, *Austr. Zool.*, **14** : 114.

7. ***Trichadenotecnum distinctum*** Datta

1969. *Trichadenotecnum distinctum* Datta, *Zool. Anz.*, **8** : 183.

Material : 1 ex., Locchou River bank, Moreh, Manipur, 22.ii.1975, coll. P.T. Cherian.

Distribution : India : Manipur (Moreh) and Meghalaya.

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

SUMMARY

The paper deals with 7 species of Psocoptera belonging to 7 genera and 5 families. Out of these 6 species are recorded for the first time from Manipur. All the species documented are furnished with synonymy, keys and distribution.

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Zool. Surv. India
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INSECTA : HEMIPTERA : HETEROPTERA : PENTATOMOIDEA

S. P. CHAKRABORTY
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Pentatomids, commonly known as "Shield Bugs" are mostly phytophagous. Some are pests on vegetable crops. A few species belonging to family Asopidae are predaceous on lepidopterous larvae. The group is distributed over tropical and temperate zones.

About 550 species of Pentatomoidea are known from India through the works of Distant, 1904, 1908, 1918; Mayar, 1978; Ahmad and Kamaluddin, 1982 ; Mathew, 1986 ; Durai, P.S.S. 1987 ; Hedge, V. 1995. Our knowledge of Pentatomid fauna of Manipur is very meagre. A perusal of literature and National Collection reveals that only 5 (five) species viz., i) *Bagrada picta* Fabr, ii) *Chrysocoris patricius* Fabr, iii) *Scutellera nobilis* Fabr, iv) *Coptosoma nazirae* Atk. and v) *Coptosoma siamicum* Walk. belonging to Families Pentatomidae, Scutelleridae and Plataspidae are so far known from the State (Distant, 1904, 1908, 1918 ; Paiva, 1919 and N 26 Reg. No. 6882/H).

The present work is an attempt to provide a comprehensive account of 17 species belonging to 13 genera under 5 families. Of these 10 species marked with asterisk under 8 genera have been recorded for the first time from the State. Hence, till date our knowledge regarding Pentatomid fauna of Manipur stands 22 species under 16 genera pertaining to 6 families.

The work is based on the collections made by different party members of the Zoological Survey of India. It is also supplemented by the materials deposited in the national Zoological Collections made by earlier Survey parties of the Department.

The classification is basically followed after Distant 1904, 1908, 1918 ; Gross, G. F. 1975 ; Durai, P.S.S. 1987. The material is in the Zoological Survey of India, Calcutta.

The present paper deals with keys to taxa ; diagnostic characters and geographical distribution ; district wise distribution chart of each species and literature references.

MATERIAL AND METHODS

Pentatomid bugs can be collected by random sweeping in crop fields or bushes with the help of Insect net or by beating branches with a stick over a sheet of white cloth or rexin or by picking up specimens from branch or twigs with the help of a forcep.

Collected specimens are then killed in a killing jar using benzene or chloroform vapour. Then the insects are put in insect envelops which are provided with date, locality, altitude, name of collector etc. lebels. The shield bugs are usually preserved dry with para-dichlorobenzene and napthalene adding carbolic acid as antifungal agent. In the Laboratory, the specimens are set, pinned and mounted to display properly for easy handling under the binocular microscope during the process of identification.

CLASSIFIED LIST OF PENTATOMOIDEA OF MANIPUR

Order HEMIPTERA

Suborder HETEROPTERA

Superfamily PENTATOMOIDEA

Family 1. PENTATOMIDAE

Division 1. EUSARCOCORIARIA

Genus 1. ***Eysarcoris*** Hahn.

*1. *Eysarcoris ventralis* (Westwood)

Genus 2. ***Carbula*** Stal

2. *Carbula* sp.

Division II. NEZARIA

Genus 3. ***Nezara*** Amyot & Serville

3. *Nezara viridula* (Linnaeus)

Division III. TROPICORARIA

Genus 4. ***Placosternum*** Amyot & Servile

*4. *Placosternum taurus* (Fabricius)

Division IV. HALYARIA

Genus 5. ***Dalpada*** Amyot & Serville

*5. *Dalpada affinis* Dallas

Genus 6. ***Erthesina*** Spinola

6. *Erthesina* sp.

Division V. EURYDEMARIA

Genus 7. ***Eurydema*** Laporte

*7. *Eurydema pulchrum* (Westwood)

Family II. SCUTELLERIDAE

Genus 8. ***Chrysocoris*** Hahn.

8. *Chrysocoris* sp.

Genus 9. ***Poecilocoris*** Dallas

*9. *Poecilocoris drurei* (Linnaeus)

*10. *Poecilocoris hardwickii* (Westwood)

Family III. DINIDORIDAE

Genus 10. ***Coridius*** Illiger

*11. *Coridius brunneus* (Thunberg)

12. *Coridius* sp.

Genus 11. ***Cyclopelta*** Amyot & Serville

13. *Cyclopelta* sp.

Family IV. UROSTYLIDAE

Genus 12. ***Urochela*** Dallas

*14. *Urochela quadripunctata* Dallas

15. *Urochela* sp.

Family V. PHYLLOCEPHALIDAE

Genus 13. ***Megarhynchus*** Laporte

*16. *Megarhynchus limatus* Herr-Sch.

17. *Megarhynchus rostratus* (Fabricius)

SYSTEMATIC ACCOUNT

A Key to the families of PENTATOMOIDEA

1. Scutellum covering the whole of the hemelytra, excepting extreme of outer margin ; without frena .. SCUTELLERIDAE

– Scutellum not as above ; frena present 2

2. Membrane very large ; scutellum never extending beyond middle of abdomen .... DINIDORIDAE

– Membrane rather small ; scutellum usually extends beyond middle of abdomen 3

3. Rostrum long, always passing anterior coxae, basal segment of rostrum not inserted at labrum..... PENTATOMIDAE

– Rostrum short, usually not passing anterior coxae 4

4. Basal joint of antennae always extends beyond apex of head ; lobes of head equal in length ..... UROSTYLIDAE

– Basal joint of antennae usually not reaching apex of head, lateral lobes of head much loner than central lobe .... PHYLLOCEPHALIDAE

Family 1. PENTATOMIDAE

A Key to the Division

1. Scutellum broad 2

– Scutellum triangular 3

N.B. : Species marked '*' are new record from the state of Manipur.

2. Body obovate ; lateral lobes of head never meet infront of central lobe .... EUSARCOCORIARIA

3. Abdomen armed at base 4

– Abdomen unarmed at base 5

4. Lateral pronotal angles usually rounded .... NEZARIA

– Lateral pronotal angles usually strongly produced ..... TROPICORARIA

5. Antero lateral margins of pronotum serrata or denate ..... HALYARIA

– Lateral margin of pronotum normal 6

6. Body elongate, head obovate .... EURYDEMARIA

Division I. EUSARCOCORIARIA

A Key to the genera

1. Head deflected ; scutellum but little narrowed on posterior half, almost as long as corium ..... ***Eysarcoris***

– Head normal ; scutellum prominently narrowed and distinctly shorter than corium ..... ***Curbula***

Genus 1. *Eysarcoris* Hahn., 1834

1834. *Eysarcoris* Hahn, *Wanz.*, **11** : 66.

Type species : *Eysarcoris aenus* Scopoli

*1. *Eysarcoris ventralis* (Westwood)

1837. *Pentatoma ventrali* Westwood, *Hope Cat.*, **1** : 36.

1904. *Eysarcoris ventralis* Distant, *Fauna Brit. India Rhyn*, **1** : 167.

1998. *Eysarcoris ventralis*, Chakraborty and Ghosh, *Fauna of Meghalaya, State Fauna Series* 4 : 391-429.

Material examined : 1 ex., Chandel (Dist. Chandel) ; 30.iii.1993, coll. (*D.K.M. & S.K.G.*) ; 1 ex., Churachandpur (Dist. Churachandpur), 4.iv.1992, coll. *A.K. Hazra and party.*

Diagnostic characters : Brownish ochraceous, thickly darkly punctate but anterior pronotal area luteous with two large brassy-black spots ; head brassy black ; levigate, luteous round spot near each basal angle of Scutellum ; central disk of abdomen brassy-black ; length 5.5–6.5 mm.

Distribution : India ; Manipur (Districts ; Chandel, Churachandpur) ; Bihar, Maharashtra, Meghalaya, Sikkim, West Bengal. Elsewhere : Burma, Malay Peninsula.

Genus 2. *Carbula* Stal., 1864

1864. *Carbula* Stal, *Hem. Afr.*, **1** : 140.

2. *Carbula* sp.

Material examined : 1 ex., Kharasom (District Ukhrul) ; 14.iv.1993 ; coll. *R.S. Barman and party.*

Remarks : Species determination was not possible due to paucity of materials.

Division II. NEZARIA

Genus 3. *Nezara* Amyot & Serville, 1843

1843. *Nezara* Amyot & Serville, *Hem.*, : 143.

Type species : *Cimex viridula* Linnaeus

3. *Nezara viridula* (Linnaeus)

1904. *Nezara viridula* Distant, *Fauna Brit. India Rhyn.*, **1** : 220.

1986. *Nezara viridula* Hedge, V. *East Ghat Ins.*, **1** : 28.

1994. *Nezara viridula*, Chakraborty et al. *Fauna of West Bengal*, State Fauna Series 3(5) : 483.

Material examined : 1 ex., Kongpopi (Dist. Senapati) ; 6.iv.1992, coll. *A.K. Hazra and party.*

Distribution : It is a widely distributed species and common to all regions in India. Elsewhere : Distributed throughout the Palaearctic, Neartic and Ethiopian Regions and over a large portion of the Neotropical, Oriental and Australasian Regions.

Division III. TROPICORARIA

Genus 4. *Placosternum* Amyot & Serville, 1843

1843. *Placosternum* Amyot & Serville, *Hem.*, : 174.

Type species : *Cimex taurus* Fabricius

*4. ***Placosternum taurus*** (Fabricius)

– Distant, *Fauna Brit, India Rhyn.*, **1** : 210.

Material examined : 1 ex., Tamenglong (Dist. Tamenglong) ; 27.xi.1992, coll. *A.K. Mandal and party.*

Diagnostic characters : Ochraceous with blackly puncatate, the punctures forming irregular black spots of which two transverse and linear on anterior area, two irregularly rounded on disk of pronotum and two on anterior area of pronotum ; antennae piceous, bases of the joints ochraceous ; the apices of the pronotal angles are trancate and bisinuate, thus being obtusely triangulate.

Length : 24 to 25 mm. Breadth : 16 to 17 mm.

Distribution : India : Manipur (Dist. Tamenglong) ; Meghalaya, Sikkim, Tamil Nadu. Elsewhere : Burma, Siam.

Division IV. HALYARIA

Key to the genera

1. Both anterior and posterior tibiae dilated ; head long, tapering at apex ..... *Erthesina*
– Anterior tibiae rarely dilated ; posterior tibiae always normal ; head normal, rounded or truncated at the apex ..... *Dalpada*

Genus 5. ***Dalpada*** Amyot & Serville, 1843

1843. *Dalpada* Amyot & Serville, *Hem.*, : 105.

Type species : *Dalpada aspera* Amyot & Serville

*5. ***Dalpada affinis*** Dallas

1851. *Dalpada affinis* Dallas, *List. Hem.* **1** : 185.

1904. *Dalpada affinis*, Distant, *Fauna Brit, India Rhyn.*, **1** : 112.

Material examined : 1 ex., Morih (Dist. Chandel) ; 24. xi. 1983, coll. *S.K. Gupta and party.*

Diagnostic characters : Luteous, very thickly punctured with brassy-black ; four minute ochraceous spots in a transverse series on anterior part of pronotum ; lateral angles of the pronotum short, tuberculous and ochraceous at their apices. Abdomen beneath with large impunctate discal area.

Length : 17 to 18 mm.

Distribution : India ; Manipur (Dist. Chandel) ; Upper Tenasserim, Sikkim.

Genus 6. ***Erthesina*** Spinola, 1837

1837. *Erthesina* Spinola, *Ess.*, : 291.

Type species : *Erthesina fullo* Thunberg

*6. ***Erthesina*** sp.

Material examined : 1 ex., Churachandpur (Dist. Churachandpur) ; 17.vi.1993, coll. *R. S. Barman and party.*

Remarks : Species determination was not possible for lack of materials.

Division V. EURYDEMARIA

Genus 7. ***Eurydema*** Laporte, 1832

1832. *Eurydema* Laporte, *Ess. Hem.*, : 61.

Type species : *Eurydema oleraceum* (Linnaeus)

*7. ***Eurydema pulchrum*** (Westwood)

1837. *Pentatoma pulchrum* Westwood, *Hope Cat.*, **1** : 34.

1904. *Eurydema pulchrum* (Westwood), Distant, Fauna Brit. India Rhyn., **1** : 190-91.

1998. *Eurydema pulchrum*, Chakraborty and Ghosh, *Fauna of Meghalaya, State Fauna Series* **4** : 391-429.

1998. *Eurydema pulchrum*, Chakraborty and Ghosh, *Fauna of Sikkim, State Fauna Series* **4** : 391-429.

Material examined : 3 ex., Bishnupur (Dist. Bisenpur) ; 8.iv.1992, coll. *S.K. Saha and party ;* 1 ex., Churachandpur (Dist. Churachandpur), 12.iv.1992, coll. *S. K. Saha and party* ; 3 exs. Churachandpur (Dist. Churachandpur), 16.iv.1993, coll. *S. K. Chakraborty and party* ; 2 exs., Churachandpur (Dist. Churachandpur), 18.v.1993, coll., *A. K. Pandit* ; 1 ex., Bishnupur (Dist. Bisenpur), 22.v.1993, coll. *A. K. Pandit.*

Diagnostic characters : Reddish-ochraceous, black ; head black, the margins ochraceous ;

pronotum with six black spots; two anterior and transverse, four discal. Scutellum with one large spot at base and two subapical lateral spots black. Body beneath and legs luteous ; lateral margins of sternum and abdomen orange-yellow and both with lateral and transverse series of black spots ; antennae, rostrum, tibiae, tarsi and apices of femora more or less black ; body above finely punctate.

Length : 8–9 mm.

Distribution : India : Manipur (Dists. Churachandpur, Bisenpur) ; Assam, Meghalaya, Nagaland, Sikkim. Elsewhere : Burma, China, Java and Sumatra.

Family II. SCUTELLERIDAE

Key to the genera

1. Body usually obovate ; abdomen beneath normal, scutellum wholly covers the abdomen except at base ..... ***Chrysocoris***
- Body ovate ; abdomen beneath sulcate ; scutellum not as above ..... ***Poecilocoris***

Genus 8. *Chrysocoris* Hahn., 1834

1834. *Chrysocoris* Hahn, *Wanz. Ins.*, **11** : 38.

8. *Chrysocoris* sp.

Material examined : 1 ex., Loktak Lake (Dist. Bisenpur) ; 21.v.87, coll. *C. Radhakrishnan.*

Remarks : Species determination was not possible for paucity of materials.

Genus 9. *Poecilocoris* Dallas, 1848

1848. *Poecilocoris* Dallas, *Trans, Ent, Soc.*, V : 100.

Type species : *Poecilocoris druraei* (Linnaeus)

Key to the species of the genus *Poecilocoris*

1. Anterior margin of pronotum reddish-yellow ; scutellum bears usually with eleven sports ; anterior and antero-lateral margins of pronotum sparsely puncatate ..... *drurei*
- — Anterior margin of pronotum black ; scutellum usually with 14 spots ; anterior and anterolateral margins of pronotum thickly and coarsely puncate ..... *hardwickii*

*9. *Poecilocoris drurei* (Linn.)

1771. *Cimex drurei* Linnaeus, *Mant.*, : 534.

1904. *Poecilocoris drurei*, Distant, *Fauna Brit, India Rhyn.*, **1** : 45-46.

1998. *Poecilocoris drurei*, Chakraborty and Ghosh, *Fauna of Meghalaya, State Fauna Series* **4** : 391-429.

Material examined : 1 ex., Turibari (Dist. Senapati), 9.xi.1992, coll. *A. K. Mandal and party.*

Diagnostic characters : Reddish ochraceous, head, two large and irregularly shaped discal spots to pronotum, thirteen spots to scutellum, body beneath, legs antennae and rostrum black or violaceous black. Basal margin of corium varies from black to reddish ochraceous. It can easily be distinguished from *P. hardwickii* by the absence of the black anterior margin to the pronotum.

Length : 18 to 22 mm.

Distribution : India : Manipur (Dist. Senapati), Assam, Bhutan, Nagaland, Sikkim. Elsewhere : Burma, Formosa, Hong Kong.

10. *Poecilocoris hardwickii* (Westwood)

1837. *Tectocoris hardwickii* Westwood, *Hope Cat.*, **1** : 13.

1848. *Poecilocoris hardwickii* Dallas, *Trans. Ent. Soc.* **V** : 107.

1904. *Poecilocoris hardwickii* Distant, *Fauna Brit. India Rhyn.*, **1** : 45.

1998. *Poecilocoris hardwickii* Chakraborty and Ghosh, *Fauna of Meghalaya, State Fauna Series* **4** : 391-429.

Material examined : 1 ex., Ukhrul (Dist. Ukhrul), 16.xi.1992, coll. *A.K. Mandal and party.*

Diagnostic characters : Dark reddish ochraceous, head, anterior margin and two large basal spots to pronotum black ; scutellum with eleven black spots of which central one is the longest ; body beneath excluding lateral margin of pro and mesosterna and discal area of abdomen, legs, rostrum and antennae black or violet black.

Length : 19 to 22 mm.

Distribution : India : Manipur (Dist. Ukhrul), Assam, Bhutan, Nagaland. Elsewhere : Burma, Hong Kong, West China.

Remarks : It is a minor pest to Tea plantations.

Family III. DINIDORIDAE

Key to the genera

1. Antennae 4 segmented ; rostrum reaching the intermediate coxae ; membrane with reticulated veins ..... ***Cyclopelta***

— Antennae 5-segmented ; rostrum reaching beyond the anterior coxae, membrane with anastomosed veins ..... ***Coridius***

— Body ovate ; abdomen beneath sulcate ; scutellum not as above ..... ***Poecilocoris***

Genus 10. *Coridius* Illiger, 1807

1807. *Coridius* Illiger, *Rossi Fauna Etrusca*, **2**(2) : 361
Type-species : *Cimex janus* Fabricius

*11. *Coridius brunneus* (Thunberg)

1879. *Aspongopus brunneus* Distant, *A.M.N.H.* (5) : 52.

1987. *Coridius brunneus* Durai, *Oriental Ins.*, **21** : 195-196.

1998. *Coridius brunneus* Chakraborty and Ghosh, *Fauna of Meghalaya, State Fauna Series* **4** : 391-429.

Material examined : 1 ex. Jirbam (Dist. Jirbam), 9.v.1993, coll. *M. Sil and party* ; 1 ex., Libona (Dist. Jirbam), 14.v.1993, coll. *A.K. Mandal.*

Diagnostic characters : Brownish ochraceous, body beneath and legs somewhat dark-brown ; antennae fuscous, apical segment luteous usually its apex black ; third antennal segment is slightly longer than second but shorter than four and last segments. Dorsal aspect of abdomen red.

Length : 17 to 20 mm.

Distribution : India : Manipur (Dist. Jirbam), Assam, Bihar, Maharashtra, Meghalaya, West Bengal. Elsewhere : Burma, Indonesia, Malaysia and Malay Archipelago.

12. *Coridius* sp.

Material examined : 1 ex., Sankai (Dist. Imphal), 25.i.1977, coll. *S.G. Patil.*

Genus 11. *Cyclopelta* Amyot and Serville, 1843

1843. *Cyclopelta* Amyot and Serville, *Hem.*, : 172.

13. *Cyclopelta* sp.

Material examined : 1 ex., Churachandpur (Dist. Churachandpur) 17.v.1993, coll. *S. K. Chakraborty* ; 1 ex., Churachandpur (Dist. Churachandpur), 7.vi.1992, coll. *R. Mathew and party.*

Family IV. UROSTYLIDAE

Genus 12. *Urochela* Dallas, 1850

1850. *Urochela* Dallas, *Hem.*, **1** : 313.

Type species : *Urochela quadripunctata* Dallas

*14. *Urochela quadripunctata* Dallas

1850. *Urochela quadripunctata* Dallas, *Tr. E.S. n.* **1** : 3.

1904. *Urochela quadripunctata*, Distant, *Fauna Brit. India Rhyn.*, **1** : 309–310.

Material examined : 2 exs., Sherou (Dist. Ukhrul), 13.iv.1993, coll. *R.S. Burman and party.*

Diagnostic characters : Brownish ochraceous, thickly puncate ; lateral and anterior margin of pronotum, basal lateral margins and narrow apical margin to corium ; a central line to pronotum and scutellum, luteous ; spots on basal lateral margin, on disk and on centre of apical margin to corium black. Abdomen beneath luteous, a spot on each segment within stigmata and another on lateral margin black ; basal segments of antennae brownish ochraceous, remaining segments black.

Length : 8 to 9 mm.

Distribution : India : Manipur (Dist. Ukhrul), Bhutan, Sikkim, West Bengal.

15. *Urochela sp.*

Material examined : 1 ex., Tamenglong (Dist. Temenglong), 23.xi.1992, coll. *A.K. Mandal*;

1 ex., Sheru Peak (8350 m) (Dist. Ukhrul), 13.vi.1993, coll. *R.S. Burman and party.*

Family V. PHYLLOCEPHALIDAE

Genus 13. ***Megarhynchus*** Laporte, 1832

1832. *Megarhynchus* Laporte, *Ess. Hem.*, : 65.

Type species : *Megarhynchus rostratus* Fabricius

Key to the species of the genus *Megarhynchus*

1. Head large, lateral margins purplish-red ; head and pronotum coarsely punctate ; lateral pronotal margin luteous, lateral pronotal angles normal ..... *rostratus*

– Head smaller ; lateral margins of head and pronotum normal ; head and pronotum sparsely punctate, lateral pronotal angles obtusely prominent ..... *limatus*

*16. ***Megarhynchus limatus*** Herr-Sch.

1853. *Megarhynchus limatus* Herr-Sch. *Wanz. Ins.*, **9** : 303.

1902. *Megarhynchus limatus* Distant, *Fauna Brit, India Rhyn.*, **1** : 302.

Material examined: 2 exs. Churachandpur (Dist. Churachandpur) ; 3.iii.1992, coll. *D.K.M. and party.*

Diagnostic characters : Dull ochraceous ; head finely punctate, lateral lobes finely punctate at tip of apices ; pronotum moderately convex ; lateral pronotal angles strongly serrate ; more obtusely prominent.

Length : 20-22 mm.

Distribution : India ; Manipur (Dist. Churachandpur) ; Assam. Elsewhere : Burma.

*17. ***Megarhynchus rostratus*** (Fabricius)

1803. *Aelia rostratus* Fabricius, *Syst. Rhyng.*, : 18.

1902. *Megashynchus rostratus* Distant, *Fauna Brit. India Rhyn.*, **1** : 302.

Material examined : 1 ex., Churachandpur (Dist. Churachandpur), 2.iii.1992, coll. *D.K.M. and party.*

Diagnostic characters : Ochraceous ; lateral margins of pronotum and corium luteous ; extreme lat. margin of pronotum and corium luteous ; body beneath and legs ochraceous ; abdomen with a stigmatal series of small black spots ; head and pronotum coarsely punctate ; scutellum longitudinally rugulose.

Length : 18-24 mm.

Distribution : India : Manipur (Dist. Churachandpur), Assam, Sikkim, Elsewhere : Burma, China, Malayasia.

SUMMARY

Out of 22 species so far known from the State of Manipur, the paper incorporate an account of 17 species belonging to 13 genera distributed over 5 families of the Super family Pentatomoidea of which 10 species and 8 genera are new record from the State. Keys to taxa, geographical distribution, literature references and diagnostic features of newly recorded species have been dealt with. Besides districtwise distribution of species has been provided through a chart.

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Table showing distribution of Pentatomoidea species in different districts of Manipur.

Name of species	Chandel	Senapati	Bisenpur	Temenglong	Churachandpur	Ukhrul	Jirbam
	1	2	3	4	5	6	7
1. *Eysarcoris ventralis* (Westwood)	+	—	—	—	+	—	—
2. *Nezara viridula* (Linnaeus)	—	+	—	—	—	—	—
3. *Placosternum taurus* (Fabricius)	—	—	+	—	—	—	—
4. *Eurydema pulchrum* (Westwood)	—	—	—	+	—	—	—
5. *Poecilocoris drurei* (Linnaeus)	—	+	—	—	—	—	—
6. *Poecilocoris hardwickii* (Westwood)	—	—	—	—	—	+	—
7. *Coridius brunneus* (Thunberg)	—	—	—	—	—	—	+
8. *Megarhynchus limatus* (Herr.-Sch.)	—	—	—	—	+	—	—
9. *Megarhynchus rostratus* (Fabricius)	—	—	—	—	+	—	—
10. *Dalpada affinis* Dallas	+	—	—	—	—	—	—
11. *Urochela quadripunctata* Dallas	—	—	—	—	—	+	—

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INSECTA : HEMIPTERA : APHIDIDAE

R. C. BASU and L. K. GHOSH*
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata-700 053

INTRODUCTION

Aphids constitute one of the most important group of phytophagous insects. They are remarkable for their polymorphism, polyphagism, host alternating heteroecious behaviour, reproductive habits and role as vector for many a plant viral diseases. As a consequence of aphid infestation, the plants show various malformations like gall. These insects are found in abundance in places having temperate climate and enjoy more or less cosmopolitan distribution.

Out of 4702 aphid species so far known World over (Remaudiere and Remaudiere, 1997) about 1015 species occur in oriental region (Agarwala and Ghosh, A.K. 1984). Of these, a little over 650 species belonging to 208 genera represent Aphididae of India (Ghosh, L.K. and Singh, 2000). A critical analysis reveals that Indian aphids constitute about 13.8% of the World aphids including a large number of rare and endemic species.

Compilation of available data also reveals that over 1200 species of plants belonging to nearly 700 genera and 175 families are infested by these aphids in India. As a result of thorough investigation on this group, quite an appreciable number of publications are made on Indian aphids but for limitation of space only some important contributions are given below.

Barlow (1890), Buckton (1893-98), Cotes (1893), Fletcher (1914), van der Goot (1916-1917), Das (1918), George (1925-1928), Krishnamurti (1928, 1937), Deshpande (1930), Ayyar (1937), Ullah (1940), Behura (1963,1965), Verma (1965-74), David and his associates (1972-recent), Chakrabarti and Quednau (1976), Chakrabarti and his associates (1969-recent), D.N. Raychaudhuri and his collaborators (1956-1983), Basu, R.C. and Raychaudhuri, D.N. (1980), Ghosh, A.K. (1974-1994), Stary and Ghosh, A.K. (1983), Ghosh, L.K. (1986, 1989), Ghosh, A.K. and Quednau (1990), Ghosh, L.K. and Basu, R.C. (1993, 1998, 2000) etc.

The State of Manipur covering an area of 22,347 square kilometers with population of 7,80,037 constitutes the central part of Purbachal Hills Tracts of Northeast India. The Central plain of the State known as Imphal or Manipur valley occupies about 80% of total population. As such, Manipur valley is overpopulated and resulted into the removal of natural vegetation to a large extent. The surrounding hill tract covers with evergreen tropical forest still remains undisturbed in part. During the year temperature of the state varies from 15.1°C to 28°C and the average monthly rainfall from 1" in January to 16" in July. The State is also noted for its altitudinal differences (*Ca* 900m-*Ca* 2500.m). These portions are abound with animal life including the occurrence of the vast magnitude of insect communities including aphids.

The aphid fauna of Manipur is known through the works of N.B. Chatterjee, A.K. Ghosh and D.N. Raychaudhuri 1991; S. Chakrabarti and D.N. Raychaudhuri 1961; D.N. Raychaudhuri, S.K. Raha and D. Raychaudhuri 1977; T.K. Singh, D.

*Emeritus Scientist, Zoological Survey of India

Raychaudhuri and D.N. Raychaudhuri 1979; B.K. Agarwala, D. Raychaudhuri and D.N. Raychaudhuri 1980; T.K. Singh, D. Raychaudhuri, S.K. Raha and D.N. Raychaudhuri 1980; D.N. Raychaudhuri *(ed.* 1980).

A perusal of literature reveals that altogether 138 species/subspecies of aphids belonging to 75 genera in seven subfamilies are so far known from the State of Manipur. The present contribution is an attempt to provide a comprehensive account of the above aphid fauna from Manipur. It deals with a brief note on earlier investigations; keys to subfamilies, tribes, subtribes, genera, species/subspecies; literature reference; geographical distribution of each species both within India and in abroad and also endemism. The taxonomic keys, however, present here are essentially for indentification of Manipur aphids and it may not work for aphids not represented in this region. The taxonomic nomenclature of the listed genera and species has mostly been adopted from Eastop and Hille Ris Lambers (1976), Raychaudhuri, D.N. (*ed.* 1980), Ghosh, A.K. (1980, 1982, 1984, 1988, 1993), Ghosh, A.K. and Quednau (1990).

A critical analysis of aphid fauna of Manipur reveals that it constitutes about 22% of the total species known from India, 13% of the species from the Oriental and 3% of the species from the World aphid fauna. Of the 138 species so far known from the State, good number of species are endemic in origin. The find of sexual forms in the area hints at the possibility of completion of holocycly for some of these species, although anholocyclic type of life cycle is shown by majority of the aphid species found in the State. The material were examined chiefly from the collections in Entomology Laboratory (C.U. Colls.), Department of Zoology, University of Calcutta, from Department of Life Science, Manipur University (Coll. T.K. Singh) and also from the collections represented in the Zoological Survey of India (ZSI Coll., NZC).

ABBREVIATION USED

The following abbreviations have been used in the text : Alata(e) : Alate viviparous female(s); Aptera(e) : Apterous viviparous female(s); a.s. : Antennal segment; b.d. : Basal diameter of antennal segment III; C.U. : Department of Zoology, University of Calcutta; F.T.C. : First Tarsal Chaetotaxy; h.t.2 : Second joint of hind tarsus; N.Z.C. : National Zoological Collection, Zoological Survey of India; pt. : Processus terminalis; U.r.s. : Ultimate rostral segment; X : times as long as; *Zool. Surv. India* : Zoological Survey of India.

CLASSIFIED LIST OF APHIDIDAE FROM THE STATE OF MANIPUR

Subfamily 1. ANOECIINAE

Genus 1. ***Aiceona*** Takahashi

1. *Aiceona tittabarensis* (Raychaudhuri and Ghosh)
2. *Aiceona (Subaiceona) manipurensis* (Singh and Raychaudhuri)

Subfamily II. APHIDINAE

Tribe **Aphidini**

Genus 2. ***Aphis*** Linnaeus

3. *Aphis fabae solanella* Theobald
4. *Aphis craccivora* Koch
5. *Aphis glycines* Matsumura
6. *Aphis gossypii* Glover
7. *Aphis kurosawai* Takahashi
8. *Aphis longisetosa* Basu
9. *Aphis nasturtii* Kaltenbach
10. *Aphis nerii* Boyer de Fonscolombe
11. *Aphis punicae* Passerini
12. *Aphis spiraecola* Patch

Genus 3. ***Hyalopterus*** Koch

13. *Hyalopterus amagdali* (Blanchard)
14. *Hyalopterus pruni* (Geoffray)

Genus 4. ***Hysteroneura*** Davis

15. *Hysteroneura setariae* (Thomas)

Genus 5. ***Melanaphis*** van der Goot

16. *Melanaphis bambusae* (Fullaway)
17. *Melanaphis donacis* (Passerini)

18. *Melanaphis sacchari* (Zehntner)
19. *Melanaphis vandergooti* Raychaudhuri and Banerjee

Genus 6. ***Rhopalosiphum*** Koch

20. *Rhopalosiphum maidis* (Fitch)
21. *Rhopalosiphum nymphaeae* (Linnaeus)
22. *Rhopalosiphum padi* (Linnaeus)
23. *Rhopalosiphum rufiabdominalis* (Sasaki)

Genus 7. ***Toxoptera*** Koch

24. *Toxoptera aurantii* (Boyer de Fonscolombe)
25. *Toxoptera citricidus* (Kirkaldy)
26. *Toxoptera odinae* (van der Goot)

Genus 8. ***Cryptosiphum*** Buckton

27. *Cryptosiphum artemisiae* Buckton

Tribe **Macrosiphini**

Genus 9. ***Acyrthosiphon*** Mordvilko

28. *Acyrthosiphon pisum* (Harris)

Genus 10. ***Amphorophora*** Buckton

29. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu

Genus 11. ***Aulocorthum*** Mordvilko

30. *Aulocorthum (Neomyzus) circumflexum* (Buckton)
31. *Aulocorthum dasi* Ghosh, Basu and Raychaudhuri
32. *Aulocorthum solani* (Kaltenbach)

Genus 12. ***Brachycaudus*** van der Goot

33. *Brachycaudus helichrysi* (Kaltenbach)

Genus 13. ***Brevicoryne*** van der Goot

34. *Brevicoryne brassicae* (Linnaeus)

Genus 14. ***Capitophorus*** van der Goot

35. *Capitophorus formosartemisiae* (Takahashi)
36. *Capitophorus mitegoni* Eastop

Genus 15. ***Cavariella*** del Guercio

37. *Cavariella salicicola* (Matsumura)

Genus 16. ***Coloradoa*** Wilson

38. *Coloradoa artemisicola* Takahashi
39. *Coloradoa rufomaculata* (Wilson)

Genus 17. ***Hyadaphis*** Kirkaldy

40. *Hyadaphis coriandri* (Das)

Genus 18. ***Hyperomyzus*** Borner

41. *Hyperomyzus carduellinus* (Theobald)

Genus 19. ***Hyalomyzus*** Richard

42. *Hyalomyzus raoi* Hille Ris Lambers

Genus 20. ***Lipaphis*** Mordvilko

43. *Lipaphis erysimi* (Kaltenbach)

Genus 21. ***Macrosiphoniella*** del Guercio

44. *Macrosiphoniella pseudoartemsiae* Shinji
45. *Macrosiphoniella sanborni* (Gillette)
46. *Macrosiphoniella spinipes* Basu
47. *Macrosiphoniella yomogifoliae* (Shinji)

Genus 22. ***Macrosiphum*** Passerini

48. *Macrosiphum pachysiphon* Hille Ris Lambers
49. *Macrosiphum rosae* (Linnaeus)

Genus 23. ***Matsumuraja*** Schumacher

50. *Matsumuraja capitophoroides* Hille Ris Lambers

Genus 24. ***Megoura*** Buckton

51. *Megoura lespedezae* (Essig and Kuwana)

Genus 25. ***Microlophium*** Mordvilko

52. *Microlophium carnosum* (Buckton)
53. *Microlophium rufiformosanum* (Takahashi)

Genus 26. ***Myzus*** Passerini

54. *Myzus dycei* Carver
55. *Myzus obtusirostris* David, Rajasingh and Narayanan
56. *Myzus ornatus* Laing
57. *Myzus (Nectarosiphum) persicae* (Sulzer)
58. *Myzus varians* Davidson

Genus 27. ***Phorodon*** Passerini

59. *Phorodon (Paraphorodon) cannabis* Passerini

Genus 28. ***Sitobion*** Mordvilko

60. *Sitobion indicum* Basu
61. *Sitobion miscanthi* (Takahashi)
62. *Sitobion rosaeformis* (Das)

Genus 29. ***Pentalonia*** Coquerel

63. *Pentalonia nigrinervosa* Coquerel

Genus 30. ***Rhodobium*** Hille Ris Lambers

64. *Rhodobium porosum* (Sanderson)

Genus 31. ***Rhopalosiphoninus*** Baker

65. *Rhopalosiphoninus latysiphon* (Davidson)

Genus 32. ***Semiaphis*** van der Goot

66. *Semiaphis heraclei* (Takahashi)

Genus 33. ***Shinjia*** Takahashi

67. *Shinjia pteridifoliae* (Shinji)

Genus 34. ***Sinomegoura*** Takahashi

68. *Sinomegoura citricola* (van der Goot)

69. *Sinomegoura rhododendri* (Takahashi)

Genus 35. ***Subovatomyzus*** Basu

70. *Subovatomyzus leucoceptri* Basu

Genus 36. ***Uroleucon*** Mordvilko

71. *Uroleucon (Uroleucon) formosana crepidis* (Ghosh, Ghosh & Raychaudhuri)

72. *Uroleucon (Uroleucon) sonchi* (Linnaeus)

73. *Uroleucon (Uroleucon) parasonchi* Raychaudhuri, Raha and Raychaudhuri

74. *Uroleucon (Uroleucon) pseudotanaceti* (Verma)

75. *Uroleucon (Uromelon) compositae* (Theobald)

Genus 37. ***Trichosiphonaphis*** Takahashi

76. *Trichosiphonaphis gerbarae* Ghosh and Raychaudhuri

Genus 38. ***Tuberocephalus*** Shinji

77. *Tuberocephalus sasaki* del Guercio

Genus 39. ***Vesiculaphis*** del Guercio

78. *Vesiculaphis verbasci* Chowdhuri, Basu, Chakrabarti and Raychaudhuri

Subfamily III. DREPANOSIPHINAE

Genus 40. ***Betacallis*** Matsumura

79. *Betacallis prunicola* Basu, Ghosh and Raychaudhuri

80. *Betacallis querciphaga* Basu, Ghosh and Raychaudhuri

Genus 41. ***Chromaphis*** Walker

81. *Chromaphis hirsutatibis* Kumar and Lavigne

Genus 42. ***Machilaphis*** Takahashi

82. *Machilaphis machill* Takahashi

Genus 43. ***Shivaphis*** Das

83. *Shivaphis celti* Das

Genus 44. ***Taoia*** Quednau

84. *Taoia indica* (Ghosh and Raychaudhuri)

Genus 45. ***Tuberculatus*** Mordvilko

85. *Tuberculatus indicus* Ghosh

86. *Tuberculatus konaracola* (Shinji)

Genus 46. ***Tinocalloides*** Basu

87. *Tinocalloides montanus* Basu

Subfamily IV. GREENIDEINAE

Tribe **Cervaphidini**

Genus 47. ***Anomalosiphum*** Takahashi

88. *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri

Genus 48. ***Cervaphis*** van der Goot

89. *Cervaphis quercus* Takahashi

90. *Cervaphis rappardi indica* Basu

Genus 49. ***Schoutedenia*** Rubsaamen

91. *Schoutedenia lutea* (van der Goot)

Genus 50. ***Sumatraphis*** Takahashi

92. *Sumatraphis celti* Takahashi

Tribe **Greenideini**

Genus 51. ***Brevitrichosiphon*** Raychaudhuri, Ghosh, Banerjee and Ghosh

93. *Brevitrichosiphon mukherjii* Raychaudhuri, Ghosh, Banerjee and Ghosh

Genus 52. ***Eutrichosiphum*** Essig and Kuwana

94. *Eutrichosiphum assemense* Ghosh, Basu and Raychaudhuri

95. *Eutrichosiphum dubium* (van der Goot)

96. *Eutrichosiphum flavum* (Takahashi)

97. *Eutrichosiphum jugeswari* Singh, Raychaudhuri and Raychaudhuri

98. *Eutrichosiphum khasyanum* (Ghosh and Raychaudhuri)

99. *Eutrichosiphum litseae* Raychaudhuri, Raha and Raychaudhuri

100. *Eutrichosiphum manipurense* Singh, Raychaudhuri and Raychaudhuri

101. *Eutrichosiphum pseudopasaniae* Szelegiewich
102. *Eutrichosiphum russellae* Ghosh, Ghosh and Raychaudhuri
103. *Eutrichosiphum sensoriatum* (Ghosh)
104. *Eutrichosiphum tattakanum* (Takahashi)

Genus 53. ***Greenidea*** Schouteden

105. *Greenidea (Greenidea) facicola* Takahashi
106. *Greenidea (Greenidea) longirostris* Basu
107. *Greenidea (Neogreenidea) ayyari* Raychaudhuri, Ghosh, Banerjee and Ghosh
108. *Greenidea (Trichosiphum) formosana* (Maki)
109. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh
110. *Greenidea (Trichosiphum) quercicola* Basu, Ghosh and Raychaudhuri

Genus 54. ***Greenideoida*** van der Goot

111. *Greenideoida (Pentatrichosiphum) luteum* Basu

Genus 55. ***Mollitrichosiphum*** Suenaga

112. *Mollitrichosiphum (Mollitrichosiphum) tenuicorphs* Okajima
113. *Mollitrichosiphum (Mollitrichosiphum) kajirangi* Ghosh

Subfamily V. HORMAPHIDINAE

Tribe **Nipponaphidini**

Genus 56. ***Neothoracaphis*** Takahashi

114. *Neothoracaphis stupensis* (Takahashi)

Genus 57. ***Nipponaphis*** Pergande

115. *Nipponaphis himalayensis* Ghosh and Raychaudhuri

Genus 58. ***Parathoracaphis*** Takahashi

116. *Parathoracaphis manipurensis* Pramanik, Samanta and Raychaudhuri

Genus 59. ***Parathoracaphisella*** Pramanik, Samanta and Raychaudhuri

117. *Parathoracaphisella indica* Pramanik, Samanta and Raychaudhuri

Tribe **Ceratiphidini**

Genus 60. ***Astegopteryx*** Karsch

118. *Astegopteryx minuta* (van der Goot)

Genus 61. ***Ceratoglyphina*** van der Goot

119. *Ceratoglyphina bambusae bengalensis* Ghosh

Genus 62. ***Ceratovacuna*** Zehntner

120. *Ceratovacuna lanigera* Zehntner
121. *Ceratovacuna silvestri* Ghosh, Pal and Raychaudhuri.

Genus 63. ***Glyphinaphis*** van der Goot

122. *Glyphinaphis bambusae* van der Goot

Genus 64. ***Pseudoastegopteryx*** Ghosh, Pal and Raychaudhuri

123. *Pseudoastegopteryx himalayensis* Ghosh, Pal and Raychaudhuri

Genus 65. ***Pseudoregma*** Doncaster

124. *Pseudoregma alexandri* (Takahashi)
125. *Pseudoregma bucktoni* Ghosh, Pal and Raychaudhuri
126. *Pseudoregma panicola* (Takahashi)

Subfamily VI. LACHNINAE

Genus 66. ***Cinara*** Curtis

127. *Cinara atrotibialis* David and Rajasingh

Genus 67. ***Eulachnus*** del Guercio

128. *Eulachnus thunbergii* Wilson

Genus 68. ***Schizolachnus*** Mordvilko

129. *Schizolachnus orientalis* (Takahashi)

Genus 69. ***Lachnus*** Burmeister

130. *Lachnus tropicalis* (van der Goot) Subfamily

Subfamily VII. PEMPHIGINAE

Genus 70. ***Tetraneura*** Hartig

131. *Tetraneura (Indotetraneura) basui* Hille Ris Lambers
132. *Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki)

Genus 71. ***Formosaphis*** Takahashi

133. *Formosaphis micheliae* Takahashi

Genus 72. ***Prociphilus*** Koch

134. *Prociphilus cornifoliae* Singh, Ghosh and Raychaudhuri

Genus 73. ***Chaetogeoica*** Remaudiere and Tao

135. *Chaetogeoica grmniniphaga* Raychaudhuri, Pal and Ghosh

136. *Chaetogoica polychaeta* Raychaudhuri, Pal and Ghosh

Genus 74. ***Geoica*** Hartig

137. *Geoica lucifuga* (Zehntner)

Genus 75. ***Smynthurodes*** Westwood

138. *Smynthurodes betae* Westwood

SYSTEMATIC ACCOUNT

Key to the Subfamilies of the Family APHIDIDAE

1 (2) First tarsal segment always with more than 7 ventral hairs and sometimes with a medial longitudinal suture ..... LACHNINAE

2(1) First tarsal segment with at most 7 ventral hairs, head may or may not have medial suture 3

3(4) 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 and eyes in apterae 3 faceted ... GREENIDEINAE

4(3) Siphunculi of various shapes, if elongate then usually without hairs 5

5(6) Empodial hair always fine; subanal plate never indented or bilobed; head and pronotum usually separate 7

6(5) Empodial hair flattened or fine, subanal plate usually indented or bilobed, if entire then body usually indented or bilobed, if entire, then body usually with wax gland plates; head and pronotum sometimes also entire 9

7(8) Siphunculus usually elongate; cauda longer than broad; p.t. usually longer than base of last antennal segment ... APHIDINAE

8(7) Siphunculi never elongate, cone-shaped with apical rim not chitinised; broader than long; p.t. always shorter than base of last antennal segment ..... ANOECIINAE

9(10) Eyes in all morphs large or sometimes 3-faceted; body and appendages devoid of conspicuous hairs, p.t. may be shorter or longer than base of last antennal segment; siphunculi not reticulated, usually truncate or ring-like, if elongate then cauda distinctly knobbed, wax gland plate present or absent ..... DREPANOSIPHINAE

10(9) Eyes in apterae always 3-faceted, siphunculi truncate, cone-shaped, ring-like or absent; wax gland plate usually present 11

11(12) Head in apterae free from pronotum, separate; frontal processi absent; antannae 5-6 segmented, first tarsal chaetotaxy with 2-7 dorsoapical hairs; dorsoapical hairs of second tarsal segments fine; cauda rounded ..... PEMPHIGINAE

12(11) Head in apterae fused with pronotum, in apterae usually with a pair of frontal horns; antennae usually 2-5 segmented; first tarsal segments with less than 5 hairs; dorsoapical hairs of second tarsal segments capitate; cauda weakly or distinctly knobbed or rounded ..... HORMAPHIDINAE

Subfamily 1. ANOECIINAE

Genus 1. ***Aiceona*** Takahashi

Key to the species of the genus *Aiceona*

8th tergite with a short stout spine-like hair; u.r.s. broad ..... ***manipurensis***

8th tergite without any spine-like hair; u.r.s. stiletto-shaped ..... ***titabarensis***

1. ***Aiceona titabarensis*** (Raychaudhuri and Ghosh)

1964. *Lachnus titabarensis* Raychaudhuri, D.N. and Ghosh, A.K., *Zool. meded. Leiden*, **39** : 257.

1980. *Aiceona litseae* : Basu, R.C. and Raychaudhuri, D.N., *Zool. Surv. India, Misc. Publ.*, **18** : 4.

1988. *Aiceona titabarensis* (Raychaudhuri and Ghosh) : Ghosh, A.K., Fauna of India, Homoptera : Aphidoidea, pt. 4, Subfamilies Phloemyzinae, Anoeciine and Hormaphidinae, ZSI : 64.

Material : Apterae and alatae, on *Litsea polyantha* (Lauraceae), Manipur : Khongampa, 1.ii.1971, Coll. *T.K.* Singh.

Distribution : India : Assam, Manipur, Sikkim and West Bengal.

Remarks : The brown coloured aphid species apparently enjoys autoecious holocyclic life on *Litsea polyantha* (Ghosh, A.K. 1988). This endemic species is so far distributed in the northeastern States including Manipur.

2. *Aiceona (Subaiceona) manipurensis* (Singh and Raychaudhuri)

1975. *Subaiceona manipurensis* Singh and Raychaudhuri, D.N., *Proc. zool. Soc. Calcutta*, **28** : 156.

1988. *Aiceona (Subaiceona) manipurensis* Singh and Raychaudhuri : Ghosh, A.K., Fauna of India, Homoptera : Aphidoidea, pt. 4, Subfamilies Phloemyzinae, Anoceiine and Hormaphidinae, ZSI : 23.

Material: Apterae and alatae, on *Machilus odoratissima*, 24.v.1974, Coll. T.K. Singh.

Distribution : India : Manipur.

Remarks : This yellowish aphid species appears to be restricted to *Machilus* spp. Its peak period of infestation is during February-May. The species is so far known only from Manipur among Northeastern States.

Subfamily II. APHIDINAE

Key to th Tribes of the Subfamily APHIDINAE

Spiracles of abdominal segments 1 and 2 usually placed close together, if apart than their mutual distance is 3.0 x diameter of spiracular aparture; abdominal segments usually without lateral abdominal tubercles though these may be variably present on abdominal segments 2-5; lateral frontal tubercles usually pronounced; apterae sometimes with secondary rhinaria on antennal segment III; antennal hairs usually not with fine apices ..... MACROSIPHINI

Spiracles of abdominal segments 1 and 2 placed far apart; abdominal segments 1 and 7 usually with lateral abdominal tubercles, other abdominal segments with or without these; lateral frontal tubercles not or hardly developed, antennal hairs usually fine; antennae and body never pilose, apterae never with secondary rhinaria ..... APHIDINI

Tribe. **Aphidini**

Genus 2. *Aphis* Linnnaeus

Key to the species of the genus *Aphis* Linn.

Apterae :

1. Ultimate rostral segment stiletto-shaped; F.T.C. 3, 3, 2; p.t. more than 1.5 x base of antennal segment VI ..... *kurosawai*

– Ultimate rostral segment may be of various shapes but never stiletto-shaped 2

2. First segment of hind tarsus usually with 3 hairs; siphunculi longer than cauda bearing 10-12 hairs; yellow to dark in life ..... *nerii*

– First tarsal segment of hind tarsus always with 2 hairs 3

3. 8th abdominal tergite with 3-8 hairs .... *fabae solanella*

– 8th abdominal tergite with only 2 haris ...4

4. Abdominal dorsum usually completely sclerotic; siphunculi longer than black and somewhat pointed cauda bearing 5-7 hairs; shiny black in life..... ...*craccivora*

– Abdominal dorsum usually pale and smooth 5

5. Hairs on posterior abdominal tergites longer, never less than 3.0 x b.d. III; secondary hairs on u.r.s. as long as or longer than primary ones; cauda with 7-9 hairs; brown to reddish brown in life ..... *longisetosa*

– Hairs on posterior abdominal tergites shorter, about only 0.5-1.8 x b.d. III 6

6. Siphunculi pale, smooth, dusky near apices; p.t. 2.5-3.1 x base of a.s. VI; cauda with 6-10 hairs; pale greenish in life ..... *punicae*

– Siphunculi brown to blackish and imbricated 7

7. Longest hair on hind femora as long as or longer than its maximum width . *spiraecola*

– Longest hair on hind femora much shorter than its maximum width 8

8. Second tarsal segment with only primary hairs; cauda usually with 5 hairs; siphunculi 1.1-1.5 x cauda; dusky to brownish in life. ..... *nasturtii*

– Second tarsal segment with both primary and secondary hairs. 9

9. Cauda dark brown to blackish; rarely pale; secondary hairs on u.r.s. never more than 4; siphunculi 1.2-1.8 x cauda bearing 4-7 hairs; colour variable ..... *gossypii*

– Cauda pale to dusky but never blackish; secondary hairs on u.r.s. variable (2-9) but usually 2; cauda usually with 7 hairs; colour yellowish in life ..... *glycines*

3. *Aphis fabae solanella* Theobald

1914. *Aphis fabae solanella* Theobald, *African Aphididae*, 1(4) : 325.

1971. *Aphis fabae solanella* : Chakrabarti, Ghosh and Raychaudhuri, *Sci. Cult.*, 37 : 247.

Material : Apterae and alatae, on *Solanum nigrum*, Manipur : Uripok, 9. iv.1971, T.K. Singh Coll.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Manipur, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Africa; Europe; Middle East.

Remarks : Blackish brown aphids usually infest the growing shoot and both the surfaces of leaves. It usually occurs on solanaceous plants.

4. *Aphis craccivora* Koch

1854. *Aphis craccivora* Koch, *Die Pflanzenlause Aphiden*, 1 : 124.

1997. *Aphis craccivora* : Ghosh, L.K. *et al. State Fauna Series* 6 : *Fauna of Delhi* : 223.

Material : Apterae and alatae, on *Vicia faba, Heliantbus annus,* College gardens, Imphal, 12.v.1960 : apterae on *Solanum* sp., Fisheries experimental Station, Wangbol, 20.vi.1960; on *Vicia faba*, Nambol, 28.xii.1984. coll. T. K. Singh.

Distribution : India : All over including Manipur.

Elsewhere : Cosmopolitan.

Remarks : The species commonly known as Black aphid, attracks many plants and most of the leguminous crops in India. It is a major pest of bean and cow pea. It acts as a vector of 14 plant viral diseases.

5. *Aphis glycines* Matsumura

1917. *Aphis glycines* Matsumura, 1. *Coll. Agric Hokkaido Imp. Univ.*, 7 : 387.

1994. *Aphis glycines* : Ghosh, L.K. and Basu, R,C. *State Fauna Series* 5 : *Fauna of West Bengal*, pt. 5, *Zool. Surv. India* : 157.

Material : Aptera.

Host plant : *Glycine max* (Papilionaceae)

Distribution : India : Manipur (Imphal) and West Bengal.

Elsewhere : China; Japan; Korea; Malayasia; Manchuria; Nepal; Philippines; Taiwan and Thailand.

6. *Aphis gossypii* Glover

1877. *Aphis gossypii* Glover, *Com. Arg. operations Dept.* for 1876 : 36.

1997. Ghosh, L.K. *et al. State Fauna Series* 6 : *Fauna of Delhi* : 223.

Material : Apterae and alatae, on *Citrus reticulata, Polygonum orientalis,* Imphal, Manipur, 6.vi.1960, C.U. Coll. : on *Cucurbita maxima,* Baruni, 30.xii.1984, on *Solanum melongena,* Uripok, 26.xii. 1984.

Distribution : India : widely distributed.

Elsewhere : Cosmopolitan.

Remarks : The species infests about 459 species of plants belonging to 85 families (Ghosh L.K. *et*

al., 1989) in India. A great of morphological variation is noticed by Behura and Das (1973). It exhibits extreme color variation and transmit over 44 plant viral diseases.

7. ***Aphis kurosawai*** Takahashi

1921. *Aphis kurosawai* Takahashi, Aphididae of Formosa, **1** : 53.

1990. *Aphis kurosawai* : Ghosh, L.K., *Mem. zool. Surv. India*, **3** : 41.

Material : Apterae and nymphs

Distribution : India : Manipur (Imphal), Kashmir, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Remarks : The Stiletto-shaped ultimate rostral segmentis the characteristic feature of the species.

8. ***Aphis longisetosa*** Basu

1969. *Aphis ruborum longisetosus* Basu, A.N., *Oriental Ins.*, **3**(4) : 345.

1994. *Aphis longisetosus* : Ghosh, L.K. and Basu, R.C., *State Fauna Series* 3 : *Fauna of West Bengal*, part **5** *zool. Surv. India* : 158.

Material : Apterae.

Host plant : *Rubus* sp. (Rosaceae)

Distribution : India : Manipur, Arunachal Pradesh, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Remarks : The species is apparently known from North Eastern States of India. Long body hairs are the characteristic feature of the aphid.

9. ***Aphis nasturtii*** Kaltenbach

1834. *Aphis nasturtii* Kaltenbach, *Mongr. fam. pflanz.* : 76.

1990. *Aphis nasturtii* : Ghosh, L.K., *Mem. zool. Surv. India*, **17**(3) : 45.

Material : Apterae, Alatae and nymphs.

Host plant : Plants belonging to Polygonaceae, Solanaceae and Verbenaceae.

Distribution : India : Manipur (Kongpokpi), widely distributed.

Elsewhere : America; Europe; Great Britain; Middle East; Nepal; Pakistan; Taiwan and U.S.A.

10. ***Aphis nerii*** Boyer de Fonscolombe

1841. *Aphis nerii* Boyer de Fonscolombe, *Annals. Soc. Ent. Er.* **10** : 179.

1997. *Aphis nerii* : Ghosh, L.K. *et al*, *State Fauna Series* **6** : *Fauna of Delhi* : 224.

Material : Apterae and alatae, on *Nerium* sp., Manipur, Kongpokpi 13.i.1976, Coll. A.K. Ghosh.

Distribution : India : All over India including Manipur.

Elsewhere : Cosmopolitan.

11. ***Aphis punicae*** Passerini

1869. *Aphis punicae* Passerini, *Arch. Zool. Annal. fisiol*, (Modena), **2** : 32.

1994. *Aphis punicae* : Ghosh, L.K. and Basu, R.C., *State Fauna Series* 3 : *Fauna of West Bengal*, pt. **5** *zool. Surv. India* : 159.

Material : Apterae.

Host plant : *Punica granatum* (Punicaceae)

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

Elsewhere : Africa; Europe; France; Italy; Moracoo; Pakistan; Spain; Switzerland and U.S.S.R.

12. ***Aphis spiraecola*** Patch

1914. *Aphis spiraecola* Patch, *Bull. Main Agric. Exp. Stn.* **233** : 277.

1975. *Aphis spiraecola* : Chakrabarti and Raychaudhuri, *Oriental Ins.* **9**(2) : 199.

1997. *Aphis spiraecola* : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 48.

Material : Apterae viviparae, on *Eupatorium odoratum*, Moirang, Manipur, 3.i.1971, Coll. T.K. Singh.

Distribution : India : widely distributed.

Elsewhere : Cosmopolitan.

Remarks : Greenish brown to brownish insects severely infest almost all the aerial parts of a plant body, Ghosh *et al.* (1972) reported sexual female from West Bengal.

Genus 3. *Hyalopterus* Koch

13. *Hyalopterus amagdali* (Blanchard)

1840. *Aphis amagdali* Blanchard, *Historie naturelle des Ins.*, **3** : 672.

1966. *Hyalopterus amygdali* (Blanchard) : Eastop, *Aust. J. Zool.*, **14** : 489.

Material : Fundatrices, on *Prunus persica,* Rulbung, Manipur, 2.ii.1971, Coll. T.K. Singh.

Distribution : The species usually occurs principally in the mediterranean countries.

14. *Hyalopterus pruni* (Geoffray)

1762. *Aphis pruni* Geoffroy, *Historie Abregee des Insects Quise troubent aux. Environs de Paris,* **1** : 497.

1980. *Hyalopterus pruni* : Raychaudhuri, D.N. (ed.), Aphids of North East India and Bhutan: 60.

Material : Apterae and alatae, on *Prunus* domestica, Uripok, Manipur, 13.iii.1971, Coll. T.K. Singh.

Distribution : India : Widely distributed.

Elsewhere : Africa; Afganistan; Cyprus; Iraq; Israel; Italy; Spain; Pakistan and U.K.

Genus 4. *Hysteroneura* Davis

15. *Hysteroneura setariae* (Thomas)

1878. *Siphonophora setariae* Thomas, *Bull. Ill. St. Lab. nat. Hist.*, **2** : 5.

1980. *Hysteroneura setariae* : Raychaudhuri, D.N. (Ed.), Aphids of North East India and Bhutan : 61.

Material : Apterae.

Distribution : India : Manipur and widely distributed all over.

Elsewhere : Africa; America; Japan; Korea; Phillipines; Taiwan.

Genus 5. *Melanaphis* van der Goot

1917. *Melanaphis* van der Goot, *Contr. Eaune Indes neerl.*, **1**(3) : 60.

Types species : *Aphis bambusae* Fullaway.

Key to the species of *Melanaphis*

Apterae :

1. Siphunculi always shorter than its basal width ..... *vandergooti*
– Siphunculi always longer than its basal width .....
2. P.t. 1.6-1.7 x base of VI ..... *donacis*
– P.t. 3-4 x base VI 3
3. Siphunculi longer than cauda, cauda with 6 hairs ..... *bambusae*
– Siphunculi shorter than cauda, cauda with 12-13 hairs ..... *sacchari*

16. *Melanaphis bambusae* (Fullaway)

1910. *Aphis bambusae* Fullaway, *Rep. Hawaii Agric. Exp. Stn.* 1909 : 35.

1974. *Melanaphis bambusae* : Raychaudhuri and Banerjee, *Oriental Ins.*, **8**(3) : 372.

Material : Apterae, on *Bambusa* sp., Manipur, Uripok, 16.i. 971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, West Bengal, Sikkim.

Elsewhere : Africa; Australia; China; Hawaii; Japan; Java; Malaya and Taiwan.

Remarks : Black aphids are covered with white powdery secretion. They usually infest ventral surface of the leaves of host plants.

17. *Melanaphis donacis* (Passerini)

1860. *Longigunuis donacis* Passerini, *Gli Afidi* : 1-460.

1974. *Melanaphis donacis Passerini* : Raychaudhuri and Banerjee, *Oriental Ins.*, **8**(3) : 375.

Material : Apterae, on *Arundo donax,* Manipur, Uripok, 24.vi.1974, Coll. T.K. Singh

Distribution : India : Manipur, Meghalaya, Tamil Nadu.

Elsewhere : Mediterranean region except Africa.

Remarks : The species usually infests the whorls of leaves and both surfaces of leaves of host plants.

18. ***Melanaphis sacchari*** (Zehntner)

1897. *Aphis sacchari* Zehntner, *Arch. Suikerind. Ned. Ind.*, **5** : 551.

1980. *Melanaphis sacchari* : Raychaudhuri, D.N. and Banerjee, *Oriental Ins.*, **8**(3) : 379.

Material : Apterae, on *Saccharum officinarum*, Manipur : Imphal 14.iv.1971, Coll. T.K. Singh

Distribution : India : Manipur (Imphal, Moirang), widely distributed.

Elsewhere : Cosmopolitan.

Remarks : The first report of this species from India was made by David (1957).

19. ***Melanaphis vandergooti*** Raychaudhuri and Banerjee

1974. *Melanaphis vandergooti* : Raychaudhuri and Banerjee, *Oriental Ins.*, **8**(3) : 382.

1980. *Melanaphis vandergooti* : Singh, Raychaudhuri, D. and Raychaudhuri, D.N., *Entomon*, **5**(3) : 382.

Material : Apterae and alate. on *Panicum paludosum*, Manipur (Moirang), West Bengal.

Remarks : The species was originally described from Kalimpong. The description was based on apterous viviparous females collected on *Oryza sativa*. So far, it is known only from Northeastern part of India.

Genus 6. ***Rhopalosiphum*** Koch

1854. *Rhopalosiphum* Koch, *Die. Pfl. Aphiden*, **1** : 23. *Types species*: *Aphis nymphaeae* Linnaeus

Key to the species of *Rhopalosiphum* Koch

Apterae :

1. Antennae 5-segmented; abdominal dorsum densely covered with long and fine hairs ... . *rufiabdominalis*

– Antennae 6-segmented; abdominal dorsum not with such hairs 2

2. P.t. about 2.5 x base VI; body about 10-15 x siphunculi ..... *maidis*

– P.t. never less than 3.9 x base VI; body at the best 8.5 x siphunculi 3

3. Siphunculi destinctly swollen, dorsal abdominal hairs fine ..... *nymphaeae*

– Siphunculi rather cylindrical; dorsal abdominal hairs with blunt apices..... *padi*

Alatae :

– Antennae 5-segmented; p.t. never less than 3.0 x base of a.s. V, may be up to 7 x base of a.s. V; a.s. III with 11-30 IV with 1-8 and V with 3-8 secondary rhinaria .... *rufiabdominalis*

– Antennae 6-segmented; p.t. 1.7-2.3 x base VI and always shorter than a.s. III; a.s. III with 11-28, IV with 1-12 and V with 1-5 secondary rhinaria ..... *maidis*

20. ***Rhopalosiphum maidis*** (Fitch)

1856. *Aphis maidis* Fitch, *Trans. N. Y. Agr. Soc.*, **15** : 550.

1960. *Rhopalosiphum maidis* : Richards, *Canad Ent.*, **92** : 19.

1997. *Rhopalosiphum maidis* : Ghosh, L.K., *et al.*, *State Fauna Series 6 : Fauna of Delhi, Zool. Surv. India* : 225.

Material : Apterae, Alatae and nymphs, on *Triticum* sp., Kongpokpi, 13.i.1996, Coll. A.K. Ghosh.

Distribution : India : Widely distributed including Manipur.

Elsewhere : Virtually cosmopolitan.

Remarks : This is the commonest aphid species on Maize and well known pest of a large number of poaceous plants. The oviparous females were reported at Delhi for the first time in India (Menon and Ghai 1969).

21. ***Rhopalosiphum rufiabdominalis*** (Sasaki)

1899. *Toxoptera rufiabdominalis* Sasaki, *Rept, Hokkaido Agr. Expt. Sta.*, 17 : 202.

1986. *Rhopalosiphum rufiabdominalis* (Sasaki) : Ghosh, L.K., *Tech. Monogr*, **16** : *Zool. Surv. India* : 38.

Material : Apterae, Alatae and nymphs, on Indet Gramineae, Kongpokpi, Manipur, 13.i.1976, Coll. A.K. Ghosh.

Distribution : India : Widely distributed including Manipur.

Elsewhere : Africa; Japan; Malayasia; Middle East; Nepal Taiwan.

Remarks : Young *et al.* (1971) reported the species from underground roots and stems of barley at Delhi. This constituted the first record of this aphid from the roots of barley in India.

22. ***Rhopalosiphum padi*** (Linnaeus)

1750. *Aphis padi* Linnaeus, *Systema Naturae,* 10th ed. : 451.

1969. *Rhopalosiphum padi* (L) : Chowdhuri *et al.,* Sci. *Cult.,* **35** : 334.

Material : Manipur : Uripok, Apterae on *Canna indica,* 1.i.1971, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed throughout India.

Elsewhere : Virtually cosmopolitan.

Remarks : This green to brownish aphid species enjoy wide distribution. The siphunculi of this species is cylindrical and is nearly 1.5-1.7 times as long as cauda.

23. ***Rhopalosiphum nymphaeae*** (Linnaeus)

1761. *Aphis nymphaeae* Linnaeus, *Fauna Suec.,* **2** : 260.

1960. *Rhopalosiphum nymphaeae* (L) : Richards, *Canad Ent.,* **92** : 26.

1971. *Rhopalosiphum nymphaeae* (Linnaeus) : David *et al. Madras agric. J.,* **58**(5) : 372.

Material : 1 apterous ovipara, on *Senecio* sp., Manipur, Iroisemba, 23.xii.1970; 1 alate ♂, on *Prunus persica,* Uripok, 24, xii.1970; apterae and alate on *Sagittaria sasithifolia,* Mongat, 3.i.1971 Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed all over India.

Elsewhere : Cosmopolitan.

Remarks : Finding of both oviparous female, alate male and viviparous morphs suggests that this brownish to blackish species enjoys holocyclic as well anholocyclic life cycle in the state of Manipur.

Genus 7. ***Toxoptera*** Koch

1856. *Toxoptera* Koch, *Die. Pflanzen. Aphiden,* **3** : 253.

Types species : *Aphis aurantii* Boyer de Fonscolombe, 1841

Key to the species of *Toxoptera* Koch

Apterae :

1. Siphunculi much shorter, maximally about half as long as cauda; F.T.C. 3 : 3 : 2 .... *odinae*

– Siphunculi as long as or longer than cauda; F.T.C. 3 : 3 : 3 2

2. Longest hair on a.s. III shorter than b.d. III; siphunculi sparsely imbricated; caudal hairs 9-17 ..... *aurantii*

– Longest hair on a.s. III longer (1.25-1.50 times) than b.d. III; siphunculi heavily imbricated, black; caudal hairs 25-36 .... *citricidus*

24. ***Toxoptera aurantii*** (Boyer de Fonscolombe)

1841. *Aphis aurantii* Boyer de Fonscolombe, *Ann. ent. Soc. Fr.,* **10** : 178.

1986. *Toxoptera aurantii* : Ghosh L.K., *Zool. Surv. India, Tech. Mon.* No. **16** : 31.

Material : Apterae on, *Rhus similiata.* Ningomthong, 11.ix.1984, Coll. T.K. Singh.

Distribution : India : Manipur (Ningomthong), widely distributed.

Elsewhere : Cosmopolitan.

Remarks : It is a black to shiny black aphid and is highly polyphagous. The species infests growing tender shoots where it produces curling of the young leaves and drying up of young stems.

25. ***Toxoptera citricidus*** (Kirkaldy)

1907. *Myzus citricidus* Kirkaldy, *Proc. Hawaii ent. Soc.,* **1** : 100.

1980. *Toxoptera citricidus* : Raychaudhuri, D.N. (ed.) Aphids of North East India and Bhutan: 77.

Material : Apterae and alate on *Coffea arabica,* Ningomthong, 1.ix.1984, Coll. T.K. Singh.

Distribution : India : Manipur (Ningomthong), widely distributed.

Elsewhere : Cosmopolitan.

Remarks : It is a dark brown polyphagous aphid and occurs throughout the year. It infests quite a few plants of importance. It sometimes occurs along with *Toxoptera aurantii.* It is much gregarious in habit and infests the tender shoots.

26. ***Toxoptera odinae*** (van der Goot)

1917. *Toxoptera odinae'* van der Goot, *Contr. Faune Indes neerl.*, **1**(3) : 113.

1976. *Toxoptera odinae* (van der Goot) : Mondal, Basu R.C. and Raychaudhuri, D.N. *Oriental Ins.*, **10**(4) : 537.

Material : 7 apterae and 5 nymphs from *Durata plumeri,* 20.xi.1970, Coll. T.K. Singh.

Distribution : India : all over including Manipur.

Elsewhere : China; Java; Malayasia; Nepal; Philippines; South America; Sri Lanka; Sumatra and Taiwan.

Remarks : Blackish brown insects infest all the areal parts of the host plants. Red ants are associated with these aphids.

Genus 8. ***Cryptosiphum*** Buckton

27. ***Cryptosiphum artemisiae*** Buckton

1879. *Cryptosiphum artemisiae* Buckton, *Monogr. British Aphides,* **2** : 145.,

1971. *Cryptosiphum artemisiae* Buckton : Ghosh, Ghosh and Raychaudhuri, *Proc. zool. Soc. Calcutta,* **24** : 164.

Material : Apterae, on *Artemisia vulgaris,* Manipur, Chakpikarong, 22.xi.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Arunachal Pradesh, Meghalaya, Sikkim and West Bengal.

Elsewhere : China; Europe; Japan; Korea and Taiwan.

Tribe **Macrosiphini**

Key to the genera of Tribe Macrosiphini

1. Tarsi without claws and atrophid; F.T.C. 1 : 0 : 0 ..... ***Shinjia***
– Tarsi normal 2
2. Supracaudal process present at least in apterae ..... ***Cavariella***
– Supracaudal process absent 3
3. Cauda usually not longer than width at base ..... ***Brachycaudus***
– Cauda distinctly longer than width at base 4
4. Second tarsal segment with spinules arranged in transverse ..... ***Amphorophora***
– Spinules absent in tarsi 5
5. Some of the secondary hairs on u.r.s. as long as or longer than primary hairs; siphunculi calf-shaped, reticulated with isodiametrical Cells; secondary rhinaria protuberant ..... ***Macrosiphoniella***
– All the secondary hairs on u.r.s. usually much shorter than hairs 6
6. Siphunculi reticulated 7
– Siphunculi not reticulated but sometimes a few interconnecting striae present near the apical flanger. 9
7. Siphunculi bag-pipe like with a few transversely elongate cells just before well developed flange at the tip ..... ***Rhopalosiphoninus***
– Siphunculi not as above but cylindrical 8
8. Secondary rhinaria protuberant; abdominal dorsum usually with hair-bearing sclerites; F.T.C. usually 5 : 5 : 5 ..... ***Uroleucon***
– Secondary rhinaria non-protuberant; abdominal dorsum not with hair-bearing sclerites as above ..... ***Macrosiphum***
9. Siphunculi warty ..... ***Vesiculaphis***
– Siphunculi not warty 10
10. Hairs on abdominal dorsum with apices like a partly opened fan; u.r.s. stiletto-shaped ... ***Coloradoa***
– Hairs on abdominal dorsum variable shaped but not as above 11

11. Abdominal dorsum in apterae with a reticulated pattern 12
- Abdominal dorsum in apterae without such pattern 13
12. Head smooth dorsally, apterae with secondary rhinaria ..... ***Sinomegoura***
- Head spinulated both dorsally and ventrally, apterae without secondary rhinaria on a.s. III ..... ***Pentalonia***
13. Head at least in apterae with processi either at middle or on lateral frontal tubercles...14
- Head without such processi 15
14. Head in apterae rugose; abdominal dorsum areolated with sparse spinules ..... ***Tuberocephalus***
- Head in apterae densely warty dorsally and ventrally; primary rhinaria strongly ciliated ..... ***Phorodon***
15. Antennal segment I with a finger-like projection 16
- Antennal segment I never with such projection 17
16. Occular tubercles distinct; primary rhinaria ciliated; abdominal dorsum in apterae pale and smooth ..... ***Matsumuraja***
- Occular tubercles indistinct; primary rhinaria non-ciliated; abdominal dorsum areolated with spinules ..... ***Tuberocephalus***
17. Apterae mostly with secondary rhinaria....18
- Apterae without secondary rhinaria 23
18. Apterae without any median frontal prominence 19
- Apterae with median frontal prominence..20
19. Secondary rhinaria in apterae restricted only near the base of a.s. III; frontal sinus 'V'-shaped ..... ***Acyrthosiphon***
20. Siphunculi gently clavate on distal 0.50 portion 21
- Siphunculi subcylindrical to cylindrical and not clavate 22
21. Ante and post-siphuncular sclerites absent; secondary rhinaria protuberant and numerous ..... ***Hyperomyzus***
- Ante and post-siphuncular sclerites usually present; secondary rhinaria non- protuberant and few ..... ***Megoura***
22. Cauda with 2-4 very short hairs apically; antennae subequal to body ..... ***Rhodobium***
- Caudal hairs more or less of similar lengths; venter of head usually smooth or with a few spinules near base of antennal sockets ..... ***Microlophium***
23. Dorsum of head in apterae usually smooth or may be slightly wrinkled 24
- Dorsum of head in apterae spinulose or warty 29
24. Dorsal abdominal hairs in apterae with capitate apices; siphunculi cylindrical but may be slightly clavate on distal half ..... ***Capitophorus***
- Dorsal abdominal hairs in apterae not with capitate apices 25
25. Siphunculi shorter than cauda 26
- Siphunculi longer than cauda 28
26. Siphunculi barrel-shaped; abdominal dorsum in apterae with pigmented transverse segmental bands ..... ***Brevicoryne***
- Siphunculi not as above 27
27. Siphunculi with a preapical circumcission, apical flange present ..... ***Hyadaphis***
- Siphunculi without preapical circumcission, apical flange absent ..... ***Semiaphis***
28. Siphunculi with prominent preapical circumcission; 8th abdominal tergite with fine hairs being much longer than those with blunt apices on anterior abdominal tergites ..... ***Subovatomyzus***
- Siphunculi without preapical circumcisson; mid thoracic furca in apterae sessile; secondary rhinaria present on a.s. III and occasionally on V also ..... ***Lipaphis***

29. Siphunculi with pore obliquely placed and flanged apically ..... ***Trichosiphonaphis***

– Siphunculi with pore being not obliquely placed 30

30. Apterae with median frontal prominence; siphunculi without preapical circumcission; primary rhinaria non ciliated... ***Aulacorthum***

– Apterae without median frontal prominence 31

31. Antennal segment I in apterae with inner apices scabrous and strongly attenuated inward; siphunculi swollen on the inner margin near at the middle, a little flanged ..... ***Hyalomyzus***

– Antennal segment I in apterae with inner margin not as above; siphunculi prominently swollen towards distal half and distinctly flanged; in apterae abdominal dorsum smooth and usually pale ..... ***Myzus***

Tribe **Macrosiphini**

Genus 9. ***Acyrthosiphon*** Mordvilko

28. ***Acyrthosiphon pisum*** (Harris)

1776. *Aphis pisum* Harris, Exposit, English Insects, London : 66.

1947. *Acyrthosiphon pisum* (Harris): Hille Ris Lambers, *Temminckia*, **7** : 247.

1971. *Acyrthosiphon pisum* : Ghosh *et al*, *Kontyu*, **39**(2) : 121.

Material : Apterae and alate on *Pisum sativum*, Manipur : Tronglaobi, 3.xi.1970, Coll. T.K. Singh.

Distribution : India : Widely distributed including Manipur.

Elsewhere : Virtually cosmopolitan.

Genus 10. ***Amphorophora*** Buckton

29. ***Amphorophora ampullata bengalensis*** Hille Ris Lambers and Basu

1977. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu, *Ent. Bet. Amst.*, **26** : 14

1980. *Amphorophora ampullata bengalensis* : Raychaudhuri, D.N. *(ed.)*, Aphids of Northeast India and Bhutan : 96.

Material : Apterae and nymphs, on *Peridium* sp., Manipur : Kongpokpi, 13.i.1976, Coll. A.K. Ghosh, Z.S.I.

Distribution : India : Arunachal Pradesh, Manipur, Himachal Pradesh, Meghalaya, Nagaland, Sikkim and West Bengal.

Remarks : All the morphs of the subspecies are known from India excepting the male which is yet to be reported from the country.

Genus 11. ***Aulocorthum*** Mordvilko

Key to the species of the genus *Aulocorthum*

1 Antennal segment III usually shorter than or almost as long as p.t. : dorsal abdominal hairs rather long; cauda 0.4-0.x siphunculi ..... *solani*

– Antennal segment III longer than p.t. 2

2. U.r.s. as long as or slightly longer than h.t.2; antennae and femora more or less uniformaly dark ..... *circumflexus*

– U.r.s. much longer than h.t.2, femora dark only on distal 0.5 portion ..... *dasi*

30. ***Aulocorthum (Neomyzus) circumflexus*** (Buckton)

1876. *Siphonophora circumflexus* Buckton, *Monograph of the British Aphides*, **1** : 130.

1972. *Neomyzus circumflexus* (Buckton) : Basu, Ghosh and Raychaudhuri, *Sci. Cult.*, **38** : 495.

1997. *Aulocorthum (Neomyzus) circumflexus* (Buckton) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 495.

Material : 2 apterae, from *Canna indica*, Manipur : Uripok, 31.i.1971, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Virtually cosmopolitan.

Remarks : This greenish aphids usually occur along with *Myzus persicae* (Sulzer). It is an extremely polyphagous species infesting both the surfaces of the leaves, growing shoots and inflorescences.

31. *Aulocorthum dasi* Ghosh, Basu and Raychaudhuri

1970. *Aulocorthum dasi* Ghosh, Basu and Raychaudhuri, *Proc. zool. Soc.*, Calcutta, **24** : 66.

1971. *Aulocorthum dasi* Ghosh, Banerjee and Raychaudhuri, *Proc. zool. Soc.*, Calcutta, **24** : 100.

Material : One, alata on unidentified plant, Manipur : Oklong, 22.iv.1972, Coll. T.K. Singh.

Distribution : India : Assam, Manipur, Meghalaya and Sikkim.

32. *Aulocorthum solani* (Kalt.)

1843. *Aphis solani* Kaltenbach, *Monogr. Pflanzenlause* : 15.

1969. *Aulocorthum solani* (Kalt.) : Basu, A.N., *Oriental Ins.*, **3**(4) : 357.

1975. *Aulocorthum solani* : Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 197.

Material : One aptera on indet plant of Urticaceae, Manipur : Mao, 15.iv.1974, Coll. T.K. Singh.

Distribution : India widely distributed including Manipur.

Elsewhere : Cosmopolitan.

Genus 12. *Brachycaudus* van der Goot

33. *Brachycaudus helichrysi* (Kaltenbach)

1843. *Aphis helichrysi* Kaltenbach, *Monogr, Pflanzenlause* : 102.

1980. *Brachycaudus helichrysi* Ka]tenbach : Raychaudhuri, D.N. (ed.), Aphids of Northeast India and Bhutan: 107.

1980. *Brachycaudus helichrysi* : Agarwala *et al. Entomon*, **5**(1) : 39.

Material : Apterae, on *Clerodendron* sp. Manipur : Ukhrul, 13.v.1978, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Cosmopolitan.

Remarks : Basu, R.C., Ghosh, A.K. and Raychaudhuri, D.N. (1970) reported for the first time the sexual morphs of the species from Northeast India. The species enjoys holocyclic life cycle in Indian climate.

Genus 13. *Brevicoryne* van der Goot

34. *Brevicoryne brassicae* (Linnaeus)

1758. *Aphis brassicae* Linnaeus, *Syst. Nat.*, (10th Ed.) **1** : 452.

1980. *Brevicoryne brassicae* (Linnaeus) : Raychaudhuri, D.N., Ghosh, M.R and Basu, R.C. In : Aphids of Northeast India and Bhutan: 111.

1994. *Brevicoryne brassicae* (Linnaeus) : Ghosh, L.K. and Basu, R.C., State Fauna Series 4 : Fauna of West Bengal, pt. 5, *Zool Surv. India* : 181.

Material : Apterae and alatae, on *Brassica* sp, Manipur: Imphal, January 1974, Coll. T.K. Singh.

Distribution : India : Delhi, Himachal Pradesh, Northeast India States including Manipur, Punjab, Nagaland, South India, Uttar Pradesh and West Bengal.

Elsewhere : Cosmopolitan.

Remarks : The species is characterised in having siphunculi barrel-shaped, triangular cauda and abdominal dorsum with pigmented wrinkled pleural patches showing various degrees of coalescence with those occurring spinally on abdominal segments 1-7. Ghosh, L.K. *et al.* (1980) made detailed study on the species.

Genus 14. *Capitophorus* van der Goot

Key to the species of the genus *Capitophorus*

Apterae :

Hairs on abdominal dorsum usually duplicated at least on post-siphuncular tergites ..... *formosartemisiae*

– Hairs on abdominal dorsum not duplicated longest spinal hairs on anterior abdominal tergites about 0.7 x b.d. III; caudal hairs 11 ..... *mitegoni*

35. *Capitophorus formosartemisiae* (Takahashi)

1921. *Myzus formosartemisiae* Takahashi, *Aphididae of Formosa*, pt. **1** : 25.

1975. *Capitophorus formosartemisiae* (Takahashi) : Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 199.

Material : Apterae, on *Artemesia vulgaris*, Manipur : Tuyang, 18.iv.1974, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Bhutan; China; Japan and Taiwan.

36. ***Capitophorus mitegoni*** Eastop

1968. *Capitophorus hippophaeus* indicus Ghosh and Raychaudhuri *Ann. Ent. Soc. Amer.*, **61**(3) : 752.

1980. *Capitophorus hippophaeus* mitegoni : Raychaudhuri, Ghosh and Basu in Aphids of Northeast India and Bhutan: 117.

1997. *Capitophorus* mitegoni : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 83.

Material : Apterae and alatae, on *Polygonum chinensis*, Manipur : Lamphelpat 3.i.1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal and Uttar Pradesh.

Elsewhere : Africa; Australia; China; Europe; Japan; Java; Korea; New Zealand; Pakistan and Taiwan.

Genus 15. ***Cavariella*** del Guercio

37. ***Cavariella salicicola*** (Matsumura)

1971. *Nipposiphum salicicola* Matsumura, *Sapaaoro. J. Coll. Agric.*, **7** : 510.

1973. *Cavariella salicicola* (Matsumura) : Basu, Ghosh and Raychaudhuri, *Proc. zool. Soc. Calcutta*, **26** : 90.

Material : Apterae and alatae, on *Salix* sp., Manipur : Progeng, 17.iv.1971, Coll. T.K. Singh.

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

Elsewhere : China, Japan, Korea and Taiwan.

Genus 16. ***Coloradoa*** Wilson

38. ***Coloradoa artemisicola*** Takahashi

1965. *Coloradoa artemisiae artemisicola* Takahashi, *Insecta Mastum.* **28**(1) : 47.

1971. *Coloradoa artemisicola* Takahashi: Miyazaki, *Insecta Mastum.* **34**(1) : 186.

Material : 1 aptera, on *Adhetoda vasica*, Manipur : Kulbung, 2.ii.971, Coll. T.K. Singh.

Distribution : India : Manipur

Elsewhere : Japan

Remarks : The greenish aphid is so far known only from Manipur State.

39. ***Coloradoa rufomaculata*** (Wilson)

1908. *Aphid rufomaculata* Wilson, *Ent. News.*, **19** : 261.

1959. *Coloradoa rufomaculata* (Wilson) : Cottier, *Bull, NZ., Dept. Scient. Ind. Res.*, **106** : 199.

1973. *Coloradoa rufomaculata* (Wilson) : Ghosh, Basu and Raychaudhuri, *Sci. Cult.*, **39** : 200.

Material : I aptera, Manipur : Uripok, 5.iii.1972, Coll. T.K. Singh.

Distribution : India : Manipur and throughout India.

Elsewhere : Virtually cosmopolitan.

Genus 17. ***Hyadaphis*** Kirkaldy

40. ***Hyadaphis coriandri*** (Das)

1918. *Brevicoryne coriandri* Das, *Mem. Indian Mus.*, **6**(4) : 180.

1980. *Hyadaphis coriandri* (Das) : Raychaudhuri, D.N. *et al in* : Taxonomy of the Aphids of Northeast India and Bhutan : 143.

Material : Apterae and alatae, on *Coriandrum sativum*, Manipur : Uripok, 14.iv .1971, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Africa; Middle east and Pakistan.

Genus 18. ***Hyperomyzus*** Börner

41. ***Hyperomyzus carduellinus*** (Theobald)

1915. *Rhopalosiphum carduellinus* Theobald, *Bull. ent. Res.*, **6** : 113.

1975. *Hyperomyzus carduellinus* (Theobald) : Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 200.

Material : Apterae, on *Sonchus* sp., Manipur : Imphal, 27.iv.1971, Coll. T.K. Singh.

Distribution : India : Manipur and almost throughout the country.

Elsewhere : Africa; Australia; Fiji; Indonesia; Java; Nepal, New Zealand; Taiwan and Uganda.

Genus 19. ***Hyalomyzus*** Richard

42. ***Hyalomyzus raoi*** Hille Ris Lambers

1973. *Hyalomyzus raoi* Hille Ris Lambers, *Oriental Ins.*, 7(2) : 242.

1973. *Hyalomyzus raoi* Hille Ris Lambers : Basu, R.C, Ghosh and Raychaudhuri, *Proc. zool. Soc. Calcutta*, **26** : 90.

Material : Apterae, on *Rubus* sp., Manipur : Tuyang, 19.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal.

Genus 20. ***Lipaphis*** Mordvilko

43. ***Lipaphis erysimi*** (Kaltenbach)

1943. *Aphis erysimi* Kaltenbach, *Mon. Fam. Pflanz.* : 99

1975. *Lipaphis erysimi* (Kaltenbach) : Chakrabarti and Raychaudhuri, *Oriental Ins.*, 9(2) : 198.

1980. *Lipaphis erysimi* (Kaltenbach) : Raychaudhuri D.N. (*ed.*) In : Taxonomy of the Aphids of Northeast India and Bhutan : 159.

Material : Apterae and alatae, on *Raphanus sativus*, Manipur : Kanglatongbi, 1.i.1971, Coll. T.K. Singh.

Distribution : India : Manipur and throughout. *Elsewhere*: Cosmopolitan.

Remarks : This blackish brown aphid is one of the most common plant lice in India. The species shows a longitudinal row of imppressed areas on each side of the mid abdominal dorsum. It is one of the major pests on cruciferous crops not only in Manipur but also other parts of India and elsewhere. It is in fact, a menace to the cultivation of mustard.

Genus 21. ***Macrosiphoniella*** del Guercio

Key to the species of the genus *Macrosiphoniella*

Apterae

1. Hind tibiae with a row of spines on the inner margin ..... *spinepes*

– Hind tibiae without a row of spines on the inner margin 2

2. Siphunculi about 1.6-1.8x its basal width... ..... *sanborni*

– Siphunculi about 3.3-3.9 x its basal width...3

3. Flagellum blackish brown; siphunculi about 3.4-3.8 x its basal width .... *yomogofoliae*

– Flagellum pale; siphunculi about 3.3 x its basal width ..... *pseudoartemisiae*

44. ***Macrosiphoniella pseudoartemisiae*** Shinji

1933. *Macrosiphoniella pseudoartemisiae* Shinji, *Kontyu*, 7(5 & 6) : 216.

1976. *MacrosiphonieLLa pseudoartemisiae* Shinji : Basu, R.C and Raychaudhuri, D.N. *Oriental Ins.*, **10**(.2) : 302.

Material : Apterae on *Artemisia vulgaris*, Manipur: Tuyang-Waichong, 19.iv.1971.

Distribution : India : Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Bhutan; China; Japan; Korea and Taiwan.

45. ***Macrosiphoniella sanborni*** (Gillette)

1908. *Macrosiphoniella sanborni* Gillette, *canad. Ent.*, **40** : 65.

1938. *Macrosiphoniella sanborni* (Gillette) : Hille Ris Lambers, *Temminckia*, **3** : 30.

1968. *Macrosiphoniella sanborni* (Gillette) : Ghosh and Raychaudhuri, *Proc. zoo!. Soc.*, Calcutta, **21** : 186.

Material : Apterae on *Chrysanthemum* sp., Manipur: Tronglaobi, 9.i.1971, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Cosmopolitan.

Remarks : Chocolate brown to dark brown aphids infest both the surfaces of leaves, stem and flower bud. The species is attended by small black and brown ants. This is very common in Northeastern part of India. The species is easily recognisable in the field by their dark chocolate colouration and by the colonial habit.

46. ***Macrosiphoniella spinepes*** Basu

1967. *Macrosiphoniella spinepes* Basu, A.N., *Bull. Ent.*, **8**(2) : 151.

1971. *Macrosiphoniella spinepes rhododendri* Ghosh, Basu and Raychaudhuri, *Oriental Ins.* **3**(3) : 250.

Material : Apterae, on *Artemisia vulgaria,* Manipur : Hentakot, 11.xi.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal.

Remarks : Raychaudhuri, D.N. *(ed.)* (1980) discussed in ,details about the species.

47. ***Macrosiphoniella yomogifoliae*** (Shinji)

1922. *Macrosiphoniella yomogifoliae* Shinji, *Zool. Mag.*, **34**(407) : 788.

1976. *Macrosiphoniella yomogifoliae* (Shinji) : Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, **10**(2) : 305.

Material : Apterae, on *Artemisia* sp., Manipur : Litan, 7.xii.1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, South India, Uttar Pradesh and West Bengal.

Elsewhere : China; Japan; Java; Korea; Malaya and Taiwan.

Genus 22. ***Macrosiphum*** Passerini

Key to the species of the genus *Macrosiphum*

Antennal segment III with about 20 secondary rhinaria; siphunculi dark in comparison to the pale body ..... *pachysiphon*

– Antennal segment with about 60 secondary rhinaria; siphunculi brownish on basal half and at the apex, rest paler; antennae very dark brown ..... *rosae*

48. ***Macrosiphum pachysiphon*** Hille Ris Lambers

1966. *Macrosiphum pachysiphon* Hille Ris Lambers, *Tijdschn. Ent.*, **169** : 203.

1998. *Macrosiphum (Macrosiphum) pachysiphon* : Ghosh and Basu, State Fauna Series **4** : Fauna of Meghalaya, *Zool. Surv. India* : 146.

Material : 1 alata, on *Triticum aestivum,* Manipur : Moirang, 5.ii.1973, Coll. T.K. Singh.

Distribution : India : Assam, Arunachal Pradesh, Himachal Pradesh, Manipur, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Pakistan.

Remarks : The species is characterised in having blackish siphunculi and pinkish to brownish body.

49. ***Macrosiphum rosae*** (Linnaeus)

1958. *Aphis rosae* Linnaeus, *Systems Naturae,* **1**(10) : 452.

1975. *Macrosiphum rosae* (Linnaeus) : Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 201.

Material : Apterae and alatae, on *Rosa* sp., Manipur : Imphal, 9.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur and throughout.

Elsewhere : Cosmopolitan.

Remarks : It is usually present on hill stations above 1800m but also survives on the plains in the cool winter season. It infests all varieties of garden and wild roses and occurs in green and brown forms. It is often found close to or mixed with *Sitobion rosaeformis* (Das).

Genus 23. ***Matsumuraja*** Schumacher

50. ***Matsumuraja capitophoroides*** Hille Ris Lambers

1966. *Matsumuraja capitophoroides* Hille Ris Lambers, *Tijdschn. Ent.*, **109**(8) : 215.

1975. *Matsumuraja capitophoroides* : Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 204.

Material : Apterae and nymphs, on *Rubus* sp., Manipur : Longakoireng, 26.i.1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Pakistan.

Genus 24. ***Megoura*** Buckton

51. ***Megoura lespedezae*** (Essig and Kuwana)

1970. *Megoura cajanae* Ghosh, MR, Ghosh, A. K. and Raychaudhuri, D.N., *Oriental Ins.*, **4**(4) : 385.

1997. *Megoura lespedezae* (Essig and Kuwana) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 118.

Material : Apterae and nymphs, on *Cajanus cajan,* Manipur : Rhoram, 11.i.1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur and West Bengal.

Remarks : The greenish aphid is commonly found in the Northeastern States including Manipur.

Genus 25. ***Microlophium*** Mordvilko

Key to the species of the genus *Microlophium*

Apterae :

Siphunculi sparsely imbricated .... *rufiformosanum*

– Siphunculi rather densely imbricated .... *carnosum*

52. ***Microlophium carnosum*** (Buckton)

1876. *Siphonophora carnosum* Buckton, *Mon. Brit. Aphides,* **1** : 144.

1949. *Microlophium carnosum* (Buckton) : Hille Ris Lambers, *Temminckia,* **8** : 205.

1997. *Microlophium carnosum* (Buckton) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 121.

Material : Apterae, on *Urtica* sp., Manipur : Mao, 27.xii.1970, Coll.,T.K. Singh.

Distribution : India. : Manipur

Elsewhere : America; Europe and Northern Asia.

Remarks : The greenish species of aphid is apparently known only from Manipur.

53. ***Microlophium rufiformosanum*** (Takahashi)

1923. *Microlophium rufiformosanum* Takahashi, *Dep. Agric., Govt. Res. Inst. Formosa,* **5** : 3.

1971. *Acyrthosiphon (Microlophium) rufiformosanum* (Takahashi) : Ghosh, Ghosh and Raychaudhuri, *Oriental Ins.,* **5**(3) : 323.

1997. *Microlophium rufiformosanum* (Takahashi) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 121.

Material : Apterae and nymphs, on *Rubus fruiticosus,* Manipur : Mao, 15.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur, Nagaland and Sikkim.

Elsewhere : Japan and Taiwan.

Genus 26. ***Myzus*** Passerini

Key to the species of the genus *Myzus*

Apterae :

1. Siphunculi without distinct flange, dark brown to black body dark ..... *obtusirostris*
– Siphunculi with a distinct flange, body pale 2
2. Siphunculi bent outwards at apex, roughly imbricated, smooth just below flange *dycei*
– Siphunculi not bent outwards at apex, cylindrical and gently clavate 3
3. Siphunculi with distal part black; antennae about as long as body ..... *varians*
– Siphunculi rather pale with apex slightly dusky 4
4. Siphunculi gently clavate, pale and slightly dusky apically; abdomen without any segmentally arranged dark marks ... *persicae*
– Siphunculi cylindrical, pale brown; abdominal with segmentally arranged dark marks .... *ornatus*

54. ***Myzus dycei*** Carver

1961. *Myzus dycei* Carver, *Proc. R. Ent. Soc. London,* B, **30** : 69.

1976. *Myzus dycei* Carver: Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.,* **10**(1) : 99.

Material : Apterae and nymph, on *Urtica* sp., Manipur, 27.xii.1970.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Australia; China; Japan and Nepal.

55. *Myzus obtusirostris* David, Rajasingh and Narayanan

1971. *Myzus obtusirostris*, David, Rajasingh and Narayanan, *Oriental Ins.*, **10**(1) : 99.

1972. *Myzus obtusirostris* : Ghosh and Raychaudhuri, *Oriental Ins.*, **6**(3) : .376.

Material : Apterae and alate, on *Paspaliam* sp., Manipur : Hentakot, 11.xi.1972.

Distribution : India : Assam, Himachal Pradesh, Manipur, Meghalaya and U.P.

Remarks : The black-coloured species was originally described from the material collected on grass from Meghalaya (David *et al.*, 1971).

56. *Myzus ornatus* Laing

1932. *Myzus ornatus* Laing, *Ent. Mon. Mag.*, **68** : 52.

1998. *Myzus ornatus* Laing: Ghosh, L.K. and Basu, R.C., State Fauna Series **4** : Fauna of Meghalaya, p.t. 4, ZSI,157.

Material : Apterae on *Eirena* sp., Manipur : Imphal, 22.iv.1970.

Distribution : India : Manipur and all over.

Elsewhere : Cosmopolitan.

Remarks : The light green to dark brown aphid usually infests all parts of the host plant excepting roots. Ants attend the aphids. It is one of the polyphagous species.

57. *Myzus (Nectarosiphon) persicae* (Sulzer)

1976. *Aphis persicae* Sulzer, *Abgekurzte Gesch. Inseckton* : 115.

1976. *Myzus persicae* (Sulzer) : Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins:*, **10**(1) : 107.

1997. *Myzus (Nectarosiphon) persicae* (Sulzer) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 127.

Material : Apterae and Alate, on *Nicotiana tabacum*, Manipur : Awanglkunon : apterae and nymphs, on *Brassica* sp., 27.xii.1970, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed throughout.

Elsewhere : Cosmopolitan.

Remarks : Light green or pale brown or pinkish aphids are highly polyphyagous species. The species transmits many virus diseases of tropical crops. It is a vector of nearly 100 plant viral diseases. The species is an important pest causing tremendous damage to the crops.

58. *Myzus varians* Davidson

1912. *Myzus varians* Davidson, 1. *Econ. Ent.*, **5** : 409.

1997. *Myzus varians* Davidson: Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 126.

Material : Apterae nymphs, on *Prunus domestica*, Manipur : Awangkhunou, 13.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur

Elsewhere : America; China; Europe; Japan; Korea and Taiwan.

Remarks : The species, yellowish green In colour is so far known from Manipur.

Genus 27. *Phorodon* Passerini

59. *Phorodon (Paraphorodon) cannabis* Passerini

1800. *Phorodon cannabis* Passerini, *Gli Afidi* : 36.

1971. *Diphorodon cannabis* (Passerini) : Miyazaki, *Insecta Matsum*, **34**(1) : 114.

1997. *Phorodon (Paraphorodon) cannabis*: Remaudiere' and Remaudiere, Catalogue of the World's Aphididae : 137.

Material : Apterae, on *Cannabis sativa*, Manipur : Langol Hills, 3.i.1997, Coll. T.K. Singh.

Distribution : India : Himachal Pradesh, Jammu & Kashmir State, Manipur, Meghalaya and West Bengal

Elsewhere : Europe; Japan and Pakistan

Genus 28. *Sitobion* Mordvilko

Key to the species of the genus *Sitobion*

Apterae :

1. P.t. about as long as a.s. III; siphunculi about twice as long as cauda; cauda pale .... *rosaeformis*

– P.t. distinctly longer than a.s. III; siphunculi not more than 1.5 x cauda 2

2 P.t. 1.3-1.7 x a.s. III; u.r.s. as long as h.t. 2 ..... *indicum*

– P.t. about 1.3 x a.s. III; u.r.s. about 0.7-0.8 x h.t.2 ..... *miscanthi*

60. *Sitobion indicum* (Basu)

1964. *Macrosiphum (Sitobion) indicum*, Basu, A.N., *J. Linn. Soc. (Zool.)*, **45** : 305.

1997. *Macrosiphum indicum* Basu : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 145.

Material : Apterae, alate and nymphs on Orchid, Manipur : Imphal, 7.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur and West Bengal.

61. *Sitobion miscanthi* (Takahashi)

1921. *Macrosiphum miscanthi*, Takahashi, *Aphididae of Formosa*, p.t., 1 : 8

1966. *Macrosiphum miscanthi* (Takahashi) : Eastop, 1966, *Aust. J. Zool.*, **14** : 45.

1975. *Macrosiphum (Sitobion) miscanthi* Takahashi: Chakrabarti and Raychaudhuri, *Oriental Ins.*, **9**(2) : 201.

Material : Apterae and nymphs on unidentified plant under N.O. Poaceae, Manipur : Moirang, 18.xi.1971; 2 alate, on indet Poaceae, 30.xi.1971, Coll. T.K. Singh.

Distribution : India : Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Australia; China; Fiji; Hawai; New Zealand; Taiwan; Tahiti and Tonga.

Remarks : Brown to bright yellow aphids infest the leaves, both growing and basal portions of the shoots. The species exhibits colour variation.

62. *Sitobion rosaeformis* (Das)

1918. *Macrosiphum rosaeformis* Das, *Mem. Indian Mus.*, **6**(4) : 158.

1997. *Sitobion rosaeformis* (Das) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 146.

2000. *Macrosiphum (Sitobion) rosaeformis* (Das), Ghosh, L.K. and Basu, R.C., *State Fauna Series* 7 : *Fauna of Tripura*, pt. 2, *Zool. Surv. India* : 360.

Material: Apterae and alatae, on *Rosa indica*, Manipur : Imphal, 7.ix.1974, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Nepal and Pakistan.

Remarks : This greenish and reddish brown aphid has holocyclic reproduction with alatae males and apterous oviparous females produced on the senescing leaves of the rose from November onwards.

Genus 29. *Pentalonia* Coquerel

63. *Pentalonia nigronervosa* Coquerel

1859. *Pentalonia nigronervosa* Coquerel, *Ann. Soc. Ent. Fr.* (3) **7** : 260.

1971. *Pentalonia nigronervosa* Coquerel : Ghosh, Banerjee and Raychaudhuri, *Proc. zool. Soc.*, Calcutta, 24 : 165.

1992. *Pentalonia nigronervosa* Coquerel : Agarwala and Bhattachya *Soc. Nat. Sci.*, **2**(3 & 4) : 2.

Material : Apterae from *Musa paradisiaca* Manipur : Uripok, 16.x.1972, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed throughout.

Elsewhere : Virtually cosmopolitan.

Remarks : This dark brown aphids infest under the old leaf bases of the host plants. Red ants attend the aphids. The species usually reproduces parthenogenitically throughout the country. However, Bhanotar and Ghosh, L.K. (1969) reported apterous oviparous females collected on *Curcuma longa* from the plains of West Bengal for the first time, Male is yet to be known.

Genus 30. *Rhodobium* Hille Ris Lambers

64. *Rhodobium porosum* (Sanderson)

1901. *Myzus porosum* Sanderson, *Rep. Del. Univ. agric. Exp. Stn.*, **12** : 205.

1972. *Acyrthosiphon (Rhodobium) porosum* (Sanderson) : Chakrabarti, Ghosh and Raychaudhuri, *Oriental Ins.*, **6**(3) : 387.

Material : Apterae, from *Rosa* sp., Manipur : Irosemba, 23.xii.1970; alatae, from *Rosa indica,* 4,iv,1974, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Cosmopolitan.

Remarks : Greenish to reddish aphids usually infest the sepals of flowers and young tender shoots of the host plants, Sometimes ants are found in association with them. The usual host plants of the species belong to N.O. Rosaceae.

Genus 31. ***Rhopalosiphoninus*** Baker

65. ***Rhopalosiphoninus latysiphon*** (Davidson)

1912. *Amphorophora latysiphon* Davidson, *J. Econ. Ent.,* **5** : 408.

1972. *Rhopalosiphoninus latysiphon* (Davidson) : Ghosh, *Oriental Ins.,* **6**(2) : 172.

1998. *Rhopalosiphoninus latysiphon* (Davidson) : Ghosh, L.K. and Basu, R.C., *State Fauna Series* 4 : *Fauna of Meghalaya,* pt. 4, *Zool. Surv. India* : 162.

Material : Alatae, from *Pyrus malus*, Manipur : Maram, 27.xii.1970.

Distribution : India : Himachal Pradesh, Manipur, Meghalaya, South India.

Elsewhere : Africa; America; Australia; Europe; Japan; New Zealand and U.K.

Remarks : Greenish aphid infests the undersurface of the leaves of the host plant. This species is characterised in having bagpipe-like siphunculi and triangular cauda bearing 4-6 hairs.

Genus 32. ***Semiaphis*** van der Goot

66. ***Semiaphis heraclei*** (Takahashi)

1921. *Brachycolus heraclei* Takahashi, *Aphididae of Formosa,* **1** : 60.

1971. *Semiaphis heraclei* (Takahashi) : Miyazaki, *Insecta Matsum.,* **34**(1) : 189.

1997. *Semiaphis heraclei* (Takahashi) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 143.

Material : Apterae and alate, from *Coriandrum sativum,* Manipur : Uripok, 12.iv.1974, Coll. T.K. Singh.

Distribution : India : Assam, Manipur, Meghalaya, Tripura.

Elsewhere : China; Howaii; Japan; Korea; Sumatra and Taiwan.

Genus 33. ***Shinjia*** Takahashi

67. ***Shinjia pteridifoliae*** (Shinji)

1929. *Microtarsus pteridifoliae* Shinji, *Lansonia,* **1** : 44.

1980. *Shinjia pteridifoliae* : Agarwala *et al., Entomon* **5**(1) : 4

Material : Apterae, on Fern, Manipur : Lamblang, 2.v.1978, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim and Uttar Pradesh.

Elsewhere : Australia; Chili; Japan; Korea and Nepal.

Genus 34. ***Sinomegoura*** Takahashi

Key to the species of the genus *Sinomegoura*

Apterae :

Polygonal reticulation on body very indistinct; caudae hairs many (12-24) ..... *citricola*

– Polygonal reticulation on body very indistnct; cauda with fewer hairs (about 7) .... *rhododendri*

68. ***Sinomegoura citricola*** (van der Goot)

1927. *Macrosiphoniella citricola* van der Goot, *Faune Indes neerl.,* **1**(3) : 34.

1980. *Sinomegoura citricola* (van der Goot) : Raychaudhuri, *et al,* in Aphids of Northeast India and Bhutan: 252.

1998. *Sinomegoura citricola* (van der Goot) : Ghosh, L.K. and Basu, R.C., State Fauna Series 4 : *Fauna of Meghalaya,* pt. 4, *Zool. Surv. India* : 164.

Material : Apterae, from *Rosa* sp., Manipur : Irosemba, 23.xii.1970; alatae, from *Rosa indica,* 4,iv,1974, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal.

Elsewhere : Australia; China; Japan; Nepal;

New Guinea; Philippines; Singapore; Sumatra and Taiwan.

Remarks : This greenish to reddish brown aphid is a polyphagous and widely distributed.

69. ***Sinomegoura rhododendri*** (Takahashi)

1937. *Acyrthosiphon rhododendri* Takahashi, Philipp. *J.* Sci., 63 : 8.

1983. *Sinomegoura rhododendri* (Takahashi) : Chakrabarti, Mondal and Raha, *J. Linn.* Soc. *(Zool.)*, **78** : 359.

Material : Apterae and 2 nymphs, on *Ajuga* sp., Manipur: Mao, 15.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya and West Bengal.

Elsewhere : Japan

Genus 35. ***Subovatomyzus*** Basu

70. ***Subovatomyzus leucoceptri*** Basu

1974. *Subovatomyzus leucoceptri,* Basu, A.N., *J. Linn. soc. (Zool),* **45**(305) : 241

1980. *Subovatomyzus leucoceptri* Basu : Raychaudhuri *et al.* In : Taxonomy of the Aphids of Northeast India and Bhutan : 255.

Material : Apterae and alate on *Elsholtzia ploystachya,* Manipur : Kosom Khulen, 8.ii.1971, coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal.

Remarks: This is an endemic species described from Darjeeling, West Bengal.

Genus 36. ***Uroleucon*** Mordvilko

Key to the species of the genus *Uroleucon*

Apterae :

Cauda pale..... *Uroleucon* S.S.

– Cauda dark ..... *Uromelon*

71. ***Uroleucon (Uroleucon) formosanum crepidis*** (Ghosh, Ghosh and Raychaudhuri)

1971. *Dactynotus formosanum crepidis* Ghosh, Ghosh and Raychaudhuri, *Oriental Ins.*, **5**(3) : 332.

1997. *Uroleucon (Uroleucon) formosanum crepidis* Ghosh *et al.* : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 152.

Material : 4 apterae, from *Sonchus* sp., Manipur : Uripok, 8.iii.1975.

Distribution : India : Manipur, Sikkim and West Bengal.

72. ***Uroleucon sonchi*** (Linnaeus)

1967. *Aphis sonchi* Linnaeus, *Systema Naturae,* **1** (12th ed.) : 735.

1997. *Uroleucon sonchi* (Linnaeus) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 154.

Material : Apterae and nymphs, from *Sonchus oleraceus,* Manipur : Iriosemba, 4.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur and widely distributed.

Elsewhere : Virtually cosmopolitan.

Remarks : This is one of the commonest species occurring on Compositae. The chocolate brown aphids usually infest the under surface of the leaves.

73. ***Uroleucon parasonchi*** (Raychaudhuri, Raha and Raychaudhuri)

1917. *Dactynotus parasonchi* Raychaudhuri, D.N., Raha and Raychaudhuri, d. *Entomon,* **2**(1) : 71.

1997. *Uroleucon parasonchi*: Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 153.

Material : Apterous viviparous females, on *Sonchus arvensis,* Manipur, 10.ii.1975, C.U. Colls.

Distribution : India : Manipur

Remarks : The species was originally described from apterous viviparous females from *Sonchus arvensis* collected at Manipur. Other morphs are yet to be described.

74. ***Uroleucon pseudotanaceti*** (Verma)

1977. *Dactynotus pseudotanaceti* Verma, *Bull. Ent.*, **10**(2) : 136.

1980. *Dactynotus pseudotanaceti* : Singh *et al., Entomon,* **5**(2) : 142.

1997. *Uroleucon pseudotanaceti* : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 153.

Material : Apterae, on *Chrysanthemum* sp., Manipur : Mao, 13.i.1977, Coll. T.K. Singh.

Distribution : India : Manipur, Jammu and Kashmir

Remarks : Singh *et al.* (1980) described apterous oviparous female from the Manipur for the first time. Earlier the species was known to occur by apterous and alate viviparous females. Thus, it appears that the species enjoys holocyclic life cycle.

75. *Uroleucon (Uromelon) Compositae* (Theobald)

1915. *Dactynotus compositae* Theobald, *Bull. ent. Res.*, **6** : 123.

1997. *Uroleucon (Uromelon) compositae* (Theobald) : Remaudiere and Remaudiere, Catalogue of the World's Aphididae : 136.

Material : Apterae and nymphs, from *Blumea* sp., Manipur : Leimakhong 16.xii.1971, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, South India and West Bengal

Elsewhere : Africa, Mauritus and Taiwan

Remarks: This reddish brown aphid mostly infests ventral surface of leaves and young shoots of the host plants.

Genus 37. *Trichosiphonaphis* Takahashi

76. *Trichosiphonaphis gerbarae* Ghosh and Raychaudhuri

1972. *Trichosiphonaphis gerbarae* Ghosh and Raychaudhuri, *Oriental Ins.*, **6** : 381

1980. *Trichosiphonaphis gerbarae* : Raychaudhuri *et al.*, In : Taxonomy of the Aphids of Northeast India and Bhutan: 381.

Material : Apterae and alate from *Polygonum perfoliatum*, Manipur : Uripok, 4.vii.1971, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya and West Bengal.

Remarks : Pale green or dark brown aphids infest ventral surface of leaves and stems of the host plants which belong mostly to Asteraceae (Compositae).

Genus 38. *Tuberocephalus* Shinji

77. *Tuberocephalus sasakii* (Matsumura)

1917. *Myzus sasakii* Matsumura, *J. Coll. Agric. Tohoku, Imp. Univ.*, **7**(6) : 404.

1971. *Tuberocephalus sasakii* (Matsumura), *Insecta Matsum.*, **34**(1) : 105.

1973. *Tuberocephalus sasakii* (Matsumura) : Basu, Ghosh and Raychaudhuri, *Proc. zool. Soc.*, Calcutta, **26** : 93.

Material : Apterae, on *Artemesia vulgaris*, Manipur : Leimakhong, 20.ii.1975, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Japan

Remarks : Yellowish aphids infest ventral surface of the leaf of the host plant.

Genus 39. *Vesiculaphis* del Guercio

78. *Vesiculaphis verbasci* Chowdhuri, Chakrabarty and Raychaudhuri

1969. *Vesiculaphis verbasci* Chowdhuri, Basu, R.C., Chakrabarti and Raychaudhuri, D.N., *Oriental. Ins.*, **3** : 90.

1980. *Vesiculaphis verbasci* Chowdhuri *et al.* : Raychaudhuri, D.N. (ed.), Aphids of Northeast India and Bhutan: 270.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Remarks : The species is characterised in having p.t. longer than base VI, u.r.s. usually shorter than h.t.2 and dorsal hairs minute and "myzine" type (Raychaudhuri, D.N. *(ed.)* 1980).

Subfamily III. DREPANOSIPHINAE

Genus 40. *Betacallis* Matsumura

Key to the species of the genus *Betacallis*

Alate viviparous females :

Dorsal cephalic hairs about 1.20-1.50 x b.d. III; segment III with 28-37 secondary rhinaria;

u.r.s. about 1.10-1.20 x h.t.2; 8th tergite with 9-10 hairs on anterior abdominal tergites about 0.50 x b.d. III ..... ***querciphaga***

– Dorsal cephalic hairs at most 0.80 x b.d. III; segment III with 18-22 secondary rhinaria; u.r.s. 1.30-1.70 x h.t.2; 8th tergite with 8 hairs ..... ***.prunicola***

79. ***Betacallis prunicola*** Basu, Ghosh and Raychaudhuri

1973. *Betacallis prunicola* Basu, Ghosh and Raychaudhuri, Proc. zool. Calcutta, **26**(2) : 93.

1990. *Betacallis prunicola* : Ghosh, A.K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. 5 Subfamily Drepanosiphinae, *Zool. Surv. India* : 21.

Material : Alatae from an unidentified plant of Anacardiaceae, Manipur : Taiyang, 3.xii.1972, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya and West Bengal.

Elsewhere : China.

Remarks : Pale yellowish aphid infest ventral surface of the leaves of the host plants.

80. ***Betacallis querciphaga*** Basu, Ghosh and Raychaudhuri

1974. *Betacallis querciphaga* Basu, Ghosh and Raychaudhuri, *Oriental Ins.*, **8**(2) : 236.

1990. *Betacallis querciphaga* : Ghosh, A.K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. 5 Subfamily Drepanosiphinae, *Zool. Surv. India* : 24.

Material : Alatae from unidentified plant of Anacardiaceae, Manipur : Taiyang, 3.xii.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal.

Remarks : Pale yellowish aphid usually infests, ventral surface of the leaves of the host plants. It appears that alate viviparous females occur during October-February in the altitudes of Northeast India including Manipur.

Genus 41. ***Chromaphis*** Walker

81. ***Chromaphis hirsutatibis*** Kumar and Lavigne

1970. *Chromaphis hirsutatibis* Kumar and Lavigne, *Pan. Pac. Entomol*, **46**(2) : 123.

1990. *Chromaphis hirsutatibis* : Ghosh, A.K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. 5 Subfamily Drepanosiphinae, *Zool. Surv. India* : 45.

Material : Alatae from *Cedrella serrata*, Manipur : Oklong, 22.iv.1972, Coll. T.K. Singh.

Distribution : India : Himachal Pradesh, Manipur, Uttar Pradesh.

Elsewhere : Nepal

Remarks : Kumar and Lavigne (1970) described this species from Himachal Pradesh. The description was based on specimens collected from *Jaglans regia*. Oviparous females were also recorded from the same host. Male was on record from Y.P.T. from Nanital (Chalrabarti, 1978). Therefore, the occurrence of both viviparae and sexuales on *Juglans* indicates the possibility of having autoecious holocyclic life cycle in the hilly terrains of the country.

Genus 42. ***Machilaphis*** Takahashi

82. ***Machilaphis machili*** Takahashi

1928. *Phyllaphis machili* Takahashi, *Tran, nat. Hist. Soc. Formosa* : **16** : 146.

1960. *Machilaphis machili* : Takahashi, *Kontyu*, **28** : 11.

1990. *Machilaphis machili* (Takahashi) : Ghosh, A. K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. 5 Subfamily Drepanosiphinae, *Zool. Surv. India* : 109.

Material : Apterae, on *Machilus odoratissima*, Manipur : Khongampat, 20.iii.1975, Coll. T.K. Singh.

Distribution : India : Assam, Manipur, Meghalaya

Elsewhere : China; Japan and Taiwan

Remarks : The yellow aphids and the members of the monotypic genus is characterised in having setiform empodial hair, arrangement of wax pores elements and sclerotic basal thickening of u.r.s.

Genus 43. ***Shivaphis*** Das

83. ***Shivaphis celti*** Das

1918. *Shivaphis celti* Das, *Mem. Indian Mus.*, **6** : 245.

1981. *Shivaphis celti* : Raychaudhuri, D.N., Raychaudhuri, D. and Singh, T.K., *Sci. Cult.*. **47** : 171.

1990. *Shivaphis celti* : Ghosh, A.K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. **5** Subfamily Drepanosiphinae, *Zool. Surv. India* : 195.

Material : Alate viviparous female, on *Celtis trandia,* Manipur : Suakeithal, 16.xii.1971 : I apterous viviparous female, on *Celtis trandia,* Manipur : Khangapta, 10.xii.1971; 1 apterous oviparous female, on *Celtis trandia,* Khangapta, 10.xii.1971, Coll. T.K. Singh & C.U. Coll.

Distribution : India : Jammu & Kashmir, Himachal Pradesh, Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : China; Japan; Korea; Pakistan and Sri Lanka.

Remarks : The species was originally described from *Celtis autralis* in Lahore (West Pakistan) Das *(op. cit.)* provided a detailed account of all morphs including the eggs with observation on biology of the species.

Genus 44. ***Taoia*** Quednau

84. ***Taoia indica*** (Ghosh and Raychaudhuri)

1969. *Euceraphis chaunsiensis* David and Rajasingh, *Proc. zool. Soc. Calcutta,* **22** : 153.

1973. *Taoia indica* Quednau, *Can Ent.,* **105** : 218.

1980. *Taoia indica*: Raychaudhuri, D.N., Chakrabarti, S., Basu, R.C. and Ghosh, A.K., in Aphids of Northeast India and Bhutan: 305.

1990. *Taoia indica*: Ghosh, A.K. and Quednau, Fauna of India, Homoptera : Aphidoidea, pt. **5** Subfamily Drepanosiphinae, *Zool. Surv. India* : 244.

Material : Not examined.

Distribution : India : Manipur, Meghalaya, Sikkim, West Bengal.

Elsewhere : Nepal

Remarks : In Indian conditions the species has been recorded during March-May and during November-December. According to Ghosh and Quednau (1990) the appears to have monoecious holocyclic life on *Alnus* and *Betula* sp. in Northeast Indian Region.

Genus 45. ***Tuberculatus*** Mordvilko

85. ***Tuberculatus indicus*** Ghosh

1972. *Tuberculatus indicus* Ghosh, L.K., *Oriental Ins.,* **6**(3) : 299.

1984. *Tuberculatus (Acanthocallis) indicus,* Agarwala and Ghosh, A.K., *Rec. zool. Surv. India,* Misc. Pub. Occ. Paper **50** : 27.

1990. *Tuberculatus indicus* : Ghosh, A.K. and Quednau, F.W., Fauna of India, Homoptera : Aphidoidea, pt. **5**, Subfamily Drepanosiphinae : 297.

Material : Single alate from *Quercus* sp., Manipur : Taiyang, 10.x.1974.

Distribution : India : Arunachal Pradesh, Manipur and Meghalaya.

Elsewhere : Japan and Korea.

Remarks : Ghosh, L.K. (1972) originally described the species on a single alate viviparous female from *Quercus* sp. in Northeast India. Nothing is known about its life cycle in the Indian subregion.

86. ***Tuberculatus konaracola*** (Shinji)

1941. *Tuberculatus konaracola* (Shinji), *Monogr. Japanese Aphidinae*: 174.

1972. *Tuberculatus konaracola* Higuchi, *Ins. Matsum.,* **35**(2) : 49.

1990. *Tuberculatus konaracola* : Ghosh, A.K. and Quednau, F. W., Fauna of India, Homoptera : Aphidoidea, pt. **5**, Subfamily Drepanosiphinae : 301.

Material : Alate viviparous female, on undet Myrtaceae, Manipur : Rephie, 11.xi.1972, Coll. T.K. Singh.

Distribution : India : Manipur.

Elsewhere : Korea.

Remarks : This species appears to be rare one and is so far known only from Manipur in India.

Genus 46. ***Tinocalloides*** Basu

87. ***Tinocalloides montanus*** Basu

1969. *Tinocalloides montanus* Basu, A.N., *Oriental Ins.,* **3** : 367.

1970. *Tinocalloides eastopi* Kumar and Lavigne, *R. Pan. Pacific Ent.,* **46** : 120.

1990. *Tinocalloides montanus* : Ghosh, A.K. and Quednau, F.W., Fauna of India, Homoptera : Aphidoidea, pt. **5**, Subfamily Drepanosiphinae : 287.

Material : Two alatae, from *Prunus cerasus,* Manipur : Oklong, 14.xi.1972, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim and West Bengal

Remarks : Basu, A.N. (1969) while describing the species from Kalimpong Hills (West Bengal) mentioned that migration of alate viviparous females occurs towards middle of November, Basu (*op. cit.*) recorded apterous oviparous female during January in Kalimpong. The species enjoys autoecious holocyclic life on *Prunus* in Northwest & Eastern India.

Subfamily IV. GREENIDEINAE

Key **to the Tribes of the Subfamily GREENIDEINAE**

Body of apterous viviparous females with processi; eyes usually 3-faceted; siphunculi usually with a very few hairs .... **Cervaphidini**

– Body of apterous viviparous females without any process; eyes always multifaceted; siphunculi always densely hairy..... ..... **Greenideini**

Tribe **Cervaphidini**

Genus 47. ***Anomalosiphum*** Takahashi

88. ***Anomalosiphum indigoferae*** Ghosh, Ghosh and Raychaudhuri

1971. *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri, *Oriental Ins.*, **5**(2) : 209..

1993. *Anomalosiphum indigoferae* : Ghosh, A.K. and Agarwala, Fauna of India, Homoptera : Aphidoidea, Subfamily Greenideini : pt. **6** : 15.

Material : Alate viviparae, on *Vigna* sp., Manipur : Morch, 17.xi.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Sikkim and West Bengal.

Remarks : The species appears to lead anholocyclic life cycle on its host *Indigofera.*

Genus 48. ***Cervaphis*** van der Goot

89. ***Cervaphis quercus*** Takahashi

1918. *Cervaphis quercus* Takahashi, *Doubts. Z. Tokyo,* **30**(361) : 458.

1941. *Cervaphis quercus* Takahashi, *Govt. Argic. Res. Ins. Taiwan, Rept.* **78** : 11.

Material : Alate viviparae, on *Quercus serrata,* Manipur : Sekma, 17.viii.1972 Coll. T.K. Singh.

Distribution : India : Manipur

Elsewhere : Indonesia and Siam

Remarks : The yellowish aphids are of common occurrence all the year round in Manipur.

Tribe **Cervaphidini**

90. ***Cervaphis rappardi indica*** Basu

1961. *Cervaphis rappardi indica* Basu, A.N., *Curr Sci.,* **30** : 390.

1993. *Cervaphis rappardi indica*: Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6** Subfamily Greenideinae : 33.

Material : Apterous viviparous females, on *Cajanus cajan,* Manipur, Canchipur, 20.xii.1998, Coll. T.K. Singh.

Distribution : India : Manipur

Remarks : The species is characterised by its ratio of frontal processi and siphunculi (0.5-0.6x) to antennae (0.36-0.50 x). Moreover, siphunculi are darker in the apices.

Genus 49. ***Schoutedenia*** Rubsaamen

91. ***Schoutedenia lutea*** (van der Goot)

1917. *Setaphis luteus* van der Goot, *Contrib Faune Indes Neerl.,* **1**(3) : 154.

1972. *Schoutedenia lutea* (van der Goot) : Basu, Ghosh and Raychaudhuri, *Sci. Cult.,* **38** : 495.

Material : 3 apterous viviparous females and nymphs, from *Glochidion* sp., Manipur : Tronglaobi, 25.v.1972, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Sikkim, South India, Tripura, West Bengal.

Elsewhere : Africa; Australia; Java and Sumatra.

Genus 50. ***Sumatraphis*** Takahashi

92. ***Sumatraphis celti*** Takahashi

1935. *Sumatraphis celti* Takahashi, *Misc. Zool. Sumatrana,* **97** : 3.

1974. *Sumatraphis celti* : Basu et. al., *Sci. & Cult.*, **40** : 43.

Material : Apterae and nymphs, on *Celti tetranda*, Manipur : Uripok, 9.iii.1975, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya and West Bengal

Elsewhere : Sumatra

Remarks : Greenish in colour; It infests leaf axils and upper surface of host plants.

Tribe **Greenideini**

Key to the genera of Tribe Greenideini

Siphunculi barrel-shaped, dorsal hairs on abdomen minute, mostly with blunt apices and somewhat expanded or subacute apices ..... ***Brevitrichosiphon***

– Siphunculi usually curved outwards and long, never as above; dorsal hairs on abdomen long or short with variable apices ..... ***Eutrichosiphum***

Genus 51. ***Brevitrichosiphon*** Raychaudhuri, Ghosh, Banerjee and Ghosh

93. ***Brevitrichosiphon mukherjii*** Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M and Ghosh, A.K.

1973. *Brevitrichosiphon mukherjii* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and A.K. *Kontyu*, **41** : 53.

1979. *Brevitrichosiphon nungsireiae* Singh *et al. Entomon*, **4** : 361.

1993. *Brevitrichosiphon mukherjii* : Ghosh, A.K. and Agarwala, B.K., Fauna of India, Homoptera : Aphidoidea, p.t. 6, Subfamily Greenideinae : 66.

Material : Apterous viviparous females, on *Quercus* sp., Manipur, Snakeithal, 16.xii.1971, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya and West Bengal

Remarks : The species was originally described as *Brevitrichosiphon nungsireiae* Singh *et al.* (1979) from Manipur. It is so far restricted to Northeast Indian States.

Genus 52. ***Eutrichosiphum*** Essig & Kuwana

Key to the species of the genus *Eutrichosiphum*

Alate viviparous females :

1. None of the dorsal hair on abdomen with furcated apices, dorsal hairs on abdomen thick and stiff, mostly thorny ..... *dubium*

– At least some of the dorsal hairs on abdomen with furcated apices 2

2. Most of the dorsal hairs on abdomen with branched apices, a few shorter ones with acute or blunt apices 3

– Some of a few of the dorsal hairs on abdomen with branched apices, others with acute, acuminate or blunt apices 4

3. Abdominal dorsum locally spinulose, antennae 5-segmented ..... *jugeswari*

– Abdominal dorsum entirely spinulose; dorsum of head smooth; none of these siphuncular hairs furcated apices ..... *pseudopasaniae*

4. Antennae 5 or 6-segmented; u.r.s. long and acute ..... *tattakanum*

– Antennae either 5 or 6-segmented; u.r.s. obtuse or long or acute 5

5. Most of the dorsal hairs on abdomen with blunt apices; antennae 1.3-1.4 times as long as h.t.2 ..... *manipurense*

– Most of the dorsal hairs on the abdomen with acute, acuminate or some with blunt or furcated apices 6

6. Dorsum of abdomen locally spinulose; siphunculi 0.15-0.19 times as long as body

– Dorsum of abdomen smooth 7

7. Antennae 5-segmented; u.r.s. obtuse and 0.23-0.33 mm long; siphunculi densely spinulose throughout ..... *assamense*

– Antennae 6.-segmented; u.r.s. long or short, acute or tapering; siphunculi very short 0.23-0.67 mm long, 0.10-0.16 times as long as body ..... *litseae*

94. *Eutrichosiphum assemense* Ghosh, Basu and Raychaudhuri

1969. *Eutrichosiphum assemense* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Oriental Ins.*, **3** : 247.

1993. *Eutrichosiphum assemense* : Ghosh, A.K. and Agarwala, B.K., Fauna. of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 84.

Material : Apterous viviparous females, on *Quercus* sp., Manipur, Churachandpur, date Nil, C.U. Coll.

Distribution : India : Manipur, Himachal Pradesh, Meghalaya and Uttar Pradesh

Remarks : According to Ghosh and Agarwala (1993) the species enjoys monoecious life cycle on *Quercus* spp. at least in the Northeast and Northwest India.

95. *Eutrichosiphum dubium* (van der Goot)

1917. *Trichosiphum dubium* van der Goot, *Rec.Indian Mus.*, **13** : 178.

1977. *Holotrichosiphum dubium* Raychaudhuri, D.N., Chatterjee, M. and Raychaudhuri, D. *Oriental Ins.*, **11** : 286.

1993. *Eutrichosiphum dubium* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 97.

Material : Apterous viviparous females, on *Passania grifithi*, Manipur, Lamlong, 29.ix.1971, C.U. Coll.

Distribution : India : Manipur, Meghalaya and West Bengal

Elsewhere : China and Taiwan

96. *Eutrichosiphum flavum* Takahashi

1941. *Paratrichosiphumflavum* Takahashi, *Rep. Govt.* Agric. *Res. Inst. Taiwan*, **78** : 8.

1980. *Eutrichosiphum (Neoacyrthosiphum) flavum* : Singh, T.K., Raychaudhuri, D., Raha, S.K. and Raychaudhuri, D.N., *Entomon* : **5** : 145.

Material : Alate viviparous females, on *Quercus* sp. Manipur, Tuyangwaichong, 19.vi. 1974, C.U. Coll.; apterous viviparous females from *Quercus* sp., Lamlongeii, 2.v.1971, Coll. T.K. Singh; 4 apterous viviparous females and 8 nymphs from *Quercus* sp, Tyang Waichong; 4 apterous viviparous females and 1 alate viviparous females and 7 nymphs from *Quercus* sp. from Tuyang, 19.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur,. Meghalaya

Elsewhere : Indonesia; Taiwan

Remarks : The species is restricted so far to Northest India.

97. *Eutrichosiphum jugeswari* Singh, Raychaudhuri and Raychaudhuri

1979. *Eutrichosiphum jugeswari* Singh, T.K., Raychaudhuri, D.and Raychaudhuri, D.N., *Entomon* **4** : 368.

1993. *Eutrichosiphum jugeswari* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 103.

Material : Apterous viviparous females, on *Quercus sp.* Manipur, Nungbi, 11.xii.1972, C.U. Coll.

Distribution : India : Manipur (Imphal)

Remarks : The species is so far known by its apterous viviparous females only from Manipur.

98. *Eutrichosiphum khasyanum* (Ghosh and Raychaudhuri)

1962. *Paratrichosiphum (Neoparatrichosiphum) khasyanum*, Ghosh, A.K. and Raychaudhuri, D.N., *J. Asiat. Soc.*, **4** : 108.

1993. *Eutrichosiphum khasyanum* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea. pt. **6**, Subfamily Greenideinae : 104.

Material : Apterae viviparae and nymphs, from *Quercus serrata*, 24.iv.1972, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Uttar Pradesh.

Elsewhere : Nepal

Remarks : This yellowish aphid species so far known by the viviparous from only and infests Oak tress in Himalayas, Central and Eastern India.

99. ***Eutrichosiphum litseae*** Raychaudhuri, Raha and Raychaudhuri

1977. *Eutrichosiphum (Neoparatrichosiphum) litseae.* Raychaudhuri, D.N., Raha, S. and Raychaudhuri, D., *Entomon,* **2** : 72.

1993. *Eutrichosiphum litseae* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 107.

Material: Apterous viviparous females, on *Litsea sebifera,* Churachandpur, 22.vi.1976, C.U. Coll.

Distribution : The species is so far known only from Manipur.

100. ***Eutrichosiphum manipurense*** Singh, Raychaudhuri and Raychaudhuri

1979. *Eutrichosiphum manipurense,* Singh, T.K., Raychaudhuri, D. and Raychaudhuri, D.N., *Entomon,* **4**: 363.

1993. *Eutrichosiphum manipurense* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 113.

Material : Apterous viviparous females, on *Quercus* sp., Manipur, Kangchup, 13.xi.1971, Coll. T.K. Singh.

Distribution : India : Manipur

Remarks : This species is also so far known from this state in North East India. Other morphs are yet to be recorded.

101. ***Eutrichosiphum pseudopasaniae*** Szelegiewicz

1968. *Eutrichosiphum pseudopasaniae* Szelegiewicz, *Annls. Zool. Warsz.,* **25** : 466.

1993. *Eutrichosiphum pseudopasaniae* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 119.

Material : Apterous viviparous females, on Indet host, Manipur, Kongpikpi, 16.i.1976, Coll. A.K. Ghosh; Alate viviparous females from *Nicotiana Tabacum.* Sanakeithal, 7.xii.1971; Apterous viviparous females from *Quercus* sp. 16.xii.1971; 1 alate viviparous females in Y.P.T., 22.xii.1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Uttar Pradesh, West Bengal.

Elsewhere : Nepal; Vietnam

102. ***Eutrichosiphum russellae*** (Ghosh, Ghosh and Raychaudhuri)

1971. *Holotrichosiphon russellae,* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N.

1993. *Eutrichosiphum russellae* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 134.

Material: Apterous viviparous and nymphs, on *Quercus* sp., Manipur; Nungbe, 11.xii.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya and West Bengal.

Remarks : The aphids are deep green in colour and are attended by ants.

103. ***Eutrichosiphum sensoriatum*** (Ghosh)

1974. *Paratrichosiphum sensoriatum* Ghosh, A.K., *Oriental Ins.,* **8** : 172.

1993. *Eutrichosiphum sensoriatum* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 142.

Material : Alate viviparous females on indet host, Manipur, date unknown, C.U. Coll.

Distribution : India : Manipur, Meghalaya,

Remarks : The species is characterised in having longer hairy siphunculi and more number of accessory rhinaria on antennal segment III.

104. ***Eutrichosiphum tattakanum*** (Takahashi)

1925. *Greenidea tattakanum* Takahashi, Aphididae of Formosa, pt. **4** : 30.

1956. *Paratrichosiphum tattakanum* Raychaudhuri, D.N., *Zool. verh. Leiden.* **31** : 94.

1993. *Eutrichosiphum tattakanum* : Ghosh and Agarwala Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 149.

Material : Apterous viviparous females on *Quercus acutissima,* Manipur; Ukhral, 23.x. 1990, C.U. Coll.

Distribution : Manipur, Himachal Pradesh, Meghalaya.

Elsewhere : Bhutan; Japan; Nepal; Pakistan; Taiwan

Remarks : This yellowish aphid species so far known by the viviparous form only and infests Oak tress. in Himalayas, Central and Eastern India.

Genus 53. ***Greenidea*** Schouteden

Key to the subgenera of genus *Greenidea*

I. Flagellum with district reticulations on a.s. III or beyond in both apterae and alate viviparae, besides normal imbrications ..... ***Neogreenidea***

– Flagellum without reticulations but with normal imbrications 2

2. Siphunculi in apterae viviparae distinctly reticulated near one surface ***Trichosiphum***

– Siphunculi in apterae viviparae distinctly reticulated on both surfaces throughout the length ..... ***Greenidea*** s.s.

105. ***Greenidea (Greenidea) ficicola*** Takahashi

1916. *Trichosiphum formosana* Maki, *Coll. Essays* for *Nawa. Gifu* : 13 (Partim).

1921 *Greenidea ficicola* Takahashi, *Aphididae of Formosa*, 1 : 66.

1993. *Greenidea (Greenidea) ficicola* Takahashi: Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. 6, Subfamily Greenideinae : 181.

Material : Apterae viviparae, on *Ficus* sp., Manipur, Eriosemba, 4.iv.1974, Coll. T.K. Singh.

Distribution: India: Karnataka, Manipur, Meghalaya, Sikkim, Tamilnadu, Uttar Pradesh and West Bengal.

Elsewhere : Australia; East China; Java; Malaya; Sumatra and Taiwan

Remarks : The species is characterised in the siphunculi longer than hind tibiae and venter of abdomen evenly spinulose.

106. ***Greenidea (Greenidea) longirostris*** Basu

1969. *Greenidea longirostris* Basu, *Oriental Ins.*, 3 : 358.

1993. *Greenidea (Greenidea) longirostris* : Ghosh and Agarwala. Fauna of India, Homoptera : Aphidoidea, pt. 6, Subfamily Greenideinae : 189.

Material : Apterous viviparous, on *Schima wallichii,* Manipur, Keithalmanbi, 14.i.1976, Z.S.I. Colls.; apterous viviparous female and nymphs, on *Schima wallichii,* Manipur, Kanglatombi 1.xi. 1971, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim and West Bengal.

Elsewhere : Nepal

Remarks : According to Basu (1969) this whitish or yellowish brown aphid is very active and run away at the slightest disturbance.

107. ***Greenidea (Neogreenidea) ayyari*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Noegreenidea) ayyari* Raychaudhuri. D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu,* 41 : 63.

1993. *Greenidea (Noegreenidea) ayyari* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. 6, Subfamily Greenideinae : 195.

Material : Apterous viviparous female, on *Quercus* sp., Manipur, date unknown, C.U. Coll.; alate viviparous female and 1 alate oviparous female, on *Lyonia* sp., Manipur, Mao, 15.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur, West Bengal.

Remarks : The species is known by its viviparous and oviparous morphs in Manipur. It appears that it enjoys holocyclic life cycle in the area of distribution of Northeast India.

Subgenus ***Trichosiphum*** Pergande

Key to the species and subspecies of subgenus *Trichosiphum*

1. U.r.s. longer upto 3 times as long as h.t.2 ..... *quercicola*

– U.r.s. less than 2.4 times as long as h.t.2...2

2. U.r.s. 0.20-0.25 mm long as 1.90-2.25 times as long as h.t.2 .....*formosana formasana*

– U.r.s. 0.15-0.19 mm long and 1.20-1.70 times as long as h.t.2 .....*formosana heeri*

108. *Greenidea (Trichosiphum) formosana formosana* (Maki)

1916. *Greenidea formosana* Maki, *Coll. Essays for Nawa, Gifu,* 13 (Partim).

1956. *Greenidea (Trichosiphum) formosana* : Raychaudhuri. D.N., *Zool. verh.* Leiden, **31** : 53.

1993. *Greenidea (Trichosiphum) formosana* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea. pt. **6**. Subfamily Greenideinae : 27.

Material : Apterous viviparous females, on *Psidium guajava,* Manipur : Morch, 20.i.1976, Z.S.I. Coll.

Distribution : India : Manipur, Meghalaya and West Bengal.

Elsewhere : Bangladesh; China; Indonesia; Japan; Nepal and Taiwan.

Remarks : This aphid is very commonly found on tender shoots and under surface of young leaves *of Psidium guajava.*

109. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, Ghosh, Banerjee imd Ghosh

1973. *Greenidea (Trichosiphum) heeri* : Raychaudhuri, D.N., Ghosh, M.R, Banerjee, M and Ghosh, A.K., *Kontyu,* **41** : 66.

1993. *Greenidea (Trichosiphum) formosana heeri* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 221.

Material : 4 apterous viviparous females and 5 nymphs, on *Psidium guajava,* Manipur : Uripok, l.i.1971; 4 apterous viviparous females and 3 nymphs, on *Psidium guajava,* Manipur : Thingong hills, 20.xi.1971; 4 apterous viviparous females and 2 nymphs, on *Psidium guajava,* Manipur : Pangyang, 11.xii.1972; 2 apterous viviparous females, on *Eugenia precox,* Manipur : Tyang, 3.xii.1972; 4 apterous viviparous and 1 alate viviparous females, on *Psidium guajava,* Manipur : Eroisemla 30.xii.1972 Colls. T.K. Singh.

Distribution: India : Manipur, Meghalaya, Nagaland, Sikkim, South India, Uttar Pradesh and West Bengal.

Elsewhere : Nepal.

110. *Greenidea (Trichosiphum) quercicola* Basu, Ghosh and Raychaudhuri

1973. *Greenidea (Trichosiphum) quercicola* Basu, R.c., Ghosh, A.K. and Raychaudhuri, D.N., *Proc. zool. Soc., Calcutta,* **26** : 96.

1993. *Greenidea (Trichosiphum) quercicola* : Ghosh and Agarwala, Fauna *of* India, Homoptera : Aphidoidea, p.t. 6, Subfamily Greenideinae : 231.

Material : Alate viviparous females, on *Quercus* sp., Manipur : Tuyandwaichong, 19.iv.1974, Coll. T.K. Singh, 2 apterous viviparous 2 alate viviparous females and 3 nymphs, on *Quercus* sp., Manipur : Tuyang Waichong, 19.iv.1974, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya

Remarks : The species was originally described from *Quercus dealbata* (N.O. Fagaceae) at Shillong, Meghalaya (Basu *et al.* 1973). Their description was based on apterous viviparous females. Subsequently, Ghosh and Agarwala (1993) described alate viviparous females collected from Manipur. The species is so far known from Northeastern part of the country.

Genus 54. *Greenideoida* van der Goot

111. *Greenideoida (Pentatrichosiphum) luteum* Basu

1969. *Pentatrichosiphum luteum* Basu, *Oriental Ins.,* **3**(2) : 183.

1993. *Greenideoida (Pentatrichosiphum) luteum* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. **6**, Subfamily Greenideinae : 263.

Material : Apterae and alata viviparae, on *Litsea polyantha,* Manipur : Uripok, 4.iv.1974, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal

Remarks : The yellowish insects infest the under surface of leaves of *Litsea* trees without causing noticable injury.

Genus 55. *Mollitrichosiphum* Suenaga

112. *Mollitrichosiphum tenuicorpus* Okajima

1908. *Trichosiphum tenuicorpus* Okajima, *Bull. Coll. Agric. Tokyo Imp. Unit.,* **8** : 22.

1993. *Mollitrichosiphum tenuicorpus* Okajima : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. 6, Subfamily Greenideinae : 273.

Material : One apterous viviparous females and 2 nymphs, on *Quercus* sp., Manipur: Raphei, 11.xi.1972, Coll. T.K. Singh.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal

Elsewhere : Indonesia; Japan; Taiwan

Remarks : This species is known to infest the young shoots of the host of N.O. Fagaceae.

112. *Mollitrichosiphum (Metatrichosiphon) kazirangi* Ghosh

1974. *Mollitrichosiphum (Metatrichosiphon) kazirangi*, Ghosh, A.K., *Oriental Ins.*, **8** : 166.

1993. *Mollitrichosiphum (Metatrichosiphon) kazirangi* : Ghosh and Agarwala, Fauna of India, Homoptera : Aphidoidea, pt. 6, Subfamily Greenideinae : 285,

Material : 3 apterous viviparous females and 5 nymphs, from unidentified host plant of Equifoliaceae, Manipur : Hentakot, 11.xi.1972, Coll T.K. Singh.

Distribution : India : Assam, Manipur and Meghalaya.

Remarks : The yellowish aphids are reported to infest ventral surface of the leaf of host plant.

Subfamily V. HORMAPHIDINAE

Key to the Tribes of HORMAPHIDINAE

Frons with a pair of horn-like process; siphunculi present, usually pore-like ..... **Ceratiphidini**

– Frons without horn like process; siphunculi absent or pore-like ..... **Nipponaphidini**

Tribe **Nipponaphidini**

Key to the genera

1(2) Siphunculi present; abdominal segment (2-7) with a pair of posteromesial hairs at hind end besides 6 pairs of submarginal hairs; 8th abdominal tergite with 4-8 hairs; prosoma and abdominal segments (2-7) usually faintly to distinctly defined both laterally and dorsally ..... ***Nipponaphis***

2(1) Siphunculi absent 3

3(4) Prosoma consolidated with abdominal segments (2-7); submarginal hairs thick and spine-like; tarsi usually 2-segmented and with rudimentary claws. ..... ***Parathoracaphis***

4(3) Prosoma not consolidated as above; hind legs with rudimentary tarsi; fore and mid legs devoid of tarsi; antennae placed ventrally and unsegmented; prosoma without mid dorsal hairs and with irregular mosaic–like sculpture ..... ***Neothoracaphis***

Key to the genera of Tribe CERPHIDINI

1(2) Frons devoid of any process or tubercle.... ***Glyphinaphis***

2(1) Frons with distinct frontal process 3

3(4) Wax glands absent in localised groups; tengum pale; frontal horns rounded; 7th and 8th tergite each with 6 hairs; siphuncular pores bearng long and fine hairs ..... ***Ceratoglyphina***

4(3) Wax glands present in localised group on the margin of body in apterae, tergum brownish, usually with distinct segmentation on abdomen 5

5(6) Subanal plate entire; apterae with numerous wax pores, marginal wax gland group well defined, composed of large cells; cauda rather semilunar; frontal horns in apterae long, pointed, in alatae reduced ..... ***Ceratoglyphina***

6(5) Subanal plate distinctly bilobed; cauda broader than long; constricted at base 7

7(8) Pronotum with two pleural grooves; vertex covered with irregular dentacles; one dorsoapical hair of second tarsal segments in both apterae and alatae .... ***Pseudoregma***

8(7) Pronotum without pleural grooves, rather evenly rounded in apterae 9

9(10) Wax gland groups composed of rounded cells or some irregularly shaped ones; siphunculi poriform, often with a sclerotic rim; dorsoapical hairs on second tarsal segments in both apterae and alate swollen at apices ..... ***Ceratovacuna***

10(9) At least marginal wax gland groups on abdomen with transversely oval cells arranged in a row; siphunculi on elevated cones with a few hairs around the base; both dorsoapical hairs on second tarsal segment in apterae swollen at apices; in alatae with normal apex ..... ***Astegopteryx***

Genus 56. ***Neothoracaphis*** Takahashi

114. ***Neothoracaphis sutapensis*** (Takahashi)

1941. *Thoracaphis sutapensis* Takahashi, *Rept. Taiwan Govt. Agric. Res. Inst.*, **78** : 22.

1988. *Neothoracaphis sutapensis* : Ghosh, A.K., Fauna of India, Aphidoidea, pt. **4**, Subfamily Phloemyzinae, Anoeciinae and Hormphidinae : 170.

Material : Apterous allienicolae, on *Quercus* sp., India : Manipur, Sedimpukhri Road, 16.i.1976, Coll. A.K. Ghosh.

Distribution : India : Manipur, Meghalaya *Elsewhere*: China, Thailand

Remarks : Ghosh, A.K. (1994) recorded the species from Manipur for the first time. According to Ghosh *(op. cit.)* the small dark coloured aphids from small colonies on undersurface of leaves of *Quercus* at temperate condition. The species is so far known only from North East India.

Genus 57. ***Nipponaphis*** Pergande

115. ***Nipponaphis (Pseudonipponaphis) himalayensis*** Ghosh and Raychaudhuri

1973. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh, A.K. and Raychaudhuri, D.N., *Kontyu*, **41**(4) : 483.

1983. *Nipponaphis (Pseudonipponaphis) himalayensis* : Ghosh, A.K., Fauna of India: Homoptera, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 176.

Material : Apterous viviparous females, on *Lindera* sp., Nogthukang, Manipur, 16.iii.1974, Z.S.I., Coll.

Distribution : India : Assam, Manipur, West Bengal.

Remarks : The species is characterised by prosoma incompletely separated from fused abdominal segments (2-7) and short fine hairs mixed with thick hairs occurring on dorsum of prosoma. The species is so far known only from North East India. According to Ghosh, A.K. (1985), the species infests leaves and stems of plants of Lauraceae *(Litsea, Machilus, Lindera* sp.) and occur both in the plains and hills upto c. 1300m, during the months of October to April in Eastern India.

Genus 58. ***Parathoracaphis*** Takahashi

116. ***Parathoracaphis manipurense*** (Pramanik, Samanta and Raychaudhuri)

1983. *Hoplothoracaphis manipurense* Pramanik, D.R., Sanianta, A.K. and Raychaudhuri, D., *Akitu*, **57** : 2.

1988. *Parathoracaphis manipurense* : Ghosh, A.K., Fauna of India : Homopterapt, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 196.

Material : Apterous viviparous female, on *Castanopsis* sp., India: Manipur, Keithelmanbi, 14.i.1974, Z.S.I., Colls.

Distribution : India : Manipur, Nagaland

Remarks : Pramanik *et. al.* (1989) described the species from Manipur. This is an endemic species so far known only from North East India. The species is characterised by the large flat (tubercle-like structure on the dorsum of prosoma. The species is usually known to infest plants belongong to Fagaceae. Other plants are *Litsea* and *Amaranthus.*

Genus 59. ***Parathoracaphisella*** Pramanik, Samanta and Raychaudhuri

117. ***Parathoracaphisella indica*** Pramanik, Samanta and Raychaudhuri

1983. *Parathoracaphisella indica* Pramanik, D.R., Samanta, A.K. and Raychaudhuri, D., *Akitu*, **57** : 4.

1988. *Parathoracaphisella indica*: Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 201.

Material : Apterous viviparous females.

Distribution : India : Manipur

Remarks : This species represents the "Type" of the monotypic genus which is so far known only from Manipur State. It is known to infest *Quercus* sp. (N.O. Fagaceae).

Genus 60. ***Astegopteryx*** Karsch

118. ***Astegopteryx minuta*** (van der Goot)

1917. *Oregma minuta* van der Goot, *Contr. Faune Indes Neerl.*, **3** : 201.

1958. *Astegopteryx minuta* David, *Indian. J. Ent.* **20**(2) : 125.

1988. *Astegopteryx minuta* : Ghosh, A.K., Fauna of; India : Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Harmaphidinae : 274.

Material : Apterous viviparous females, A.K. Ghosh Coll.

Distribution : India: Arunachal Pradesh, Manipur, Meghalaya, Nagaland, North India, South India, Sikkim, West Bengal

Elsewhere : Indonesia

Genus 61. ***Ceratoglyphina*** van der Goot

119. ***Ceratoglyphina bambusae bengalensis*** Ghosh

1972. *Ceratoglyphina bambusae bengalensis* Ghosh, L.K., *Oriental Ins.*, **6** : 301.

1988. *Ceratoglyphina bambusae bengalensis* : Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 300.

Material : Apterous viviparous females.

Distribution : India : Assam, Manipur, Sikkim, West Bengal and Northeast India.

Remarks : This aphid forms dense colonies on the leaf bases of host plant during March-May in India. It leads to a monoecious anholocyclic life cycle on bamboo. Black ants usually attend the aphids. In hilly region it has been recorded between altitude C 600m and 1500m.

This subspecies differs from nominate species from Java in having longer frontal hairs (exceeding 0.05mm) and antennal segment III being longer than frontal horns.

Genus 62. ***Ceratovacuna*** Zehntner

Key to th species of the genus *Ceratovacuna*

1. Dorsum of abdomen with spinal wax gland cell groups; dorsal abdominal hairs with normal or swollen apices ..... ***silvestri***

– Dorsum of abdomen without spinal wax and pleural wax gland cell groups 2

2. Longest hair on a.s. III 0.9-1.0 times as long as b.d. III; dorsal cephalic hairs 1.2-1.5 times as long as b.d. III ..... ***lanigera***

– Longest hair on a.s. III up to 1.3-2.0 times as long as b.d. III; dorsal cephalic hairs upto 4 times as long as b.d. III ..... ***spinulosa***

120. ***Ceratovacuna lanigera*** Zehntner

1897. *Ceratovacuna lanigera* Zehntner, *Meded. Profester Java (NS)*, **33** : 29.

1988. *Ceratovacuna lanigera* Zehntner : Ghosh, A. K., Fauna of India: Homoptera : Aphidoidea, pt. **4**, Subfamily Harmaphidinae : 15.

Material : Apterae and alatae, on *Saccharum officinarum*, Manipur : Uripok, 20.vii.1972, Coll. T.K. Singh.

Distribution : India : Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, Tripura, Uttar Pradesh and West Bengal

Elsewhere : Africa; Formosa; Indonesia; Japan; Nepal; Philippines

Remarks : The species is of common occurrence in the sugarcane growing areas like northeastern region and Uttar Pradesh. Recently it's infestation on sugarcane has taken epidemic form in Southern India with special reference to Maharashtra State.

121. ***Ceratovacuna silvestri*** (Takahashi)

1927. *Oregma silvestri* Takahashi, *Bull. Lab. zoo!. Gen. Agric. Pacific*, **20** : 148.

1969. *Ceratovacuna silvestri*: Tao, Sci. *Yb, Taiwan Mus.*, **12** : 64.

1988. *Ceratovacuna silvestri*: Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 325.

Material : Apterous viviparous females from *Bambusa arundinacea*

Distribution : India : Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, Tripura, West Bengal

Elsewhere : China

Remarks : The species was originally described from dark brown aphids from dense colonies on under surface of Bamboo. It secretes honey dew, resulting in the formation of sooty moulds. Recently, detailed biology of *Ceratovacuna silvestri* and its predator *Anioslemnia dialatata* on Bamboo in Tripura has been worked out by Agarwala, Saha and Ghosh, A.K. (1984). The species is so far known from only the North Eastern States of India.

Genus 63. ***Glyphinaphis*** van der Goot

122. ***Glyphinaphis bambusae*** van der Goot

1917. *Glyphinaphis bambusae* van der Goot, *Contr. Fauna Indes neerl.*, **1**(3) : 232.

1988. *Glyphinaphis bambusae* : Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Harmaphidinae : 349.

Material : Nymphs and apterous viviparous females.

Host plant : Bamboo (N.O. Poaceae)

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal

Elsewhere : Indonesia

Remarks : According to Ghosh, A.K. (1988) the species usually infests tender shoots of Bamboo and *Thysanolaena maxima* and form large colonies. This species is attended by ants. Ghosh, A.K. *(op. cit.)* also observed that apterous generations appear to be much more predominent.

Genus 64. ***Pseudoastegopteryx*** Ghosh, Pal and Raychaudhuri

123. ***Pseudoastegopteryx himalayensis*** Ghosh, Pal and Raychaudhuri

1974. *Pseudoastegopteryx himalayensis* Ghosh, M.R., Pal, P.K. and Raychaudhuri, D.N., *Proc. zool. Soc. Calcutta*, **27** : 109.

1988. *Pseudoastegopteryx himalayensis* : Ghosh, A.K., Fauna of India: Homoptera : Aphidoidea, pt. **4**, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 355.

Material : Apterous and alate viviparous females.

Host plant : Bamboo (N.O. Gramineae)

Distribution : India : Manipur, Nagaland, Sikkim, West Bengal

Elsewhere : Indonesia

Remarks : This is an endemic species originally described from Darjeeling area of West Bengal. It infests undersurface of leaves of Bamboo mostly during February-March and again in September-October. The colony remains covered with scanty powdery secrertion. The species is so far known only from the northeastern belt of the country.

Genus 65. ***Pseudoregma*** Doncaster

Key to the species of the genus *Pseudoregma*

1(2) Wax gland cell groups present but variably distributed over body 3

2(1) Wax gland cell groups absent. Head and body with numerous small wax pores; frontal horns short, bluntly conical, u.r.s. up to 0.7 times as long as h.t.2 ..... *bucktoni*

3(4) Wax gland groups present on cephalothorax and abdomen, sometimes these may be ill-developed on anterior tergites or on head; frontal horns short, rounded at apex .... *panicola*

4(3) Head, thorax and basal abdominal segments without well developed wax glands; frontal horns long, stout and sharply pointed at apex, curved ..... *alexandri*

124. ***Pseudoregma alexandri*** (Takahashi)

1924. *Oregma alexandri* Takahashi, *R. Aphididae of Formosa*, **3** : 81.

1988. *Oseudoregma alexandri* : Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. **4**, Subfamilies, Phloemyzinae, Anoeciinae and Hormaphidinae : 386.

Material : Apterae and nymphs, from Bamboo, Manipur : Keithelmanbi, 14.i.1974, Z.S.I., Coll.

Distribution : India : Manipur, Meghalaya, Nagaland, Sikkim and West Bengal

Elsewhere : Nepal and Taiwan

Remarks : Originally described under *Oregma.* The species was transferred to *Pseudoregma* by A.N. Basu (1968).

125. ***Pseudoregma bucktoni*** Ghosh, Pal and Raychaudhuri

1893. *Oregma bambusae* Buckton, *Indian Mus. Notes,* **3** : 7.

1966. *Pseudoregma bambusicola* Doncaster, *The Entomologist,* **99** : 159.

1974. *Pseudoregma bucktoni* Ghosh, M.R., Pal, P.K. and Raychaudhuri, D.N., *Proc. zool. Soc. Calcutta,* **27** : 113.

1988. *Pseudoregma bucktoni* : Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. 4, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 373.

Material : Apterous viviparous females on Bamboo, India : Manipur : Tongon, 23.i.1977, Z.S.I., Coll.

Distribution : India : Karnataka, Manipur, Meghalaya, Sikkim, Tamilnadu and West Bengal

Elsewhere : Sri Lanka; Taiwan; Vietnam

Remarks : The species infests stems and young leaves of *Bambusa arundinacea* and other indet Bamboo species and produces copious honey dew. Ghosh, A.K. (1988) discussed the taxonomic position of species.

126. ***Pseudoregma panicola*** (Takahashi)

1918. *Oregma panicola Takahashi, Aphididae of Formosa,* **1** : 90.

1969. *Pseudoregma panicola* : David and Rajasingh, *Proc. zool. Soc. Calcutta,* **22** : 156.

1988. *Pseudoregma panicola* : Ghosh, A.K., Fauna of India : Homoptera : Aphidoidea, pt. 4, Subfamilies Phloemyzinae, Anoeciinae and Hormaphidinae : 386.

Material : Apterous viviparous females on Poaceae, Coll. A.K. Ghosh (ZSI).

Distribution : India : Arunachal Pradesh, Manipur, Meghalaya, Sikkim, Tamilnadu and West Bengal.

Elsewhere : Australia; Africa; Cuba; Formosa; Japan; Mauritus; New Zealand.

Remarks : The species was originally described from Taiwan, infesting *Panicum patens.* In the Indian region its hosts include *Andropogon* sp., *Bambusa* sp., *Capillipedium assimilae, Eragrostic* sp., *Oblismenus compositus, Panicum* spp. and indet grass and Bamboo. The wax-covered aphids constitute dense colonies on leaves of the host plants.

Subfamily VI. LACHNINAE

Key to the Tribes of Subfamily LACHNINAE

Ultimate rostral segment blunt, rostral segment 5 reduced; siphunculi always on hairy cones; forewings often with pigmentation, radius of forewing curved and of moderate length; rostrum longer than body ..... **Lachnini**

– Ultimate rostral segment usually acuminate, distinctly divided into segment 4 and 5; forewings usually hyaline; radius of forewing straight and short; rostrum not longer than body ..... **Cinarini**

Tribe **Cinarini**

Key to the genera of the Tribe Cinarini

1. Body round; epicranial suture usually distinct; u.r.s. pointed, distinctly divided into segment 4 and 5 ..... ***Cinara***

– Body elongate; epicranial suture obscure; u.r.s. short and segment 5 indistinctly seperated from segment 4 2

2. First tarsal segment of hind leg with dorsal hair, primary rhinarium without chitinised rim.. ..... ***Eulanhnus***

– First tarsal segment of hind leg without dorsal hair; primary rhinarium with chitinised rim .....***Schizolachnus***

Genus 66. ***Cinara*** Curtis

127. ***Cinara atrotibialis*** David and Rajasingh

1968. *Cinara atrotibials* David and Rajasingh, *Oriental Ins.*, **2**(1) : 103.

1982. *Cinara atrotibials* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, Subfamily Lachninae : 20.

Material : Apterous viviparous females on *Pinus* sp.

Distribution : India : Himachal Pradesh, Manipur and Meghalaya.

Remarks : The aphids normally remain confined to the base of the needle in young growing shoots.

Genus 67. ***Eulachnus*** del Guercio

128. ***Eulachnus thunbergii*** Wilson

1919. *Eulachnus thunbergii* Wilson, *Ent. News*, **30** : 3.

1982. *Eulachnus thunhergii* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, Subfamily Lachninae : 69.

Material : Apterous viviparous females on Pine.

Distribution : India : Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland.

Elsewhere : Australia; Formosa; Japan and Korea

Remarks : The species has been recorded to infest *Pinus* spp. from elsewhere. It is usually recognisable by the dirty green to brown-coloured colony on the pine needles. Sexuales are yet to be recorded from India though the same are known from Japan.

Genus 68. ***Schizolachnus*** Mordvilko

129. ***Schizolachnus orientalis*** (Takahashi)

1924. *Unilachnus orientalis* Takahashi, Rept. *Dept. Agric. Govt. Res. Inst.* **10** : 74.

1982. *Scxhizolachnus orientalis* : Ghosh, A.K. Fauna of India, Homoptera: Aphidoidea, Subfamily Lachninae : 75.

Material : Apterous viviparous females on *Pinus kesiya*, Manipur : Langol Hill, 12.i.1976, Coll. T.K. Singh.

Distribution : India : Manipur

Elsewhere : China; Formosa and Japan

Remarks : The species is originally described from Manipur and so far known only from the State.

Tribe **Lachnini**

Genus 69. ***Lachnus*** Burmeister

130. ***Lachnus tropicalis*** (van der Goot)

1916. *Pterochlorus tropicalis* van der Goot, *Rec. Indian* Mus., **12** : 3.

1950. *Lachnus tropicalis* Takahashi, *Annls. Ent. Soc. Amer.*, **45** : 592.

1982. *Lachnus tropicalis* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, Subfamily Lachninae : 91.

Material : Apterous viviparous females on *Quercus sp.*

Distribution : India : Manipur, Meghalaya and Sikkim

Elsewhere : China; Indonesia; Japan; Korea and Vietnam

Remarks : The species was originally described from Assam (India) and so far restricted to Northeastern states of the country. It is common on plants belonging to Natural Order Fagaceae.

Subfamily VII. PEMPHIGINAE

Key to the Tribes of Subfamily PEMPHIGINAE

1(2) Siphunculi present as cones or as rings, surrounded by a few hairs; wax glands present, composed of a row of cells surrounding a central space; tarsi in apterae 1-2 jointed ..... **Eriosomatini**

2(1) Siphunculi absent or very indistinct, without hairs; wax glands may be present or absent, if present, composed of a row of cells appressed together without any central space; tarsi in apterae usually 2-jointed 3

3(4) Wax gland group in apterae each bearing a hair; u.r.s. with a few or without accessory hair; secondary rhinaria in alatae strongly transverse and narrow or may be reticulated; cauda with anocaudal process ..... **Pemphigini**

4(3) Wax gland absent or insconspicuous, in apterae never with hair; u.r.s. with 2 to many accessory hairs; secondary rhinaria in alatae round, oval or transversely oval; cauda never with anocaudal process ..... **Fordini**

Tribe. **Eriosomatini**

Genus 70. ***Tetraneura*** Hartig

131. ***Tetraneura (Indotetraneura) basui*** Hille Ris Lambers

1968-69 *Tetraneura (Indotetraneura) basui* Hille Ris Lambers, *Boll. zool. agri. Bachic.* Ser. II, **9** : 44.

1984. *Tetraneura (Indotetraneura) basui* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, pt. **3**, Subfamily Pemphiginae : 86.

Material : Apterae on grass root, Kerbul, Manipur,10.iv.1974; alate, on Grass root, Manipur : Imphal, 1.iv.1974, C.U. Coll.

Distribution : India : Manipur, Nagaland, Sikkim and West Bengal

Remarks : Ghosh, A.K. (1984) discussed the taxonomic affinity with the related species. The species is so far known only from North East Indian States.

132. ***Tetraneura (Tetraneurella) nigriabdominalis*** (Sasaki)

1899. *Schizoneura nigriabdominalis* (Sasaki), *Manual of Insect. Pests of Crops in Japan*: 435.

1971. *Tetraneura nigriabdominalis* (Sasaki) : Chakrabarti, Ghosh and Raychaudhuri, *Sci. Cult.*, **37**: 247.

1984. *Tetranellra (Tetraneurella) nigriabdominalis* (sasaki) : Ghosh, A. K. Fauna of India, Homoptera: Aphidoidea, pt. **3**, Subfamily Pemphiginae : 111.

Material : Alate in Y.P.T., Manipur : Uripok, 30.i.1972.

Distribution : India : Manipur and widely distributed

Elsewhere : Africa; Australia; Japan; Malaya; Pakistan; Taiwan.

Key to the Genera of Pemphigini

Secondary rhinaria in alatae reticulated; antennae 5-segmented in alatae, 4-5 segmented in apterae; wax glands subcircular to oval ..... *Formosaphis*

– Secondary rhinaria in alatae narrow and transverse, head never with frontal prominences; a.s. III-IV with secondary rhinaria; abdominal wax groups well developed; dorsal hair short or sparse or long and numerous ..... *Prociphilus*

Genus 71. ***Formosaphis*** Takahashi

133. ***Formosaphis micheliae*** Takahashi

1925. *Formosaphis micheliae* Takahashi, *Rep. Govt. Res. Inst. Dep. Agric. Formosa,* **4** : 53.

1984. *Formosaphis micheliae* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, pt. **3**, Subfamily Pemphiginae : 178.

Material : Apterae, C.U. Coll.

Distribution : India : Manipur and West Bengal

Elsewhere : Formosa and Japan

Remarks : Ghosh, A.K. (1984) asserts that the species appears to be common in localised area of Darjeeling District of West Bengal on plant family Magnoliaceae.

Genus 72. ***Prociphilus*** Koch

134. ***Prociphilus cornifoliae*** Singh, Das and Raychaudhuri

1977. *Prociphilus cornifoliae* Singh, T.K., Das. B. and Raychaudhuri, D.N., *Entomon,* **2**(2) : 221.

1984. *Prociphilus cornifoliae* : Ghosh, A.K. Fauna of India, Homoptera: Aphidoidea, pt. **3**, Subfamily Pemphiginae : 255.

Material : Aptera, on *Cornus* sp. Manipur : Mao, 15.iv.1974, C.U. Coll.

Distribution : India : the species is known so far only from Manipur.

Elsewhere : Nepal

Remarks : According to Ghosh, A.K. (1984) the species appears to be found in high altitude areas of Nepal and Eastern India, (*Ca* 1400m to 2130m).

Key to the genera of the Tribe Fordini

1(2) Primary and secondary rhinaria without any cilia; head ventrally sclerotised along the margin of eyes in alatae; antennae 5-6 segmented in apterae, 6 segmented in alatae; F.T.C. 5 : 5 : 4; dorsal hairs fine; rhinaria without sclerotised rim. ..... ***Smynthuroides***

2(1) Primary or secondary rhinaria variable, ciliated; head never sclerotised as above....3

3(4) Head often reticulated in apterae; spinal wax gland groups on abdomen (in alatae) less coherent; F.T.C. 3 : 3 : 3; secondary rhinaria in alatae round and oval, protuberant, always present on a.s. III, variable so on IV V; cephalic hairs in apterae broadened at apices, in alatae blunt ..... ***Geoica***

4(3) Head without reticulation in apterae; spinal wax gland groups on abdomen (in alatae) regular, coherent; F.T.C 4 : 4 : 4 or 5 : 5 : 5; cephalic hairs not as above... ***Chaetogeoica***

Genus 73. ***Chaetogeoica*** Ramaudiere and Tao

Key to the species of the genus *Chaetogeoica*

Body pubescent; u.r.s. shorter (1.2-1.4 times h.t.2) and bearing 4 accessory hairs..... ..... *polychaeta*

– Body not pubescent; u.r.s. longer (1.7-2.1) times h.t.2) and bearing 5-6 hairs .... *graminiphaga*

135. ***Chaetogeoica graminiphaga***
Raychaudhuri, D.N., Pal, P.K. and Ghosh

1978. *Chaetogeoica graminiphaga* Raychaudhuri, D.N., Pal, P.K. and Ghosh, MR, *Entomon.* 3(2) : 242.

1984. *Chaetogeoica graminiphaga* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, pt. 3, Subfamily Pemphiginae : 359.

Material : 2 apterae and nymphs, from the root of Grass, Manipur : Kanglep, 4.iv.1974, C.U. Coll.

Distribution : India : Manipur, Sikkim and West Bengal

136. ***Chaetogeoica polychaeta***
Raychaudhuri, Pal and Ghosh

1978. *Chaetogeoica polychaeta* Raychaudhuri, D.N., Pal, P.K. and Ghosh, M.R., *Entomon.* 3(2) : 245.

1984. *Chaetogeoica polychaeta* : Ghosh, A.K. Fauna of India, Homoptera : Aphidoidea, pt. 3, Subfamily Pemphiginae : 366.

Material : 2 apterae, from root of *Cynodon dactylon,* Manipur : Morang, 12.,iv.1970, C.U. Coll.

Distribution : India : Manipur and West Bengal

Remarks : The species is so far known only from the Eastern India.

Genus 74. ***Geoica*** Hart

137. ***Geoica lucifuga*** (Zehntner)

1898. *Tetraneura lucifuga* Zehntner, *Arch. Suikerind Ned. Ind.,* **6** : 555.

1990. *Geoica lucifuga* : Raychaudhuri, D.N., Pal. P.K. and Ghosh, A.K., Aphids of North East India and Bhutan: 420.

Material : Aptetae, on *Cynodon dactylon.* Mampur : Mao, 14.iv.1974, C.U. Coll.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal

Elsewhere : Australia; Central Asia; China; Java; Malaya; Middle East and Philippines

Remarks : In Northeast India apterae are found throughout the year on roots of grasses growing in semi-dry to sandy loam soil up to altitude of *Ca* 2200m. Ants attend the aphids.

Genus 75. ***Smynthurodes*** Westwood

138. ***Smynthurodes betae*** Westwood

1849. *Smynthurodes betae* Westwood, *Gdnr' chron..* 7, vii: 240.

1984. *Smynthurodes betae* : Ghosh, A.K. Fauna of India, Homoptera: Aphidoidea, pt. 3, Subfamily Pemphiginae : 406.

Material : Apterae, on indet Grass, Manipur : Leimakhong, 3.v.1974, C.U. Coll.

Distribution : India : Manipur and West Bengal

Remarks : The species is hitherto known only from Northeast India. It causes serious damage to beans and other vegetables.

SUMMARY AND CONCLUSION

A retrospect of the work reveals that a total of 138 species/subspecies of aphids belonging to 75 genera under 7 Subfamilies of the family Aphididae occur in the State of Manipur. Here the family Aphididae includes Anoeciinae, Aphidinae, Depanosiphinae, Greenideinae, Hormaphidinae, Lachninae and Pemphiginae. An attempt has been made to present a comprehensive account of the aphid fauna of Manipur in this contribution.

The analysis of the host plant association of the Manipur aphids clearly depicts polyphagism for some of these species and host restriction for quite a few. Analysis of the collection data also reveals that majority of the species are available during September-February. This is probably because of rich vegetation after monsoon on one hand and low temperature on the other. Moreover, host specificity could be found not only for some species but also for some of the genera like *Pentalonia, Cryptosiphum, Rhodobium, Formosaphis Shivaphis* etc.

A critical analysis of the data also reveals that aphids of Manipur constitute about 3% of the total species known from the World, 13.7% of species from the Oriental and 22% of the species from th Indian fauna.

The state of Manipur represents a rather rich aphid fauna and these insects resemble more closely the Oriental fauna. Moreover, the present work will help in extending the knowledge of distribution of already known species.

A perusal of available literature till date reveals that the maximum intrusion of these plant lice has taken place from Eastern Palaearctic region and from the countries of South East Asia. The diverse climatological conditions together with rich floral assemblage prevailing in the state of Manipur and Eastern Himalaya has helped these insects to represent 3% of World Fauna and 22% of Indian Fauna.

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INSECTA : HEMIPTERA : HETEROPTERA : COREOIDEA

R. C. BASU and S. C MITRA

Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Coreids are commonly known as the leaf-footed bugs. They are phytophagous in nature and include some pests of cultivated plants. This superfamily includes four families *viz.*, Alydidae, Coreidae, Rhopalidae and Stenocephalidae. Among these, members belonging to the family Coreidae are important pests of crops. In Manipur the coreid species mostly belong to families Alydidae and Coreidae.

The Stenocephalidae and the Rhopalidae, the most primitive among Coreoidea is also reported by Schaefer (1965) on the basis of series of character which he studied. The representatives of the family Stenocephalidae are probably the most primitive from similar ancestors probably arose Rhopalids. Similar ancestors probably gave rise on one hand to Alydids and on the other hand the most advanced Coreidae. This conclusion goes hand in with the findings of Schaefer (1965) and Ahmed and Shadab (1975).

Coreid fauna in the oriental region comprises of 212 species and according to Distant (1918) the Indian Fauna pertains to 148 species belonging to 53 genera which is about 11% of the World fauna.

Record of coreid fauna from the State of Manipur is mainly done by the Distant (1904, 1908 and 1918) The material through the faunistic surveys and those lying in the National Zoological Collection could be studied. It pertains to 37 species under 19 genera which are dealt with in this present paper.

MATERIAL AND METHOD

Coreids like most of the hemipteran insects are phytophagous in nature and occur on agricultural fields, vegetables gardens, crop field etc. As these insects are weak fliers like other hemipterans insects they are being collected by sweeping the habitat with insect net or by hand picking with forceps and light trapping during night time.

The collected materials are killed in a killing jar usuing benzene or chloroform vapour and preserved dry with paradichlorobenzene and napthelene. The insects are kept in the insect envelops and labelled properly mentioning locality, altitude, date of collection and name of the collector with ecological notes etc. In the laboratory the specimens are set, pinned and mounted to display properly for easy handling under binocular microscope during the process of identification. For detailed specific identification the genital structures are also dissected out and mounted on slides for further study.

SYSTEMATIC ACCOUNT

List of coreid species studied from the State of Manipur are provided in this paper as given below. Species with asteric marks indicates as new record from the State.

Superfamily COREOIDEA

Family ALYDIDAE

Subfamily LEPTOCORISINAE

Genus ***Leptocorisa*** Latr. 1825

1. *Leptocorisa acuta* (Thunberg)

Subfamily PSEODOPHLOENAE

Genus *Clavigralla* Signoret

2. *Clavigralla horrens* Distant

Subfamily 2 ALYDINAE

Genus ***Riptortus*** Stal 1859

3. *Riptortus linearis* (Fabricius)
4. *Ritortus strenus* (Horvath)
5. *Riptortus fuscus* (Fabricius)
6. *Riptortus pedestris* (Fabricius)

Family COREIDAE

Subfamily COREINAE

Genus ***Daladar*** Amy. & Serv.

7. *Daladar planiventris* (Westwood)

Genus ***Petilla*** Stal

8. *Patilla calcer* (Dallas)
9. *Petilla lobipes* (Westwood)
10. *Petilla notatipes* Walker
11. *Petilla palulicollis* (Walker)

Genus ***Petalocnemis*** Stal 1853

12. *Petalocnemis obscura* Dallas

Genus ***Helcomeria*** Stal 1873

13. *Helcomaria spinosa* Signoret

Genus ***Prinolomia*** Stal 1873

14. *Prinolomia fulvicornis* (Fabricius)
15. *Prinolomia gigus* Distant

Genus ***Ochrochira*** Stal 1873

16. *Ochrochira biplagiatase* (Walker)
17. *Ochrochira albiditarsis* (Westwood)

Division MICTARIA

Genus ***Mictis*** Leach 1814

18. *Mictis tenebrosa* (Fabricius)

Genus ***Anoploenemis*** Stal 1973

19. *Anoplocnemis phasiana* (Fabricius)

Tribe CLORESNINI

Genus ***Cloresmus*** Stal 1859

20. *Cloresmus antenotus* Distant

Genus ***Notobitus*** Stal 1859

21. *Notobitus meleagris* (Fabricius)

Tribe **Gonocerini**

Genus ***Cletus*** Stal 1859

22. *Cletus bipunctatus* (Westwood)
23. *Cletus punctulatus* (Westwood)

Genus ***Cletomorpha*** Mayer 1988

24. *Cleotomorpha raja* Distant

Genus ***Homoeocerus*** Burmeister 1835

25. *Homoeocerus albiguttulus* Stal
26. *Homoeocerus inornatus* Stal
27. *Homoeocerus simiolus* Distant
28. *Homoeocerus serrifer* (Westwood)
29. *Homoeocerus signatus* (Walker)
30. *Homoeocerus stricornis* Scott
31. *Homoeocerus variabilis* Dall
32. *Homoeocerus walkeri* Kirby

Genus ***Physomerus*** Burmeister 1835

33. *Physomerus grossipes* (Fabricius)

Genus ***Acanocornis*** Amyot & Serville

34. *Acanthocornis scabrator* (Fabricius)

Subfamily CORIZINAE

Genus ***Serinatha*** Stal 1837

35. *Serinatha abdominalis* Fabricius
36. *Sertnatha augur* (Fabricius)
37. *Serinatha rufomarginata* (Fabricius)

GENERAL DIAGNOSIS OF THE SUPERFAMILY COREOIDEA

The coreid bugs are generally medium to large insects, head much narrower than pronotum, antennae four-segmented, inserted well on sides of the head, ocelli present and rostrum are four segmented. Clavus of wing extending beyond scuttellum. Scent glands opening on thorax conspicuous. Mostly dull-coloured and capable of producing pungent scent, in some genera they exhibit extraordinary dialation of the antennae, many species have flattened and leaf-like legs called leaf-footed bugs. A few species are known to be predaceous also.

Key to the families of superfamily COREOIDEA found in Manipur

Bucculae short, not extending to the insertion of antennae, pronotum posteriorly slightly longer than the head along the mid longitudinal axis; scutellum not reaching the base of metanotum and generally narrower than the : interocular space ..... ALYDIDAE

Bucculae long, extending to near insertion of antennae, pronotum posteriorly three times or more longer than head along the mid longitudinal axis; scutellum reaching or surpassing the base of metanotum and generally broader than the interocular space .....COREIDAE

Key to the subfamilies of ALIDIDAE

1(2) Odoriferous orifices distinct; dorsal surface of 4th and 5th abdominal segments at bases medially sinuate 3

2(1) Odoriferous orifices usually indistinguishable ..... LEPTOCORIXINAE

3(4) Bucculae usually long as extending to near insertion of antennae; pronotum posteriorly usually thrice or more than twice the width of head; dorsal surface of first abdominal segment posteriorly truncated; scutellum reaching or passing base of metanotum.... ..... PSEUDOPHLOENAE

4(3) Bucculae small, short, placed before insertion of antennae; pronotum posteriorly not or slightly broader than width of head; dorsal surface of first abdominal segment: posteriorly rounded; scutelum frequently; not reaching base of metanotum .... ALYDINAE

Subfamily LEPTOCORISINAE

Genus ***Leptocorisa*** Latr.

1825. *Leptocorisa* Latr. *Fam. Nat.*. **3** : 86.

Type species: *Leptocorisa tipuloides* del Geer

1. ***Leptocorisa acuta*** (Thunb.)

1883. *Climex acuta* Thunb. *Nov. Ins.* sp. **2** : 34.

1904. *Leptocorisa acuta* : Distant, *Fauna Brit. India* **1** : 410.

Material examined : 5 exs., Imphal, 20.x.1993, Coll. K. K. Roy

Diagnosis Character : Body above brownish, beneath pale greenish, antennae fuscous, base of second, third and fourth joint luteus, a small distinct tubercle near each lateral pronotal angle, a distinct central carinate line to pronotum.

Distribution : Manipur, Other Indian States, Assam, Bihar, Karnataka, Meghalaya, West Bengal, Tamil Nadu and Sikkim.

Elsewhere : China and Islands of Malaya Archipelago.

Remarks : Generally infest on paddy and Millet crop.

Subfamily PSEUDOPHLOENAE

Genus ***Clavigralla*** Signoret

2. ***Clavigralla horrens*** Dohrn

1860. *Clavigralla horrens* Dohrn, *Stett ent., zeit. xxi,* : 403. Distant, *Fauna, Brit. India.*

Material examined : 6 exs., Manipur : Imphal 1065m. l.xi.1945, Coll. M. L. Roonwal.

Diagnostic Character : Head, pronotum and secutellum brownish ochraceous, coarsely punctate, somewhat granulose, moderately pilose; corium ochraceous, its apex castaneous; connexivum ochraceous with castaneous spots; legs luteus, apical areas of the posterior femora and bases and apices of posterior tibiae castaneous, each femur with a luteous spot before apex; body beneath obscure brownish-ochraceous, the lateral area of sternum and abdomen distinctly marked with cretaceous, abdomen more or less suffused with ochraceous; pronotum with two more or less distinct central longitudinal ridges, the lateral angular spines long, black; antennae ochraceous, the apical joint a little darker, second joint slightly longer than the third, posterior femora longly spined beneath near apex; lateral angles of the posterior segments strongly spined.

Length : 7 mm; breadth between pronotal angles 3 mm.

Distribution : Manipur : States in India : Assam; Maharashtra (Mumbai); Sikkim.

Elsewhere : Burma, Ceylon.

Subfamily ALYDINAE

Genus ***Riptortus*** Stall

1859. *Riptortus* Stal, *Ofv. vet..Ak. Forth.*, : 460.

Type species: *Riptortus dentipes* Fabricius.

Key to the species of the genus *Riptortus*

1(2) Partial or total absence of the pale laevigate sternal spots which even when present are small and usually obliterated on the metasternum ..... *fuscus*

2(1) Sternal spots always present and very prominent 3

3(4) Pronotal disk with no distinct rugocities, lateral pronotal spines not acute, and small ..... *linearis*

4(3) Pronotal disk with scattered rugocities; lateral pronotal spines acute and long 5

5(6) Body cinemon brown, one single long lateral pronotal spine on each angle; posterior femur with thick row of ventro-lateral spines ..... *strenuus*

6(5) Body dark brown ochraceous; one moderately long and another small-two spines on lateral pronotal angle on each side; posterior femur with moderate spine row on ventro-lateral side ..... *pedestris*

3. ***Riptortus fuscus*** (Fabr.)*

1798. *Lygaeus fuscus* Fabr. *Ent. Syst. Suppl.*, 539.

1904. *Riptortus fuscus* Fabr.; Distant *Fauna Brit. India*, 1 : 414.

Material examined : 2 exs., Bishnupur, Sandra, 1993. Coll. M. S. Shishodia.

Diagnostic characters : Closely allied to *Riptortus pedestris* but slightly differs from it by the partial or total absence of and usually obliterated on the metasternum.

Distribution : Manipur; Other States in India : Assam, Bihar, Kerala, Maharashtra, Uttar Pradesh, West Bengal.

Elsewhere : Burma, Ceylon, Malay peninsula.

Remarks : Infest on pigeonpea or red gram *(Cajanus cajan)* *The species is recorded for the first time from the State.

4. ***Riptortus linearis*** (Fabricius)

1775. *Lygaeus linearis* Fabricius, *Syst. Ent.*, : 710.

1904. *Riptortus linearis* : Distant. *Fauna Brit. India* 1 : 415.

Diagnostic character : Dark cinnamon brown, pronotum, scuttelum, corium and lateral areas of sternum distinctly punctate; first second and third joint of antennae, fascia at base of head between eyes, central fascia to head beneath, lateral angular spines to pronotum, disk or sternum and abdomen black, a sublateral laevigate pale ochraceous fascia margined with black on each side of head and sternum; lateral areas, base, and some spots on discal black of abdomen, luteous, a small spot at the middle of posterior pronotal margin and the apex of the scutellum, pale luteous. Adult insects may be up to 14-16 mm in length.

Material examined : 2 exs. Imphal. 14.v. 1993, Coll. B. Mitra.

Disiribution : Manipur : Other States in India : Meghalaya, Karnataka, West Bengal.

Elsewhere : Burma, Malayan Archipelago, Sri Lanka.

5. ***Riptortus pedestris*** (Fabricius)

1775. *Lygaeus pedestris* Fabricius, *Syst. Ent.* 727.

1904. *Riptortus pedestris* : Distant, *Fauna Brit. India* 1 : 414

Material examined : 2 exs., Ukhrul, 28.ix.95, Coll. M.S. Shishotia.

Diagnostic characters : Dark brownish ochraceous, finely and obscurely pilose; posterior margin of the pronotum and a lateral fascia on each side of the head, not extending beyond base of antennae, dark castaneous posterior thickly mottled with reddish brown, posterior tibiae with

the bases and reddish brown, lateral pronotal spine black.

Distribution : Manipur , Other States in India : Karnataka, Maharashtra, Uttar Pradesh, West Bengal and Sikkim.

Elsewhere : Burma, Sri Lanka, Malay Peninsula.

Remarks : This coreid species generally infests on various crops and vegetables like pigeonpea or red gram, wheat, black gram, cow pea and also on cardamom.

6. ***Riptortus sternus*** Horvath

1889. *Riptortus sternus* Horvath, *Term. Fuzetek.* : 35.

1904. *Riptortus sternus* : Distant, *Fauna Brit. India,* **1** : 415.

Material examined : 3 exs., Manipur : 1890m., 3.x.1975, Coll. M. S. Shishodia.

Diagnostic characters : Cinnamon brown, greyish silky, antennae unicolorous, body concolorous with head with the vertex behind eyes and between ocelli and eyes blackhead, beneath, a long spine at the lateral fronal angles, disks of sternum and abdomen black, a lateral fascia to head and sternum pale luteous, abdomen with the base and lateral areas pale luteous, a median broad black vitta on each side and at apex of fourth and fifth segments angularly produced, posterior femora beneath and apices of posterior tibiae black, rostrum extending to the intermediate coxae.

Adult about 13.5 mm in length.

Distribution : Manipur : Other States in India : Meghalaya, NEFA, Uttar Pradesh, Sikkim.

Family COREIDAE

Key to the subfamilies of COREIDAE

Tibiae sulcated or dialated above; head near central lobe distinctly longitudinally impressed ..... COREINAE

Tibiae non sulcated and rounded above; dorsal surface of 4th abdominal segment at base and apex more or less medially sinuate ..... CORIZINAE

Key to the Divisions of subfamily COREINAE

1(2) Posterior femora rarely incrassate or spined ..... DALADERARIA

2(1) Posterior femora distinctly incrassated and more or less spinous or tuberculate 3

3(4) Posterior coxae much nearer to each other, not widely separated ..... DALADERARIA

4(3) Posterior coxae usually remote from each other 5

5(6) Posterior femora in males profoundly thickened; tibiae not dialated as above outwardly dialated in both sexes ..... MICTARIA

6(5) Posterior femora in males moderately thickened; tibiae not dilated as above ..... PHYSOMERARIA

Key to the genera of *Mictini*

Abdomen beneath in male distinctly tuberculate; posterior tibiae dentate on inner margin in male ..... *Mictis*

Abdomen beneath in male very strongly gibbously tuberculate; posterior tibiae not dentate in either sex ..... *Anoplocnemis*

Subfamily COREINAE

Genus ***Daladar*** Amy. and Serv.

1843. *Daladar* Amy. and Serv., Hem. 187.

Type species : Daladar acuticosta Amy. and Serv.

7. ***Daladar planiventris*** (Westwood)*

1842. *Acanonicus planiventris* Amy and Serv., in *Hope cat.* **2** : 8.

1904. *Daladar planiventris* : Distant, *Fauna Brit. India,* **1** : 352.

Material examined : 3 exs., Manipur : Moreh 600 m., 29.ix.1975. Coll. M. S. Shishodia.

Diagnostic characters : Frontal angles more horizontally and less lunately produced, their apices obtusely reduced and moderately denatate

before the anterior angles; the third joint of the antennae less broadly dialated.

Distribution : Manipur; Other States in India : Assam, Maharashtra, Tamil Nadu.

Elsewhere : Burma, Sri Lanka, Malaya Peninsula and Sumatra.

Remarks : *The species is recorded for the first time from the State.

Genus ***Petillia*** Stal

1865. *Petillia* Stal, *Hem., Afr.*, **2** : 2.

Type species : *Petillia tragus* Fabricius

8. ***Petillia petulicollis*** (Walker)*

1871. *Trematocoris patulicollis* Walker, *Cat. Het.*, 4: 37.

1904. *Petillia patulicollis* : Distant, *Fauna Brit. India*, **1** : 350.

Material examined : 3 exs., Manipur : Imphal, Lylong, 15.v.1993, Coll. B. Mitra.

Diagnostic Character : Pale brownish or brownish ochraceous moderately ochraceously pilose; pronotum finely darkly crenulate, the lateral angles broadly and somewhat convexly produced, their margins serrated and each terminating in a small spines directed backward; posterior tibiae dialated on inner margin and very irregularly dentate, broadest near base, and most strongly spined a little before apex.

Distribution : Manipur; Other States in India : Naga Hills, West Bengal, Sikkim.

Remarks : *The species is recorded for the first time from the State.

9. ***Petillia calcer*** (Dall.)

1852. *Myctis calcer* Dall, *List Hem.* **2** : 397

1904. *Petillia calcer* : Distant, *Fauna Brit. India* **1** : 351.

Material examined : 5 exs., Manipur : Bishnupur 22.x.1993. Coll. K. K. Roy.

Diagnostic characters : Pronotum with some scattered black tuberculous points and sometimes with distinct longitudinal dark fascie, the lateral margin darkly serrate, the lateral angles only moderately produced, their apices pointed and slightly directed backward; veins of the corium piceous; posterior femora incrassated more strongly so in males, with small scattered dark tubercles; obsolacely spined beneath, and with a broad black central and apical annulation; posterior tibiae inwardly dilated and strongly dentate.

Distribution : Manipur; Other States in West Bengal, Maharashtra, Nagaland, Sikkim.

Elsewhere : Burma, Sri Lanka and Philippines islands.

10. ***Petillia lobipes*** (Westwood)*

1842. *Myctis lobipes* Westwood, In *Hope Cat;*, **2** : 11.

1904. *Petillia lobipes* : Distant *Fauna Brit. India.*, **1** : 349.

Material examined : 3 exs., Manipur : Dimapur 2900m. 19.x.1945., Coll. M. L. Roonwal.

Diagnostic characters : Body above and legs pale brownish, moderately ochraceously pilose; pronotum with scattered black tuberculous spots on anterior area; posterior tibiae dentately dilated near base and then apinose to apex, the dentate dialation black with an ochraceous spot near base; body beneath with scattered small dark tuberculous spots, the surrounding areas of the intermediate and posterior coxae somewhat broadly piceous; antennae fuscous.

Distribution : Manipur; Other States in India: Maharashtra.

Elsewhere : China, Java and Pakistan

Remarks : *The species is recorded for the first time from the state.

11. ***Petillia notatipes*** (Walker)

1871. *Trematocoris notatipes* Walker in *Cat. Het.*, **4** : 34.

1904. *Petilla notatipes* : Distant. *Fauna Brit. India*, **1** :

Material examined : 2 exs., Manipur : Ukhrul, 1890m., 2.iii.1975, Coll. P. T. Cherian.

Diagnostic character : Very closely allied to *Petilla lobipes* but only differs in by the shorter and less produced pronotal angles in both the sexes. Adult with 20-22 mm. body length.

Distribution : Manipur; Other States in India : West Bengal, Calcutta, Sikkim.

Genus ***Petalocnemis*** Stal

1853. *Petalocnemis* Stal. *Ofe. Vet. Ak. Forth,* 259,

Type species : *Petlocnemis pachycera* Stal

12. ***Petalocnemis obscura*** Dallas

1852. *Petalocnemis obscura* Dallas, List. Hem. II : 518

1904. *Petalocnemis obscura* : Distant, *Fauna Brit. India* 1

Material examined : 3 exs., Manipur : Burma bazar, 600m, 30.ix.1975. Coll. M. S. Shishodia.

Diagnostic characters : Body obscure brownish ochraceous clothed with short hairs; pronotal angles broadly truncate; head and pronotum with a distinct central pale carinate line, body beneath and legs paler than, posterior femora incrassated with a double series of tuberculate on the inner area; anterior tibiae compressed, somewhat dialated with a double series of spinous tubercles on outer margin, intermediate tibiae tuberculate externally, posterior tibiae inwardly dialated and distinctly angulate near middle; antennae hirsute, the first, second and third joints concolorous with the body, apices of second and third joint black, apical joint brownish-ochraceous, its base paler. Adult one nearly 14 to 15 mm long.

Distribution : Manipur ; Other states in India : Meghalaya, Maharashtra, Sikkim.

Elsewhere : Sri Lanka.

Genus ***Helcomeria*** Stal

1873 *Helcomeria* Stal, *En. Hem.*, **3** : 40.

Type species: *Helcomeria spinosa* Signoret

13. ***Helcomeria spinosa*** Signoret

1851. *Helcomeria spinosa* Signoret, *Ann. Soc. ent., France,* : 123.

1904. *Helcomeria spinosa* : Distant, *Fauna Drit. India,* **1** : 336.

1919. *Helcomeria spinosa*: Paiva, *Rec. Indian Mus.,* **16** : 356.

Material examined : 3 exs., Manipur : Moreh., 600m., 28.ix.1975, Coll. M. S. Shishodia.

Diagnostic characters : Body elongate 34 to 38 mm long, anterior margin of pronotum strongly spined, lateral margins of the dialated processes more irregularly spinose, upper side finely tuberculated and rugose; posterior femora strongly tuberculate in both sexes, in male strongly spined before apex; posterior tibiae dialated on both sides, inwardly spined in male only; middle and anterior tibiae outwardly dialated.

Distribution : Manipur ; Other states in India : Assam, Nagaland, Sikkim

Genus ***Prionolomia*** Stal

1873. *Prionolomia* Stal, *En. Hem.* **3** : 37.

14. ***Princolomia fulvicornis*** (Fabricius)

1852. *Cimex fulvicornis* Fabricius, Mant., **2** : 288.

1904. *Prionolomia fulvicornis* : Distant, *Fauna Brit. India* : **1** : 338.

Material examined : 4 exs., Manipur : Vishnupur 25.x.1993. Coll. K. K. Roy.

Diagnostic characters : Adult about 26-28 mm in length, pronotum distinctly granulated anteriorly; lateral process of pronotum produced horizontally with the apices narrowed and obtusely pointed; posterior femora in male tuberculated on both above and beneath; posterior tibiae in male dialated on the inner side with prominently angulated.

Distribution : Manipur ; Elsewhere in India : Khasi & West Garo Hills.

15. ***Prionolomia gigas*** Distant

1879. *Prionolomia gigas* Distant, *Ann. Mag. nat. Hist.* **5** : 128

1904. *Prionolomia gigas*: Distant, *Fauna Brit. India* **1** : 337.

Material examined : 3 exs., Manipur, Imphal. 21.x.1993. Coll. K. K. Roy.

Diagnostic characters : Adult about 43mm in length, pronotum rugose and obscurely granulated; lateral process of pronotum produced somewhat upward and forward, gradually narrowed to the apex; posterior femora in the male tuberculated

above and prominently spined beneath near apex; posterior tibiae in male prominently dialated on both sides with strongly angulate beyond middle on the inner side.

Distribution : Manipur ; Other states in India : Meghalaya (Kashi Hills, West Garo Hills).

Elsewhere : Burma.

Genus ***Ochrochira*** Stal

1873. *Ochrochira* Stal, *En. Hem.*, **3** : 39.

Type species : *Ochrochira albiditaris* Westwood

Key to the species of the genus Ochrochira

1(2) Pronotum with distinct mid-longitudinal depression; pronotal angles more produced and dentation on the posterior margin of lateral angles; first and fourth antennal joints suequal in length, while second and third joints almost equal; male with posterior femoral spine on each more stronger and longer structure ..... *biplagiata*

2(1) Pronotum with insconspicuous or no midlongitudinal depression; pronotum with lateral margins prominently produced, strongly and coarsely dentated; posterior femur of male with prominent spine placed a little beyond the middle..... *albiditarsis*

16. ***Ochrochira albiditarsis*** (Westwood)

1842. *Myctis albiditarsis* Westwood, In *Hope Cat.*. **2** : 11.

1873. *Ochrochira albiditarsis;* Stal, *En. Hem.*, **3** : 44.

1904. *Ochrochira albiditarsis* : Distant, *Fauna Brit. India* : **1** : 343.

Material examined : 5 exs., Manipur : Chura Chandpur, 20.v.1993, Coll. B. Mitra.

Diagnostic characters : Body length 23 mm. breadth between pronotal angles 8 mm; other characters as in the key.

Distribution : India : Manipur; Other states in India: Himachal Pradesh, Meghalaya.

Elsewhere : Bangladesh.

17. ***Ochrochira biplagiata*** (Walker)*

1971. *Prionolomia biplagiata* Walker, *Cat. Het.*, **4** : 22.

1893. *Ochrochira biplagiata* : Distant, *Ann Mag. nat. Hist.*, **6**(12) : 121.

1904. *Ochrochira biplagiata* : Distant, *Fauna Brit India*, **1** : 343.

Material examined : 4 exs., Manipur : Churachandpur 19.v.1993. Coll. B. Mitra.

Diagnostic characters : Body above ochraceous; antennae, eyes lateral dentation to pronotum transverse striae to scubellum, membranous, body beneath and legs fuscous; apical joint of antennae and the tarsi pale ochraceous; pronotum with a somewhat distinct central longitudinal impression; other characters as in the key.

Distribution : India : Manipur; Other states in India: Meghalaya, West Bengal.

Elsewhere : Burma.

Remarks : *Both genus and species are the new record from the state.

Division MICTARIA

Genus ***Mictis*** Leach

Type species : *Mictis profana* Fabricius.

18. ***Mictis tenebrosa*** (Fabricius)

1787. *Cimex tenebrosa* Fabricius, *Mant.*, 2 : 288.

1904. *Mictis, tenebrosa* : Distant *Fauna Brit.* India, **1** : 344.

Material examined : 2 exs., Manipur : Ukhrul 1890 m. 4.x.1975. Coll. M. S. Shishodia.

Diagnostic characters : Greyish brown to brownish ochraceous; antennae, legs and body beneath somewhat darker in hue; abdomen above black with two large central ochraceous spots sometimes narrowly connected; pronotum with the lateral margins finely serrated, the lateral angles moderately, prominently subacutely rounded.

Distribution : India : Sikkim, Mongan; Other ststes in India : Assam, Meghalaya, West Bengal.

Elsewhere : Burma, China and Malay Peninsula.

Remarks : *Both the genus and species are recorded for the first time from the State.

Genus ***Anoplocnemis*** Stal

1973. *Aniplocnemis* Stal, *En. Hem.*, **3** : 47

Type species : *Anoplocnemis curvipes* (Fabricius)

19. ***Anoplocnemis phasiana*** Fabricius*

1781. *Lygaeus phasiana* Fabricius, Spec. Ins., 2 : 261

1904. *Anoplocnemis phasiana* : Distant, *Fauna Brit. India*, **1** : 346.

Material examined : 3 exs., Manipur : Moreh 600 m., 25.iii.1975. Coll. P. T. Cherian.

Diagnostic characters : Colour varies from ochraceous, castaneous: piceous or piceous with the corium castaneous, antennae fuscus or piceous with the apical joint ochraceous; extreme apex of scutellum ochraceous; posterior femora in male much curved at base then strongly incrassate inwardly broadly dentate near apex, in both sexes segmental margins are more or less distinctly ochraceous.

Distribution : India : Manipur; Other states in India : Assam, Meghalaya, Karnataka, Maharashtra, Naga Hills.

Elsewhere : Burma, Sri Lanka and Malay Peninsula.

Remarks : Mostly infest brinjal.

*The species is also recorded for the first time from the State.

Tribe **Cloresmini**

Key to the genera of the Tribe Cloresmini

1(2) Rostrum almost reaching the base of mesosternum; antennae with 1st, 2nd and 3rd joints of nearly equal length .... *Notobitus*

2(1) Rostrum not reaching the base of mesosternum; antennae with 1st joint shorter than the 2nd ..... *Cloresmus*

Genus ***Cloresmus*** Stal

1859. *Cloresmus* Stal *Ofv. Mant.*, **2** : 297.

Type species : *Cloresmus signoreti* Stal

20. ***Cloresmus antennatus*** Distant

1908. *Cloresmus antennatus* Distant, *Fauna Brit.* India, **4** : 471.

Material examined : 3 exs., Manipur, Burma bazar 600 m., 29.ix.1975, Coll. M. S. Shishodia.

Diagnostic characters : Body length 12-13 mm; antennal basal joints clothed with long hairs; rostrum reaching the anterior. coxae posterial femora conspicuously spined underside on the apical half other characters as in the key.

Distribution : India : Manipur Khasi Hills, Sikkim.

Genus ***Notobitus*** Stal

1859. *Notobitus* Stal *Ofv. vet., Ak., Forth.* : 451.

Type species : *Notobitus meleagris* Fabricius

21. ***Notobitus meleagris*** (Fabricius)

1787. *Cimex meleagris* Fabricius, *Mant.*, **2** : 297.

1835. *Menatopus meleagris* : Burmeister,. *Handb.* **2** : 337.

1904. *Notobitus meleagris* : Distant, *Fauna Brit. India*, **1** : 371.

Material examined : 2 exs., Manipur : Imphal, 14.v.1993, Coll. B. Mitra.

Diagnostic characters : Body length 22-25 mm, breadth between pronotal angles 6-7m posterior tibiae of male with inner margins strongly serrate, posterior femur of male on the inner side with strong and prominent spine p~aced a little beyond the middle and the fe~ur reaching considerably beyond the apex of the abdomen.

Distribution : India : Manipur; Other states in India: Maharashtra; Tamilnadu.

Elsewhere : Burma, China, Malaya Archipelago.

Tribe **Gonocerini**

Key to the the genera of the Tribe Gonocerini

1(2) Lateral angles of pronotum horizontally produced; abdominal segmental angles

externally acutely produced .... *Cletomorpha*

2(1) Lateral angles of pronotum acutely upwardly produced; abdominal segmental angles not anteriorly acutely produced ..... *Cletus*

Genus ***Cletus*** Stal

1859. *Cletus* Stal, *Fred. Eug. Resa, Ins., Hem.*, 236.

Type species : *Cletus triginus* Thunb.

Key to the species of the genus Cletus

1(2) Breadth between the pronotal angles 3-4.4 mm; pronotal angles shortly but acutely produced, apices ending with sharp pointed fuccous spines; femora without castaneous spots ..... *bipunctatus*

2(1) Breadth between the prontal angles 4.5-5 mm; prontal angles widely and acutely produced, apices ending, with short thick castaneous spines; all femora covered with numerous castaneous spots ..... *punctulatus*

22. ***Cletus bipunctatus*** (Westwood)

1842. *Cletus bipunctatus* Westwood, in *Hope Cat.*, **2** : 23.

1904. *Cletus bipunctatus* : Distant. *Fauna Brit. India*, **1** : 393.

1919. *Cletus bipunctatus* : Rsaiva, *Rec. Indian Mus.*, **16** : 358.

Material examined : 8 exs., Manipur : Imphal 1065m, l.xi.1945. Coll. M. L. Roonwal; 2 exs, Manipur : Dimapur 2590m, 18.xi.19 Coll. M. L. Roonwal.

Diagnostic characters : Body beneath and legs luteus a small spot on the lateral area of each sternal segment and a few small discal spots to abdomen black; antennae pale reddish ochraceous, the apical joint fuscous, pronotal lateral angles shortly but acutely produced, the apices of the spines fuscous.

Distribution : India : Manipur; Other states in India: Karnataka and Maharashtra.

Elsewhere : Burma, Sri Lanka.

Remarks : Known as sugarcane black bug, also infests on paddy.

23. ***Cletus punctulatus*** (Westwood)

1842. *Coreus punctulatus* Westwood, *In Hope Cat.*, **2** : 23.

1904. *Cletus punctulatus* : Distant, *Fauna Brit. India*, **1** : 392.

1919. *Cletus punctulatus*. Paiva, *Rec. Indian Mus.*, **10** : 358.

Material examined : 1 ex., Manipur : Impahl 1065m., l.xi.1945. Coll. M. L. Roonwal.

Diagnostic characters : Body length scarcely 10 mm, breadth between pronotal angles 4.5-5 mm. Other characters as in the key.

Distribution : India : Manipur; Other states in India : Assam (Khasi Hills), Nagaland, West Bengal.

Genus ***Cletomorpha*** Mayr

1866. *CLetommpha* Mayr. *Reise Nov. Hem.*, 118.

Type species : *Clitomorpha bellula* Stal

24. ***Cletomorpha raja*** distant

1901. *Cletomorpha raja* Distant *Amer. Mus. Nat. Hist.*, (7) : 423.

1904. *Cletomorpha raja*: Distant, *Fauna Brit. India*, **1** : 397.

1919. *Cletomorpha raja*: Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 2 exs., Manipur : Mao Song Song, 1755m., 13.xi.1975. Coll. M. S. Shishodia.

Diagnostic characters : Body length 9 mm; breadth between pronotal angles 4 mm; antennae dark brown in colour; antennal first and second joints subequal in length; pronotum with lateral angles acutely produced and distinctly recurved on each.

Distribution : India : Manipur; Other States in India: Assam, West Bengal, West Garo Hills.

Elsewhere : Burma.

Tribe **Homoeocerini**

Key to the genera of the Tribe Homoeocerini

1(2) Posterior femora and tibiae modified; pronotal angles either not prominent or moderately prominent 3

2(1) Posterior femora and tibiae not modified; pronotal angles moderately prominent .... *Homoeocerus*

3(4) Claval suture a little longer than the apical margin of corium; 4th antennal segment distinctly shorter than the 3rd segment..... ..... *Acanthocoris*

4(3) Claval suture about as long as apical margin of corium; 4th antennal segment rather shorter than the 3rd segment .... *Physomerus*

Genus ***Homoeocerus*** Burm.

1835. *Homoeocerus* Burm. *Handb, ii(l)* : 316

Type species : *Homoeocerus puncticornis* Burm.

Key to the species of the genus Homoeocerus

1(2) Pronatal angles moderately prominent to form small process on each 3

2(1) Pronotal angles conspicuously prominent and each terminating with an acute spine like structure 7

3(4) Corium without any spot ..... *simiolus*

4(3) Corium with spot 5

5(6) Corium more or less shaded with castaneous, the anterior lateral and apical margins and a marginal spot at inner angle ..... *variabilis*

6(5) Corium with a thin transversed rather pale spot near the inner angle ..... *albiguttulus*

7(8) Antennal 3rd joint shortest and considerably shorter than the 4th; corium without pale but with a subcostal black line..... ..... *streicornis*

8(7) Antennal 4th joint shortest and longer than 3rd; corium with pale spot but no subcostal black line 9

9(10) Corium with a small discal fuscous spot an the apical area ..... *serrifer*

10(9) Corium with two small transverse spots placed at the inner .....*walkeri*

25. ***Homoeocerus albiguttulus*** Stal*

1873. *Homoeocerus albiguttulus* Stal, *En. Hem.*, **3** : 61.

1904. *Homoeocerus albiguttulus* : Distant, *Fauna Brit. India*, **1** : 361.

Material examined : 3 exs., Mao, 22.ix.1975. Coll. M. S. Shishodia.

Diagnostic characters : Corium with a small pale luteous transverse spot near inner angle, broadly marginated posteriorly with piceous; antennae very pale custaneous, long, slender, second joint largest, first, third and fourth joints subequal in length, fourth joint luteous with its apical half black; rostrum with the third and fourth joint subequal in length.

Distribution : India; Manipur; Other States in India: Maharashtra, Meghalaya and West Bengal.

Elsewhere : Burma, Sri Lanka, China, Java and Malay Peninsula.

Remarks : *Recorded for the first time from the State..

26. ***Homoeocerus signatus*** (Walker)*

1971. *Homoeocerus signatus* Walker, *Cat. Het.*, **4** : 97.

1904. *Homoeocerus signatus* : Distant, *Fauna Brit. India*, **1** : 355

Material examined : 2 exs., Dimapur, 19.x.1945, Coll. M. L. Roonwal.

Diagnostic characters : Corium with a large transverse macular spot at inner angle and the lateral margins luteous; head with a narrow fascia on each side before eyes and the subglanular lateral margins of the pronotum black; antennae with the first and second joint pale castaneous, third joint black, lateral angles of the pronotum moderately and subacutely produced.

Distribution : India : Manipur; Other States in India : Maharashtra and West Bengal.

Elsewhere : Sri Lanka.

Remarks : Recorded for the first time from the State of Sikkim.

27. ***Homoeocerus simiolus*** Distant*

1904. *Homoeocerus simiolus* Distant, *Fauna Brit. India*, **1** : 363.

1919. *Homoeocerus simiolus*: Paiva, *Rec. Indian Mus.*, **16** : 356.

Material examined : 2 exs., Churachandpur, 18.v.1993, Coll. M. Sil.

Diagnostic characters : Head, pronotum, scutellum, basal lateral margin of corium, body beneath and legs ochraceous; pronotum and the corium purplish brown; two small spots placed transversely and sometimes amalgamated at inner angles of corium luteous; antennae pale castaneous, apical joint infuscated, apices of second and third joints piceous, first joint much shorter.

Distribution : India : Manipur; other States in India : Assam, Meghalaya, West Bengal.

Elsewhere : Burma, China.

Remarks : *The species is recorded for the first time from the State.

28. ***Homoeocerus innornatus*** Stal

1873. *Homoeocerus inornatus* Stal, *En. Hem.*, **3** : 58.

1904. *Homoeocerus inornatus* : Distant, *Fauna Brit. India* **1** : 355.

Diagnostic characters : Antennae very pale castaneous; meso and metasterna with a very small fuscous spot on each lateral area; antennae with the second joints longest than the first, third joint subequal to the length to the first, fourth shortest; pronotum with the lateral angles moderately and subacutely produced, between them the disk is somewhat indistinctly infuscated.

Distribution : India : Manipur; Other States in India: Pondichery, West Bengal.

Elsewhere : Burma, China and Rangoon.

29. ***Homoeocerus serrifer*** (Westwood)*

1842. *Coreus serrifer* Westwood, *In Hope Cat.* **2** : 24.

1904. *Homoeoceres serrifer* : Distant, *Fauna Brit.* India, **1** : 366.

Material examined : 2 exs., Imphal, 5.iii.1975. Coll. P. T. Cherian.

Diagnostic characters : Body ochraceous, thickly and somewhat darkly punctate; lateral margins of pronotum and basal lateral margin of corium pale luteous; antennae with second joint longest, second and third subequal in length, fourth shortest much shorter than first; pronotum with the lateral angles moderately angulately prominent.

Distribution : India : Manipur; Other States in India: Assam, Meghalaya, Naga Hills, and West Bengal.

Elsewhere : Burma, Sri Lanka.

Remarks : *This species is a new record from the State.

30. ***Homoeocerus striicornis*** Scott

1874. *Homoeocerus striicornis* Scott, *Ann. Mag. Nat., Hist.*, (4) **14** : 362.

1904. *Homoeocerus striicornis* : Distant, *Fauna Brit. India* **1** : 360.

Material examined : 3 exs. Bishnupur, 25. x. 1993, Coll. K. K. Roy.

Diagnostic characters : Body length 17-20mm, breadth between pronotal angles 4.5-5.5 mm; third antennal joint shortest and considerably shorter than fourth; corium with no pale spot but a subcostal black line.

Distribution : India : Manipur; Other States in India: Assam, East Khasi Hills, Maharashtra.

Elsewhere : Japan, Sri Lanka.

31. ***Homoeocerus variabilis*** Dall*

1852. *Homoeocerus variabilis* Dall. *List. Hem.*, ii : 502.

1904. *Homoeocerus variabilis* : Distant, *Fauna Brit. India*, **1** : 375.

Diagnostic characters : Head, pronotum and scutellum ochraceous or greenish ochraceous; lateral margins of the head and pronotum and a broad basal fascia between the pronotal angles dark, castaneous membrane dark bronzy; body beneath and legs pale ochraceous, apices of femora, the tibiae and tarsi castaneous; antennae stout, bases of second and third joints luteous, first and third joints suequal in length, second the longest, fourth shortern, third somewhat dialated

at apex, pronotum with the lateral angles subprominent. Length about 13 to 15 mm, breadth between pronotal angles 4.5 to 5 mm.

Distribution : India : Manipur; Other States in India : Tamil Nadu.

Remarks : *This species is recorded for the first time from the State of Sikkim.

32. ***Homoeoecrus walkeri*** Kirby

1891. *Homoeocerus walkeri* Kirby, *J. Linn. Soc., zool.*, **24** : 91.

1904. *Homoeocerus walkeri* Distant, *Fauna Brit. India*, **1** : 358.

Diagnostic characters : Head, pronotum, scutellum, basal lateral margins of corium, .body beneath, and legs ochraceous; pronotum and the corium purplish brown; two small spots placed transversely and sometimes amalgamated in inner angles of corium luteous, antennae pale castaneous, apical joint infuscated, apices of second and third joints piceous, first joint much shorter than second and slightly longer than third, the apex of which a little dialated, antennal fourth joint shortest and longer than third.

Distribution : India : Manipur; Other States in India : Assam, Meghalaya (Khasi Hills, East Garo Hills), Nagaland.

Elsewhere : Burma, Sri Lanka.

Genus ***Physomerus*** Burmeister

1853. *Physomerus* Burmeister, *Hanbd.* **2** : 341.

Type species : *Lygaeus grossipes* Fabricius.

33. ***Physomerus grossipes*** (Fabricius)

1794. *Lygaeus grossipes* Fabricius, *Ent. Syst.*, **4** : 135.

1871. *Physomerus dilineatus* Walker, *Cat. Het.*, **4** : 59.

1904. *Physomerus grossipes* : Distant, *Fauna Brit. India*, **1** : 383.

Material examined : 2 exs., Imphal, 14. v.1993. Coll. B. Mitra.

Diagnostic characters : Body length 20-24mm, breadth between pronotal angles 5.5-6.5mm.; posterior tibiae and femora modified pronotum either not prominent or moderately prominent; claval suture as long as apical margin of corium; 4th antennal joint slightly shorter than the 3rd joint, posterior femora strongly incrassate, finely longitudinally tuberculate on upper and outer areas and obtusely spinous beneath, each with a long spine at the middle of inner margin and finely serrated upto apex; rostrum reaching the intermediate coxae.

Distribution : India : Manipur; Other States in India: Andaman and Nicobar Islands, Assam, East Khasi Hills, Maharashtra and West Bengal.

Elsewhere : Burma, Malay Archipelago, Sri Lanka.

Genus ***Acanthocoris*** Amy. and Serv.

1843. *Acanthocoris* Amy. and Serv., *Hem.*, 213

Type species : *Acanthocoris scabrator* Fabricius

34. ***Acanthocoris scabrator*** (Fabricius)*

1803. *Coreus scabrator* Fabricius, *Syst. Rhyng.* 195.

1904. *Acanthocoris scabrator* : Distant, *Fauna Brit. India.* **1** : 385.

Material examined : 3 exs., Churchandpur, 19.v.1993. Coll. M. Sil.

Diagnostic characters : Fuscous or brown with numerous brownish ochraceous points; antennae hirsute, the apical joint ochraceous with its base fuscous; pronotum with the lateral angles acutely produced, their anterior margin serrate; posterior femora moderately incrassated toothed or serrate on inner margin; rostrum reaching the intermediate coxae.

Distribution : India : Manipur; Other States in India: Assam, Karnataka, Maharashtra, Meghalaya West Bengal.

Elsewhere : Burma, Ceylon

Remarks : *The species is recorded for the first time from the State.

Diagnostic characters : Body length 13-14.5 mm, breadth between pronotal angles 5-5.5 mm; pronotum with lateral angles acutely produced with serrated anterior margin; posterior of femora moderately incrassated with serrated inner margin; rostrum reaching the intermediate coxae.

Distribution : India : Manipur; Other States in India: Assam, Karnataka, Meghalaya (West Garo Khasi Hills), Maharashtra.

Elsewhere : Burma, Malay Archipelago.

Subfamily CORIZINAE

Genus ***Serinetha*** Stal

1837. *Serinetha* Stal, En. Hem. iii. 99

Type species : *Serinetha abdominalis* Fabricius

35. ***Serinatha abdominalis*** Fabricius

1803. *Serinetha abdominalis* Fabricius, Syst. Rhyng, : 226.

1904. *Serinetha abdominalis* Distant, *Fauna Brit. India,* 1 : 419.

Diagnostic characters : Body 16-20 mm in length; antennae, legs membranous, disks of sternum and abdomen beneath piceous; head rugously excavated; pronotum thickly and somewhat coarsely punctate the lateral margins hirsute; legs longly pilose.

Distribution : India : Manipur; Ohter States in India: Assam, Maharashtra, West Bengal.

Elsewhere : Sri Lanka.

36. ***Serinetha augur*** (Fabricius)

1781. *Cimex augur* Fabricius, *Spec. Ins.* II : 366.

1904. *Serinetha augur*: Distant, *Fauna Brit. India* 1 : 420.

Diagnostic characters : Body 11.4 to 16 mm in length, body pale, antennae, rostrum legs and membrane piceous; pronotum very distinctly centrally carinate and finely punctate, lateral margins moderately hirsute.

Distribution : India : Manipur; Other States in India: Assam, Chennai, Maharashtra, West Bengal.

Elsewhere : Sri Lanka, Malay Peninsula.

37. ***Serinetha rufomarginata*** (Fabricius)

1794. *Lygaeus rufomarginata* Fabricius, *Ent. Syst.*, iv : 152.

1852. *Serinetha rufomarginata* : Dall, *List Hem.* ii : 460.

1904. *Serinetha rufomarginata* Distant *Fauna Brit. India.*, 1 : 410.

Diagnostic characters : Body 18-21 mm in length; Piceous, head, lateral margins of corium, both above and beneath, lateral margins of sternum and abdomen and apex of abdomen sanguineous pronotum obtusely centrally carinate; apical joint of antennae somewhat greyish pilose head with a very distinct incision in front of and between ocelli.

Distribution : India : Manipur; Other States in India : West Bengal.

Elsewhere : Borneo and Philippines.

SUMMARY

The paper presents an account of 37 species belonging to 19 genera of the Superfamily Coreoidea. Out of the four families of Coreoidea only two families *viz.* Alydidae and Coreidae are represented in the State of Manipur. Most of the species also belong to Coreidae which is the largest family and good number of species infest most of the economically important crops like cereals, pulses, vegetables etc. and cause considerable damage to the agricultural yield. In the present paper two genera and 9 species are newly recorded from the state of Manipur. Key to different Subfamilies, Divisions, Genera and species are provided for easy differentiation and identification of coreid species. Diagnostic characters of each species which could be studied have been provided. Distribution pattern of all the species available in the state have also been provided for knowing the range of distributions of those species in India and different other parts of the world. Only a few species have been recorded and their salient identifying features have been mentioned from the literature only in those cases where sufficient material were not available for study. The present contribution is a comprehensive account of the Coreid fauna so far known from the State of Manipur.

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INSECTA : HEMIPTERA : HOMOPTERA : FULGOROIDEA, CERCOPOIDEA, CICADOIDEA AND MEMBRACIDAE

B. BISWAS, M. GHOSH, ANIMESH BAL & G. C. SEN
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Suborder Homoptera of the Order Hemiptera is comprising of 8 Superfamilies. Under these Superfamilies 44 families have, so far, been reported from India while world has 56 families. The members of these homopteran families are very important from the agricultural point of view since many of them are found to be serious pest, causing considerable destruction of the crop plants and products in various ways. The insects like Aphids, Mealy bugs, Psyllids, White flies, Tree and Leaf hoppers are some of the pest groups in India. Homopteran insects are characterised by the presence of uniformly chitinous fore wings which differs by the presence of membranous apical portion of the fore wings among Heteropteran.

Superfamily Fulgoroidea of Manipur has been reported with 4 families while superfamilies Cicadoidea and Cercopoidea have 2 families each. Family Membracidae of the superfamily Cicadelloidea with only 2 species have been studied in the present paper. Cicadelloidea as a superfamily with 8 families 20 genera and 29 species have already been studied and the work has been submitted for publication separately in State Fauna Series for the Fauna of Manipur.

The present paper is dealt with the taxonomic account of 26 species under 19 genera distributed in 9 families under the above mentioned superfamilies of Homoptera. The present study may be considered as the first consolidated taxonomic account of the species under these families from the State of Manipur since no such earlier published report has been found from the state. Hence, all the species studied in this paper, are reported as new record from Manipur. Diagnostic characters, references and distribution in India and elsewhere of each species as well as the taxonomic keys to different taxa have been provided in this paper.

SYSTEMATIC ACCOUNT

Suborder HOMOPTERA

Superfamily I. FULGOROIDEA

Family I. FULGORIDAE

Genus 1. ***Zanna*** Kirkaldy, 1902

1. *Zanna distanti* (Schmidt)

Family II. AREAOPIDAE

Genus 2. ***Liburnia*** Stål, 1866

2. *Liburnia doherty* Distant
3. *Liburnia furcifera* (Horv.)

Genus 3. ***Tropidocephala*** Stål, 1853

4. *Tropidocephala luteola* Distant

Family III. DICTYOPHORIDAE

Genus 4. ***Centromeria*** Stal, 1870

5. *Centromeria speilinea* (Walker)

Family IV. CIXIIDAE

Genus 5. ***Kuvira*** Distant, 1906

6. *Kuvira semihyalina* Distant

Genus 6. ***Oliarus*** Stal, 1862

7. *Oliarus walkeri* (Stal)

Superfamily II. CERCOPOIDEA

Family I. APHROPHORIDAE

Genus 7. ***Poophilus*** Stal, 1866

8. *Poophilus costalis* (Walker)

Genus 8. ***Ptyelus*** St. Farg and Serv., 1825

9. *Ptyelus nebulosus* (Fabricius)

Family II. CERCOPIDAE

Genus 9. ***Callitettix*** Stal, 1865

10. *Callitettix varsicolor* (Fabricius)

Genus 10. ***Eoscarta*** Bredd., 1902

11. *Eoscarta borealis* (Distant)

Genus 11. ***Leptataspis*** Schmidt, 1911

12. *Leptataspis fulviceps* (Dallas)

Genus 12. ***Phymatostetha*** Stal, 1870

13. *Phymatostetha signifera* (Walker)

14. *Phymatostetha stalli* Butler

Genus 13. ***Cosmoscarta*** Stal, 1869

15. *Cosmoscarta bispecularis* White

16. *Cosmoscarta septempunctata* (Walker)

17. *Cosmoscarta dorsimacula* (Walker)

18. *Cosmoscarta minor* Atkinson

19. *Cosmoscarta metallica* (Walker)

Superfamily III. CICADOIDEA

Family I. CICADIDAE

Subfamily I. GAEANINAE

Genus 14. ***Platylomia*** Stal, 1870

20. *Platylomia umbrata* (Distant)

21. *Platylomia saturata* (Walker)

Subfamily II. CICADINAE

Genus 15. ***Pomponia*** Stal, 1866

22. *Pomponia linearis* (Walker)

Family II. TIBICINIDAE

Genus 16. ***Abroma*** Stal, 1866

23. *Abroma maculicollis* (Guer)

Genus 17. ***Scieroptera*** Stal, 1866

24. *Scieroptera splendidula* Fabr.

Superfamily IV. CICADELLOIDEA

Family I. MEMBRACIDAE

Genus 18. ***Anchon*** Buckton, 1903

25. *Anchon echinatum* Distant

Genus 19. ***Gargara*** Amyot and Serville, 1843

26. *Gargara robusta* Distant

Key to the super families of the order HOMOPTERA

1. Wings without ambient veins; 1A and 2A of the fore wings joined apically to form 'Y' vein; tegulae usually present; antennal pedicle with numerous sensilla .... FULGOROIDEA

– Wings with ambient veins; 1A and 2A of fore wings not forming a 'Y' vein; tegulae absent 2

2. Head with distinct frons and three ocelli; hind legs elongated, slender but not saltatorial; male with conspicuous stridulatory organ at the base of abdomen ..... CICADOIDEA

– Head with frons not distinct and with two ocelli; hind legs saltatorial 3

3. Head with postclypeus greatly expanded occupying most part of the face and extending on the dorsal side; hind legs with tibae elongated and bearing one or two large lateral spines and a double apical groups of small spines ..... CERCOPOIDEA

– Head with postclypeus not greatly expanded on the dorsal side; hind legs with tibae ridged and bearing longitudinal rows of spines on lateral margins ..... CICADELLOIDEA

Superfamily FULGOROIDEA

Key to the families of the superfamily FULGOROIDEA

1. Anal area of wings reticulated, the ridge separating the front from the genae and continued on the sides of the clypeus..... ..... FULGORIDAE

– Anal area of wings very rarely reticulate, when so, the clypeus convex without lateral ridges 2

2. Claval veins not reaching apex, united with commissural margin near apex 3

– Claval veins either continued to the apex itself, or united with the claval suture near apex; sides of the clypeus carinate; first joint of posterior tarsi rubust only moderately long ..... ARAEOPIDAE

3. Face without an apical ocellus; lateral margins of the clypeus always carinate or acute..... .....DICTYOPHARIDAE

– Face with three ocelli, one of which is situated on the apex of the front; ..... CIXIIDAE

Family I. FULGORIDAE

Genus 1. ***Zanna*** Kirkaldy

1902. *Zanna* Kirkaldy, *J. Bombay nat. Hist. Soc.*, **14** : 46.

1. ***Zanna distanti*** (Schmidt)

1911. *Pyrops distanti* Schmidt, *Zool. Anz.*, **38** : 163.

1947. *Zanna distanti* : Metcalf, *General Catalogue of Homoptera*, **9** : 246.

Material examined : 1 ex., Churachandpur, Churachandpur Dist., 22.ii.1993, D.K.M. and S.K.G. Coll.

Diagnosis : Body brownish yellow; cephalic process of head with thick, prominent black spots, its apex moderately broad; cephalic process tricarinate; pronotum and mesonotum thickly prominently black spotted; tegmina greyish, the venation brownish, most of the portion of tegmina closely black spots.

Length : 36 mm.

Distribution : India : Manipur (Churachandpur); Elsewhere : Myanmar.

Family II. ARAEOPIDAE

Key to genera of the family ARAEOPIDAE

1. Legs moderately short; hind tibiae with a long robust spur at apex ..... ***Liburnia***

— Legs long; hind tibiae with prominent blunt spur at apex..... ***Tropidocephala***

Genus 2. ***Liburnia*** Stal

1866. *Liburnia* Stal, *Hem. Afr.*, iv : 179.

Key to the species of the genus *Liburnia*

1. Pronotum testaceous with a longitudinal greyish fascia ..... *dohertyi*

— Pronotum white without longitudinal greyish farm .....*furcifera*

2. ***Liburnia dohertyi*** (Distant)

1906. *Sogata dohertyi* Distant, *Fauna Brit. India, Rhynchota*, **3** : 471.

1967. *Liburnia dohertyi* : Metcalf, *General Catalogue of Homoptera*, **3** : 370.

Material examined : 1 ex., Ukhrul; Ukhrul Dist., 9.iv.1992, A.K. Hazra and party Coll.

Diagnosis : Body reddish brown in colour, head with a pale greyish longitudinal fascia running to anterior area of vertex, and a black line on each side; face with white carina and its margin black; pronotum and mesonotum yellowish brown; tegmina greyish brown, venation dark brown, its basal area semiopaque.

Length : 4 mm.

Distribution : India : Manipur (Ukhrul); Tenasseriun.

3. ***Liburnia furcifera*** (Horv.)

1899. *Delphax furcifera* Horv., *Termesz. Fuzetek.*, **22** : 372.

1967. *Liburnia furcifera* : Metcalf, *General Catalogue of Homoptera*, **3** : 372.

Material examined : 1 ex., Ukhrul; Ukhrul Dist., 9.iv.1992, A.K. Hazra Coll.

General Diagnosis : Body yellowish white in colour; head with carina; eyes black; carinae of clypeus yellowish white; pronotum white, with two punctured spot and tegmina hyalina, veination brownish yellow, apical marginal vein brown.

Length : 4.5 mm.

Distribution : India : Manipur (Ukhrul). Elsewhere : Japan, Sapparo, Tokyo and Kuschu.

Genus 3. *Tropidocephala* Stal

1853. *Tropidocephala* Stal, *Ofv. Vet.-AK. Forh.* : 266.

4. *Tropidocephala luteola* Distant

1912. *Tropidocephala luteola* Distant, *A.M.N.H.* (8) ix : 193.

1943. *Tropidocephala luteola* : Metcalf, *General Catalogue of Homoptera*, **3** : 367.

Material examined : 1 ex., Ukhrul; Ukhrul Dist., 9.iv.1992, A.K. Hazra Coll.

Diagnosis : Body pale greenish in colour, vertex longer than broad; eyes brownish, pro- and mesonotum strongly tricarinate; tegmina pale fuscous brown, covered with greyish white spots, an elongate spot on clavus; wing hyaline with vein darker; legs brownish; abdomane above black, basal area reddish.

Length : 2 mm.

Distribution : India : Manipur (Ukhrul); West Bengal. Elsewhere : Pusa.

Family III. DICTYOPHORIDAE

Genus 4. *Centromeria* Stal

1870. *Centromeria* Stal, *Ofv. Sevenska Vet. Akad Forh.*, **27**: 745.

5. *Centromeria speilin* (Walker)

1867. *Dictyophora speilinea* Walker, *Jour. Proc. Linn. Soc.*, **1** : 84.

1966. *Centromeria speilinea* : Metcalf, *General Catalogue of Homoptera*, **8** : 39.

Material examined : 1 ex., Churachandpur, Churachandpur Dist., 11.xi.1992, R. Mathew coll.

Diagnosis : Body brownish in colour, head with marginal carina and a central line to cephalic process; pronotum with central carina and marginal fascia; mesonotum tricarinate; face with central carina and tegmina hyaline, its venation brownish olivaceous; stigma fuscous.

Length : 11 mm.

Distribution : India : Manipur (Churachandpur). Elsewhere : Malay Peninsular S.E. Borneo.

Family IV. CIXIIDAE

Key to genera of family CIXIIDAE

1. Mesonotum with three longitudinal ridges ..... ***Kuvera***

— Mesonotum with five longitudinal ridges ... . ***Oliarus***

Genus 5. *Kuvera* Distant

1906. *Kuvera* Distant, *Fauna Brit. India, Rhynchota*, **3** : 261.

6. *Kuvera semihyalina* Distant

1906. *Kuvera semihyalina* Distant, *Fauna Brit. India, Rhynchota*, **3** : 261.

1934. *Kuvera semihyalina* : Metcalf, *General Catalogue of Homoptera*, **2** : 121.

Material examined : 1 ex., Ukhrul; Ukhrul Dist., 8.iv.1992, A.K. Hazra Coll.

Diagnosis : Body castaneous brown in colour, head broader than long, head with ridgedat lateral margin; face subquadrate, with a central ridged not reaching to anterior margin; pronotum short with three carinae; mesonotum large with three carinae; tegmina semihyalina, venation pale fuscous; stigma piceous.

Length : 4.5 mm.

Distribution : India : Manipur (Ukhrul); Elsewhere : Myanmar.

Genus 6. *Oliarus* Stal

1862. *Oliarus* Stal, *Berliner. Ent. Zeit.*, **6** : 306.

7. *Oliarus walkeri* (Stal)

1859. *Cixius walkeri* Stal, *Freq. Eug. Resa, Hem.*, 272.

1936. *Oliarus walkeri* Stal : Metcalf, *General Catalogue of Homoptera*, **2** : 108.

Material examined : 1 ex., Imphal, Imphal Dist., 29.i.1992, P. H. Roy Coll.

Diagnosis : Body reddish brown, two ridge on the head; face with oval, a single forked ridge pronotum very short; mesonotum have five carina; tegmina hyaline, vein dark brown, apical area five transverse veins dark brown.

Length : 4 mm.

Distribution : India : Manipur (Imphal).

Elsewhere : Borneo, East Indies, Java, Phillipines, Singapore.

Superfamily II. CERCOPOIDEA

Key to families of the superfamily CERCOPOIDEA

1. Anterior margin of pronotum rounded or angulate; eyes moderately transverse, scutellum flat and triangular ..... APHROPHORIDAE
- Anterior margin of pronotum straight, eyes as long as broad ..... CERCOPIDAE

Family I. APHROPHORIDAE

Key to the genera of the family *Aphrophoridae*

1. Clypeus slightly passing the apices of the anterior coxae ..... ***Poophilus***
- Clypeus reaching but not extending beyond the apices of the anterior coxae ..... ***Ptyelus***

Genus 7. ***Poophilus*** Stal

1866. *Poophilus* Stal, *Hem. Afr.*, **4** : 72.

8. ***Poophilus costalis*** (Walker)

1851. *Ptyelus costalis* Walker, List Hom., **3** : 707.

1908. *Poophilus costalis* : Distant, *Fauna Brit. India*, **4** : 86.

1996. *Poophilus costalis* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 14.

Material examined : 1 ex., 16 miles North of Imphal, on Dimapur Rd., 3.x.1945, M. L. Roonwal Coll.

Diagnosis : Central apical margin of vertex with five very small black spots; tegmina with the costal margin paler which becomes broader in the apical area; tawny brown species thickly griseously pilose.

Length : 9-10 mm.

Distribution : India : Manipur (Imphal), Gujarat, Karnataka, Maharashtra, West Bengal.

Genus 8. ***Ptyelus*** St. Farg & Serv.

1825. *Ptyelus* St. Farg & Serville, *Enc. Mith.*, **10** : 608.

9. ***Ptyelus nebulosus*** (Fabricius)

1794. *Cercopis nebulosus* Fabr., *Entomologia Systematica emendata et. acuta*, **4** : 50.

1908. *Ptyelus nebulosus* : Distant, *Fauna Brit. India*, **4** : 88.

1996. *Ptyelus nebulosus* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 16.

Material examined : 1 ex., Below Modlong near Imphal, 1.xi.1945, M. L. Roonwal Coll.

Diagnostic characters : Pale yellowish grey, thickly pilose species; two small spots at the anterior margin of head; tegmina darkly fuscous, and about two and half times as long as broad.

Length : 9-10 mm.

Distribution : India : Manipur (Imphal).

Family II. CERCOPIDAE

Key to genera of the family CERCOPIDAE

1. Anterior legs elongate, anterior femora longly passing the lateral margins of the body & distinctly longer than the intermediate femora; posterior tibiae with one spine; vertex of the head transversely depressed before apex .... ***Callitettix***
- Anterior legs of moderate length; anterior femora only slightly passing the lateral margins of body and only slightly or not longer than the intermediate femora 2
2. Face with a longitudinal furrow ... ***Eoscarta***
- Face without any longitudinal furrow 3
3. Posterior margins of the pronotum foliaceous and without any protuberance ... ***Leptataspis***
- Posterior margin of the pronotum foliaceous 4
4. Pronotum with the posterior lateral margins straight and sinuate, its greatest breadth a

little more than half of its length .... ***Phymatostetha***

– Pronotum with the posterior lateral margins straight not sinuate, its greatest breadth about two-third of its length ..... ***Cosmoscarta***

Genus 9. ***Callitettix*** Stal

1865. *Callitettix* Stal, *Ofv. Vet. Ak. Forh.,*: 152.

10. ***Callitettix versicolor*** (Fabr.)

1974. *Cercopis versicolor* Fabr., *Rynchotas, Ent. Syst.*, **4** : 50.

1908. *Callitettix versicolor* : Distant, *Fauna Brit. India.*, **4** : 113.

1996. *Callitettix versicolor* : Biswas, Ghosh, and Basu, *State Fauna Series* 3 : *Fauna of West Bengal,* Part **5** : 5.

Material examined : 1 ex., Near Imphal, 1.xi.1945, M.L. Roonwal Coll.

Diagnosis : Shining black species; tegmina with a white spot before the middle of the clavus; and a subtransverse white spot between the middle of the upper claval margin and the costal margin; the apex of clavus sanguineous and two sanguineous spots beyond the middle of the tegmen, the external one large and transverse and the internal small.

Length : Excluding tegmina 9 mm, Expansion tegmina 20-22 mm.

Distribution : India : Manipur (Imphal), Bihar, Jammu and Kashmir, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Elsewhere : China, Malay, Mayanmar, Siam, South East Asia.

Genus 10. ***Eoscarta*** Bredd.

1902. *Eoscarta* Bredd., *Soc. Ent.*, **17** : 58.

11. ***Eoscarta borealis*** (Distant)

1878. *Cosmoscarta borealis* Distant, *Tr. E.S.,*: 321.

1908. *Eoscarta borealis* : Distant, *Fauna Brit. India,* **4** : 116.

Material examined : 30 exs., 16 miles North of Imphal on Dimapur Rd., 28.ix.-22.x.1945, M.L. Roonwal Coll.

Diagnosis : Head, pronotum, sternum, legs pale luteous; antennae, ocelli, anterior and intermediate tibiae, apices of posterior tibae and tarsi black; abdomen beneath and tegmina rosate.

Length : Excluding tegmina 6 mm; Expansion tegmina 16-17 mm.

Distribution : India : Manipur (Imphal).

Genus 11. ***Leptataspis*** Schmidt.

1911. *Leptataspis* Schmidt, *Stett. Ent. Zeit.*, **72** : 81.

12. ***Leptataspis fulviceps*** (Dallas)

1850. *Cercopis fulviceps* Dallas, *Ent. Soc. London, Trand.*, **2.**(1) : 10.

1996. *Leptataspis fulviceps* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal,* Part **5**, 13.

Material examined : 2 exs., Luniburg, 9.vi.1992, R. Mathew and party Coll; 2 exs., Churachandpur, 17.vi.1992, R.S. Burman and party Coll.

Diagnosis : Head, pronotum, lateral margin of prosternum luteous; tegmina black, with a short sanguineous basal streak to clavus, pronotum, thickly and very finely punctate, with three transverse foveations before anterior margin, one central and the other two behind the central one on each side.

Length : Excluding tegmina 14-18 mm., Expansion tegmina 38-44 mm.

Distribution : India : Manipur (Churachandpur), Assam, Meghalaya, Nagaland, Sikkim, West Bengal. Elsewhere : China, Hong Kong, Java, Laos, Malay, Siam.

Genus 12. ***Phymatostetha*** Stål

1870. *Phymatostetha* Stal, *Ofv. Vet. AK. Forh.*, : 721.

Key to the species of the genus *Phymatostetha*

1. Tegmina with about basal half straminaous containing three fuscous spots, remaining area fuscous with a broken testaceous fascia ..... ***signifera***

— Tegmina fuscous brown, costal area connected with a narrow transverse fascia before apical area, stramineous ..... *stalii*

13. ***Phymatostetha signifera*** (Walker)

1851. *Cercopis signifera* Walker, *List. Hom.*, **3** : 655.

1906. *Phymatostetha signifera* : Distant, *Fauna Brit. India*, **4** : 121.

Material examined : 2 exs., Ukhrul, Rev, W. Pethgrew. 2 exs., Churachandpur, Churachandpur Dist., 16.vi.1993, R.S. Barman and Party coll.

Diagnosis : Base of head and two broad angulated fasciae to pronotum black; pronotum centrally longitudinally carinate, foveately impressed on each side before anterior margin lateral margin refexed, tegmina with basal half stramineous containing three fuscous spots, remaining area fuscous with a much waved and broken testaceous fascia; posterior tibae with two long spines one near base and the other beyond middle.

Length : Excluding tegmina 14-15 mm; Expansion tegmina 38-40 mm.

Distribution : India : Manipur (Churachandpur), Assam, Nagaland, West Bengal. Elsewhere : Bangladesh.

14. ***Phymatostetha stalii*** Butler

1874. *Phymatostetha stalii* Butler, *Cist. Ent.*, **1** : 267.

1908. *Phymatostetha stalii* : Dist., *Fauna Brit. India*, **4** : 119.

Material examined : 1 ex., 16 km. north of Imphal, on Dimapur Rd., 3.x.1945, M.L. Roonwal Coll.

Diagnosis : Head piceous; vertex, head infront of eyes, face, lateral margin and anterior area of pronotum, scutellum, legs ochraceous, tegmina piceous, with a basal costal and claval streak, two transverse fasciae, the first before middle, the second before apical area and the apical margin pale testaceous; pronotum centrally longitudinally carinate on anterior half, transversely foveately impressed on each side before anterior margin, posterior tibae with a moderately strong spine near base and a very strong spine a little beyond middle.

Length : Excluding tegmina 14-15 mm. Expansion tegmina 29-37 mm.

Distribution : India : Manipur (Imphal), Assam, Nagaland, Uttar Pradesh. Elsewhere : Mayanmar.

Genus 13. ***Cosmoscarta*** Stal

1869. *Cosmoscarta* Stal, *Hem. Fabr.*, **2** : 11.

Key to the species of the genus *Cosmoscarta*

1. Tegmina with pale transverse fasciae 4
– Tegmina not transversely fasciated, ...2
2. Apical area of tegmina black, basal area generally more or less spotted, pronotum red or luteous, more or less spotted with black ..... *bispecularis*
– Apical area of tegmina ochraceous, basal area spotted 3
3. Tegmina usually with six spots arranged in two irregular transverse series sometimes with a seventh subapical and subcostal black spot and about two and a half times as long as broad; pronotum rarely with two small black spots near anterior margin *septempunctata*
– Tegmina with seven large black spots six in two irregular transverse series the seventh subapical and subcostal and twice as long as broad; pronotum with four spots .... *dorsimacula*
4. Head, pronotum, scutellum metallic bluish black, tegmina with a red basal streak giving off a short subcostal branch and two transverse branches one at base and the other at the apex of middle third ..... *minor*
– Body dark indigo blue, with abdominal segmental margins dull reddish; tegmina with the two irregular shaped and angulate sanguineous transverse fasciae; the first one at about one third from base, the other before apical area ..... *metallica*

15. *Cosmoscarta bispecularis* (White)

1844. *Cercopis bispecularis* White, *A.M.N.H.*, **14** : 426.

1908. *Cosmoscarta bispecularis* : Distant, *Fauna Brit. India*, **4** : 147.

Material examined: 1 ex., Churachandpur, 7.v.1993, S.K. Chakraborty Coll.

Diagnosis : Legs and ventral side of the body testaceous red; four black spots two larger, two smaller near margin, of the disk; sternum and a quadruple series of large spots to abdomen beneath, black; tegmina pale testaceous red, the apical area with six large rounded spots arranged in two transverse series and a longitudinal spot at base, black; posterior tibae with a short spine near base and a strong spine beyond middle.

Length : Excluding tegmina 11 mm; Expansion tegmina 24-25 mm.

Distribution : India : Manipur (Churachandpur).

16. *Cosmoscarta septempunctata* (Walker)

1851. *Cosmoscarta septempunctata* Walker, *List. Hom.*, **3** : 659.

1908. *Cosmoscarta septempunctata* : Distant, *Fauna Brit. India*, **4** : 148.

1996. *Cosmoscarta septempunctata* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 12.

Material examined: 2 exs., Churachandpur, 19.v.1993, A.K. Pandit Coll., 3 exs., Churachandpur 6.vi.1992, R. Mathew and party Coll.

Diagnosis : Body and legs testaceous red, a double row of large spots on each side of abdomen, mesosternal tubercles and sometimes two small spots near anterior margin of pronotum, black, tegmina testaceous red, apical area ochraceous, six spots in two irregular transverse series, sometimes with a seventh subapical and subcostal spot black; pronotum transversely foveate on each side behind anterior margin and longitudinally so near each lateral angle.

Length : Excluding tegmina 10-11 mm; Expansion tegmina 40-44 mm.

Distribution : India : Manipur (Churachandpur), Assam, Meghalaya, Sikkim, Uttar Pradesh, Elsewhere : Java, Mayanmar, Thailand.

17. *Cosmoscarta dorsimacula* (Walker)

1851. *Cercopis dorsimacula* : Walker, *List. Hom.*, : 658.

1908. *Cosmoscarta dorsimacula, Fauna Brit. India*, **4** : 147.

1996. *Cosmoscarta dorsimacula* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 10.

Material examined: 1 ex., Kumpik Pukri, 24.v.1981, C. Radhakrishnan Coll.; 1 ex., Chandel, 9.v.1992, R. Mathew and party coll.; 1 ex., Churachandpur, 18.v.1993, A.K. Pandit Coll.

Diagnosis : Legs and body testaceous red; four spots to pronotum, the smaller near anterior margin, the larger discal, metanotum, base of abdomen above, sternum and a double longitudinal series of spots on each side of abdomen below, black; tegmina testaceous red, the apical area with seven large rounded black spots, six in two transverse rows and the seventh subapical and subcostal, wings pale bronzy; pronotum with two foveate impresions near anterior margin and two smaller black spots and an oblique foveation in each of the larger black spots.

Length : Excluding tegmina 13-15 mm; Expansion tegmina 36-38 mm.

Distribution : India : Manipur (Churachandpur).

18. *Cosmoscarta minor* Atkinson

1888. *Cosmoscarta minor* : Atkinson, *J.A.S.B.*, **7** : 385.

1906. *Cosmoscarta minor* : Distant, *Fauna Brit. India*, **4** : 133.

1996. *Cosmoscarta minor* : Biswas, Ghosh and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 11.

Material examined: 1 ex., Kharsoma, 14.vi.1993, R.S. Barman and party Coll.

Diagnosis : Head and thorax shining bluish black, base and apex of abdomen reddish, a broad transverse brownish black median band; tegmina with the basal streak giving off a short subcostal branch and two transverse bands, one at the base and the other at the apex of the middle third, red in colour.

Length : Excluding tegmina 7 mm; Expansion tegmina 21 mm.

Distribution : India : Manipur, Sikkim, West Bengal. Elsewhere : Mayanmar.

19. *Cosmoscarta metallica* Distant

1900. *Cosmoscarta metallica* : Distant, *Jr. E.S..*, : 679.

1996. *Cosmoscarta metallica* : Biswas, Ghosh and Basu, *State Fauna Series* **3** : *Fauna of West Bengal*, Part **5** : 11.

Material examined : 1 ex., Kharsoma, 14.vi.1993, R.S. Barman and party Coll.

Diagnosis : Body dark indigo blue with apex and lateral margin of abdomen and femora coral red; tegmina black with two irregular shaped angulate, sanguineous transverse fasciae first at about one-third from base, the other before apical area, the innermost connected with base by a slender longitudinal sanguineous fasciae; pronotum strongly foveate on each side near anterior margin more so in each lateral angle; the lateral margins strongly reflexed; mesonotum with two tubercles.

Length : Excluding tegmina $5\frac{1}{2}$-6 mm. Expansion tegmina 27-29 mm.

Distribution : India : Manipur, West Bengal. Elsewhere : Mayanmar.

Superfamily III. CICADOIDEA

Key to families of Superfamily CICADOIDEA

1. Tympanal covering always present .... CICADIDAE

– Tympanal covering entirely absent .... TIBICINIDAE

Family I. CICADIDAE

Key to the subfamilies of the family CICADIDAE

1. Tympanal covering more or less exposing orifices ..... GAEANINAE

— Tympanal covering not exposing completely ..... CICADINAE

Subfamily I. GAEANINAE

Genus 14. *Platylomia* Stal

1870. *Platylomia* Stal, *ofv. Vet. -Ak. Forh.*,: 768.

Key to species of the genus *Platylomia*

1. Opercula in male reaching fourth abdominal segment ..... *umbrata*

— Opercula in male reaching penultimate segment ..... *saturata*

20. *Platylomia umbrata* (Distant)

1888. *Cosmopsaltrea umbrata* Distant, *A.M.N.H.*, **6** : 293.

1963. *Platylomia umbrata* : Distant : Metcalf, General Catalogue of Hom., **8** : 626.

Material examined : 2 exs., Manipur; Bishenpur, 29.v.1992, R. Mathew Coll.

Diagnosis : Body olive green in colour, some irregular black spot on lateral margin of head; pronotum with two central black fasciae and a black spot on posterior margin; mesonotum with two marginal black spot and a central fascia, two black spots on crucifera elevation; tegmina hyaline, its venation reddish; wings hyaline; legs black; abdomen olive green in colour with black shading.

Length : 47 mm.

Distribution : India : Manipur (Bishenpur), Assam, Meghalaya, Uttar Pradesh, West Bengal. Elsewhere : Myanmar.

21. *Platylomia saturata* (Walker)

1858. *Dundubia saturata* Walker, *List. Hom. Suppl.* : 6.

1963. *Platylomia saturata* Walker : Metcalf, *General Catalogue of Home.*, **13** : 625.

Material examined : 1 ex., Manipur; Uchathaltera, Imphal Dist.; 29.xi.1992, A.K. Mandal Coll.

Diagnosis : Body olive green in colour, two black fasciae on pronotum, the fasciae inwardly curved and outwardly united; mesonotum also with two black fasciae connected with two fused black spots; and two black spots in front of

cruciform elevation; tegmina wih olive green tinge, its venation reddish in colour; a series of marginal spots at its apical area; wings hyaline; legs olive green; abdomen pitchy black, lateral area brownish and pilose.

Length : 44 mm.

Distribution : India : Manipur (Imphal), Assam, Naga Hills, U.P., West Bengal. Elsewhere : Indochina, Malay Peninsula, Nepal.

Subfamily II. CICADINAE

Genus 15. ***Pomponia*** Stal

1866. *Pomponia* Stal, *Hem. Afr.*, IV : 6.

22. ***Pomponia linearis*** (Stal)

1790. *Cicada fusca* Olivier, *Enc. Meth.*, V : 749.

1866. *Pomponia linearis* : Stal : Metcalf, *General Catalogue of Homp.*, 8 : 827.

Material examined : 1 ex., Manipur; Khundengthale, 14.vi.1992, R. Mathew and party Coll.

General Diagnosis : Body greenish brown, an irregular central fascia on anterior margin of head enclosing ocelli, a black spot at inner margin of eyes; a greenish broad longitudinal fascia on pronotum and a black oblique spot on each lateral margin of pronotum; a lance shaped fascia on mesonotum; two black spots on cruciform elevation; tegmina hyaline, its costal membrane greenish; wings hyaline, legs pale greenish.

Length : 43 mm.

Distribution : India : Manipur (Khundengthale) Assam, Margherita, Naga Hills, Nilgiri Hills, Sibsagar, Sylhet. Elsewhere : Java, Japan, Philippines.

Family II. TIBICINIDAE

Key to the genera of the family TIBICINIDAE

1. Pronotum about as long as head, lateral margin nearly straight; tegmina hyaline..... ..... ***Abroma***

– Pronotum longer than head, its lateral margin slightly convexly oblique; tegmina more or less opaque ..... ***Scieroptera***

Genus 16. ***Abroma*** Stal

1866. *Abroma* Stal, *Hem. Afra.* IV : 27.

23. ***Abroma maculicollis*** (Guer)

1830. *Cicada maculicollis* Guer, *Voy Coquille Zool.*, : 183.

1963. *Abroma maculicollis* Guer : Metcalf, *General Catalogue of Homp.*, 8 : 22.

Material examined : 1 ex., Manipur; Khundengthale, 14.vi.1992, R. Mathew Coll.

General Diagnosis : Body castaneous brown, margin of head castaneous, anterior margin of eye and pronotum with a greyish tomentose central hourglass shaped brownish fascia and four obconical spots on mesonotum; tegmina hyaline, its membrane castaneous; wings hyaline; legs pale castaneous; operculum in male small and lobately directed inward.

Length : 20 mm.

Distribution : India : Manipur, West Bengal. Elsewhere : Sri Lanka, Malaypeninsula, Borneo.

Genus 17. ***Scieroptera*** Stal

1866. *Scieroptera* Stal, *Hem. Afr.*, IV : 4.

24. ***Scieroptera splendidula*** (Fabricius)

1775. *Telligonia splendidula* Fabricius, *Sys. Ent.* : 681.

1999. *Scieroptera splendidula* Fabricius : G. C. Sen, M. Ghosh and L. K. Ghosh, *State Fauna Series*, 4 : Fauna of Meghalaya Part-4 : 282.

Material examined : 3 exs., Manipur; 1 ex., Ukhrul, Ukhrul Dist., 14.xii.1992, A.R. Lahiri; 1 ex., Giribum, Imphal Dist., 9.v.1992, S.K. Chakraborty Coll; 1 ex., Bishnupur, Bishnupur Dist., 21.v.1993, A.K. Pandit Coll.

General Diagnosis : Body black; purplish spot in front of vertex, brownish yellow at lateral area of vertex; a brownish yellow central fascia on pronotum; mesonotum brownish yellow; tegmina blackish red in colour; wings hyaline with brownish, yellow tinge; legs reddish brown;

abdomen brownish yellow with central dorsal longitudinal black macular fascia.

Length : 16 mm.

Distribution : India : Manipur (Bishenpur, Imphal, Ukrul), Assam, Meghalaya, Sikkim. Elsewhere : Myanmar, China.

Superfamily IV. CICADELLOIDEA

Family I. MEMBRACIDAE

Key to the genera of the family MEMBRACIDAE

1. Lateral pronotal processes present, posterior pronotal process rising obliquely near base of pronotum and then rectangularly directed to about or beyond the posterior angle of inner margin of tegmina ..... ***Anchon***

— Lateral pronotal processes absent or at least practically obsolet; posterior pronotal process closely inpinging on the tegmina ....***Gargara***

Genus 18. *Anchon* Buckton

1903. *Anchon* Buckton, *Monogr. Membrac.*, : 214.

25. *Anchon echinatum* Distant

1908. *Anchon echinatum* Distant, *Fauna Brit. India*, **4** : 51.

Material examined : 1 ex., Chiklaphani, 3.iv.1992, A.K. Sanyal and party Coll.

Diagnostic characters : Body umber brown, pronotum with a cretaceous sericeous line on each side, commencing behind each lateral process and continued at base of scutellum; tegmina with a prominent brown spot at posterior angle of inner margin, lateral pronotal processes broad flattened, their margins finely spinous, their apices ampliate, convexly truncate, the posterior angle broadly subacute.

Length : 6 mm. Width : lateral pronotal process $3\frac{1}{2}$ mm.

Distribution : India : Manipur.

Genus 19. *Gargara* Amy. & Serv.

1843. *Gargara* Amy. & Serv., *Hem.*,: 537.

26. *Gargara robusta* (Distant)

1908. *Gargara robusta* Distant, *Fauna Brit. India.*, **4** : 61.

1996. *Gargara robusta* : Biswas, et al., *State Fauna Series* 3 : *Fauna of West Bengal*, Part 5 : 85.

Material examined : 1 ex., Giribum, Imphal 20.xi.1992, A.K. Mandal and party Coll.

Diagnostic characters : Head, pronotum and body beneath black, tegmina subhyaline black at base with a pale brownish transverse spot, the extreme apical margin of the posterior process short and robust, only just passing the apex of the claval area, centrally and laterally carinate; femora black, their apices tibiae and tarsi castaneous.

Length : 3.5 mm. width lat. pronotal angle : 2 mm.

Distribution : India : Manipur (Imphal), West Bengal.

SUMMARY

The paper presents a first time taxonomic account of 26 species under 16 genera distributed over 9 families belonging to 4 Superfamilies. All the species constitute the new record from the State of Manipur. Lack of suitable number of Membracid specimens has compelled to deal the family with only two species from the State. Keys to different taxa, diagnostic characters, references and distribution of each species from India and elsewhere have been incorporated in the present paper.

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Table 1. Showing the districtwise distribution of Homopteran species from the State of Manipur.

Name of the species	Imphal	Ukrul	Chandel	Churachandpur	Senapati	Toubal	Bishenpur	Tamenglong
1. *Zanna distanti* (Schmidt)				+				
2. *Liburnia doherty* Distant		+						
3. *Liburnia furcifera* (Horv.)		+						
4. *Tropidocephala luteola* Distant		+						
5. *Centromeria speilinea* (Walk.)		-		+				
6. *Kuvira semihyalina* Distant		+						
7. *Oliarus walkeri* (Stal)	+							
8. *Poophilus costalis* (Walker)	+							
9. *Ptyelus nebulosus* (Fabricius)	+							
10. *Callitettix varsicolor* (Fabricisu)	+							
11. *Eoscarta borealis* (Distant)	+							
12. *Leptataspis fulviceps* (Dallas)				+				
13. *Phymatostetha signifera* (Walker)		+		+				
14. *Phymatostetha stalli* Butler	+							
15. *Cosmoscarta bispecularis* White				+				
16. *Cosmoscarta septempunctata* (Walker)			+	+				
17. *Cosmoscarta dorsimacula* (Walker)			+	+				
18. *Cosmoscarta minor* Atkinson	?	?	?	?	?	?	?	?
19. *Cosmoscarta metallica* (Walker)	?	?	?	?	?	?	?	?
20. *Platylomia umbrata* (Distant)							+	
21. *Platylomina saturata* (Walker)	+							
22. *Pomponia linearis* (Stal)	?	?	?	?	?	?	?	?
23. *Abroma maculicollis* (Guer)	?	?	?	?	?	?	?	?
24. *Scieroptera splendidula* (Fabricius)	+	+					+	
25. *Anchon echinatum* Distant	?	?	?	?	?	?	?	?
26. *Gargara robusta* Distant	+							

+ present; absent; ? not known

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INSECTA : HOMOPTERA : CICADELLOIDEA

M. GHOSH AND L. K. GHOSH
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Cicadellids or Leafhoppers are considered insects of economic importance. They usually cause damage to the plants by sucking the sap from vascular tissues, injecting toxins while sucking and transmitting virus diseases besides reducing the vitality, vigour and furit–bearing capacity and also forming malformations. 115 species of cicadellids have been reported to transmit 86 plant pathogens (Ishihara, 1969). Despite their severe damage caused to the crop plants, not much work is on record to explore the abundance and distribution of these insects in the country.

In India, about 680 species (against about 15,000 in the world) are known through the contributions made by Distant (1908, 1916, 1918) ; Pruthi (1930, 1934, 1936, 1940) ; Ghauri (1963, 1967, 1971, 1975) ; Rao (1967, 1969) ; Ramkrishnan and Menon (1971, 1972, 1973, 1974) ; Singh (1969) ; Bindra and Singh (1979) ; Sohi (1972) ; Datta (1969, 1972, 1973, 1988) ; Datta and Ghosh (1973, 1974) ; Datta and Dhar (1984) ; Sohi and Dworakowska (1983) ; Viraktamath (1976-1983) and Ghosh and Ghosh (1994). Perusal of literature reveals that only two species (marked*) were known from Manipur (Distant 1908). The present paper is an attempt to provide a first comprehensive account of cicadellid fauna of Manipur, comprising 29 species belonging to 20 genera under 8 subfamilies. Of these, 27 species belonging to 19 genera have been recorded for the first time from the state. This faunistic-cum-taxonomic study is chiefly based on the collections made by various Mopping Survey Parties of Zoological Survey of India and other named and unnamed collections represented in National Zoological Collections at Z. S. I. The account deals with a brief note on earlier investigations, keys to taxa, diagnosis and geographical distribution of each species. Short description of genitallic armature of the species is given wherever possible with suitable illustrations. This is an aid to identification of the species category. A table showing the distribution of 29 species examined from various districts of Manipur has also been included in this paper.

The classification has been mainly adopted from Distant (1908–1918), Young (1952) and Ghauri (1963-1975).

SYSTEMATIC ACCOUNT

Superfamily CICADELLOIDEA

Family I. CICADELLIDAE

Subfamily I. CICADELLINAE

Genus 1. ***Bothrogonia*** Melichar

1. *Bothrogonia ferruginea* (Fabricius)
2. *Bothrogonia indistincta* (Walker)

Genus 2. ***Cicadella*** Melichar

3. *Cicadella spectra* (Distant)

Genus 3. ***Cofana*** Melichar

4. *Cofana mimica* Distant

Genus 4. ***Kolla*** Distant

5. *Kolla gregalis* Distant
6. *Kolla insignis* Distant

7. *Kolla mungphuensis* Distant
8. *Kolla opponens* Walker

Genus 5. ***Tettigella*** China and Fennah

9. *Tettigella bellona* Distant

Family II. EVACANTHIDAE
Subfamily II. EVACANTHINAE

Genus 6. ***Evacanthus*** Lep. & Serv.

10. *Evacanthus extremus* Distant
11. *Evacanthus repexus* Distant

Family III. HECALIDAE
Subfamily III. HECALINAE

Genus 7. ***Parabolocratus*** Fieber

12. *Parabolocratus albomaculatus* (Distant)

Family IV. DELTOCEPHALIDAE
Subfamily IV. DELTOCEPHALINAE

Genus 8. ***Balclutha*** Kirkaldy

13. *Balclutha punctata* Thunb.

Genus 9. ***Cicadula*** Setterstede

14. *Cicadula indrina* Singh-Pruthi

Genus 10. ***Chiasmus*** Mulsant and Rey

15. *Chiasmus jagodishi* Singh-Pruthi

Genus 11. ***Deltocephalus*** Burmeister

*16. *Deltocephalus coloratus* Distant
17. *Deltocephalus nigrifascialis* Distant

Genus 12. ***Dio*** Distant

18. *Dio facialis* Distant

Genus 13. ***Exitianus*** Ball

19. *Exitianus atkinsoni* (Distant)
20. *Exitianus indicus* (Distant)
21. *Exitianus nanus* (Distant)

Genus 14. ***Goniagnathus*** Fieber

22. *Goniagnathus punctifer* Walker

Genus 15. ***Nephotettix*** Matsumura

23. *Nephotettix nigropicta* Stal
24. *Nephotettix virescens* (Fabricius)

Genus 16. ***Thomsoniella*** Signoret

25. *Thomsoniella porrecta* Walker

Family V. IASSIDAE
Subfamily V. IASSINAE

Genus 17. ***Iassus*** Fabricius

26. *Iassus indicus* (Walker)

Family VI. KRISNIDAE
Subfamily VI. KRISHNINAE

Genus 18. ***Krisna*** Kirkaldy

27. *Krisna strigicollis* (Spinola)

Family VII. AGALLIDAE
Subfamily VII. AGALLINAE

Genus 19. ***Agallia*** Curtis

28. *Agallia campbelli* Distant

Family VIII. TYPHLOCYBIDAE
Subfamily VIII. TYPHLOCYBINAE

Genus 20. ***Empoanara*** Distant

*29. *Empoanara lineolata* Distant

Key to the Subfamilies of CICADELLIDAE

1(2) Veins at base of tegmina indistinct, not forked on corium ... TYPHOLOCYBINAE

2(1) Veins at base of tegmina distinct, on corium more or less branched and connected by transverse veins 3

3(4) Face tumid; ocelli situated on vertex 5

4(3) Face not tumid; ocelli may or may not be on vertex 9

5(6) Face centrally carinate ; anterior of pronotum not produced between eyes .... EVACANTHINAE

6(5) Face neither centrally carinate nor foveate 7

7(8) Lateral facial sutures ending over margin ; head not produced ..... CICADELLINAE

8(7) Lateral facial sutures not as above ; pronotum not extending to forwards beyond anterior margin of eyes ..... AGALLINAE

9(10) Large insects, rather dorsoventrally flattened, ocelli on anterior margin of head 11

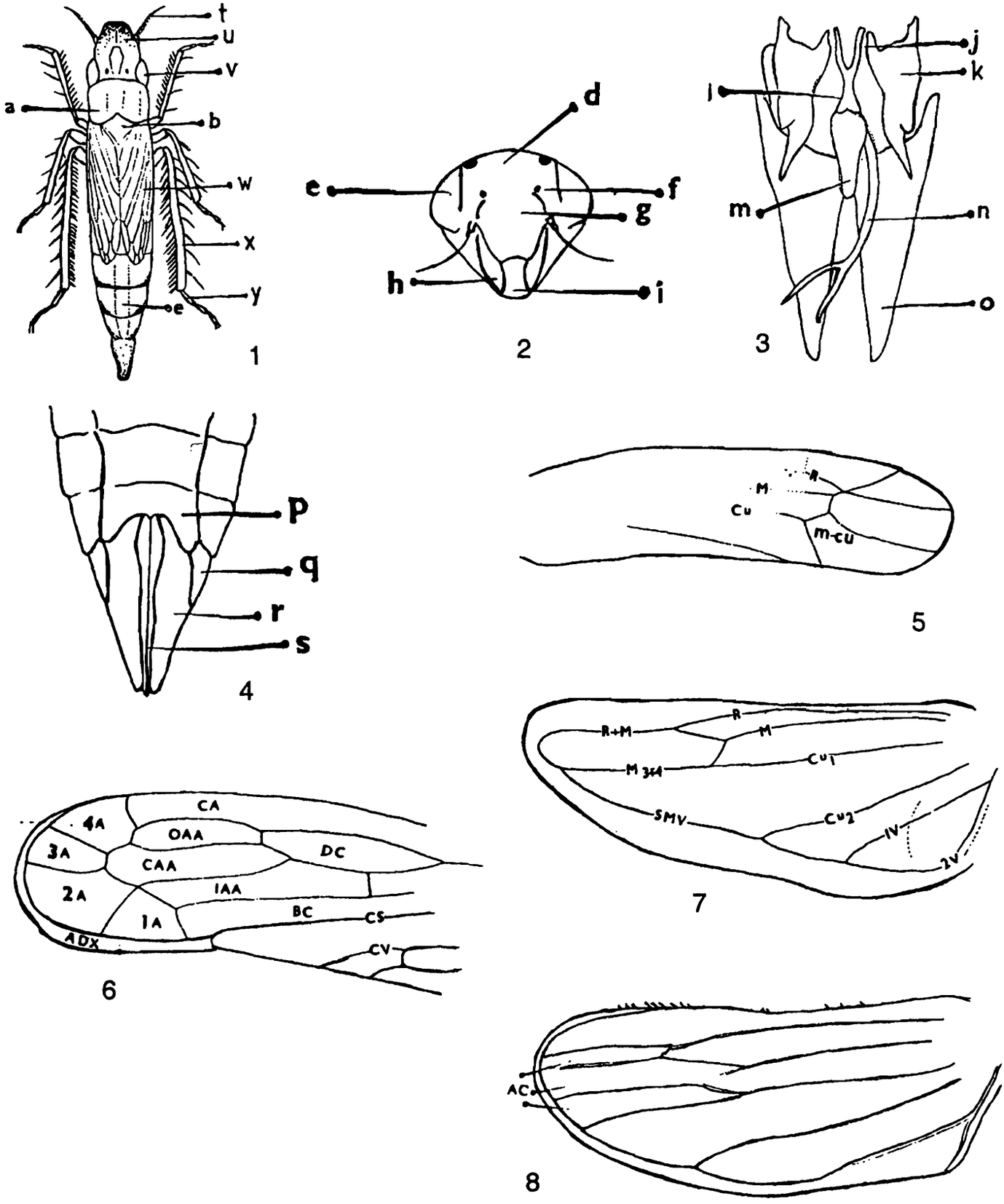

Fig. 1-8 : Structural features of generalised adult Leafhopper 1 : a, pronotum ; b, scutellum ; t, antenna ; u, vertex of head, v, eye ; w, tegmen ; X, tibia ; y, tarsus ; 2 : d, Crown ; e, compound eye ; f, Ocellocular area ; g, Clypeus ; h, Lorum ; 3 : e, Clypellus ; j, Connective ; k, style ; connective shaft ; m, Aedeagal base ; n, Aedeagal shaft ; o, Male plate ; 4 : P. VIIth sternum ; q, VIIth sternum ; r, Pygofer ; s, Ovipositor ; 5-8 : AC, Apical cells ; SMV, Submarginal vein ; 1A-4A-4A : 1st—4th apical cells ; ADX, Appendix ; BC, Brachial cell ; CAA, Central anteapical ; CA, Costal area ; DC, Discal cell ; OAA, Outer anteapical ; CS, Claval suture ; IAA, Inner anteapical ; CV, Claval vein

10(9) Smaller insects, usually not dorsoventrally flattened 13

11(12) Submarginal vein in hind wing continued over jugum ..... KRISHNINAE

12(11) Submarginal vein not continued over jugum ..... IASSINAE

13(14) Ocelli on face ; frontal sutures continued up to the ocelli ..... IDIOCERINAE

14(13) Ocelli on anterior margin of head or on vertex ; face convex in profile 15

15(16) Body dorsoventrally flattened ; pronotum with lateral margin carinate ; vertex, pronotum with lateral margin carinate ; vertex, pronotum and scutellum without any longitudinal median impressed black line ..... HECALINAE

16(15) Body not as above, rather robust, broad and compressed .... DELTOCEPHALINAE

Key to the genera of Subfamily CICADELLINAE

1(2) Face flattened, medially smooth and distinctly transversely striate 3

2(1) Face not flattened ; elongate and moderately globose and without striation 5

3(4) Vertex strongly produced, anterior margin subcarinate ..... ***Kolla***

4(3) Vertex not strongly produced as above, anterior margin rounded ..... ***Cofana***

5(6) Tegmina longer than abdomen ; forewing with five apical cells ; posterior tibiae longly spinulose 7

6(5) Tegmina shorter than abdomen; forewings with four apical cells ; posterior tibiae not longly spinulose ..... ***Cicadella***

7(8) Lateral margin of vertex in a line with inner margin of the eyes ..... ***Tettigella***

8(7) Lateral margin of vertex not in a line with inner margin of the eyes ..... ***Bothrogonia***

Family I. CICADELLIDAE

Subfamily CICADELLINAE

1. Genus *Bothrogonia* Melichar

1926. *Bothrogonia* Melichar, *Ann. Mus. Nat. Hist. Hung.*, **23** : 341.

Key to the species of *Bothrogonia*

1. Face with a transverse black spot, sometimes divided before clypeus ..... *ferruginea*
2. Face with a longitudinal black fascia not divided before clypeus ..... *indistincta*

1. *Bothrogonia ferruginea* (Fabricius) (Fig. a-c)

1794. *Tettigoniella ferruginea* Fabricius, *Entomologia Syst.*, **1** : 32.

1988. *Bothrogonia ferruginea* (Fabricius) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 4.

Material examined : 10 exs., Manipur ; 6 exs., Churachandpur, Churachandpur Dist. ; 4.vi. 1992, coll. *R. Mathew and party* ; 4 exs., Korsong, Ukhrul Dist., 14. vi. 1993, coll. *S. Barman and party.*

Diagnosis : Vertex brownish yellow in colour, with two black spots, one at base and another at apex between the ocelli ; face with a black spot before clypeus ; pronotum with three black spots, one at central near anterior margin and other two at base ; scutellum with a black spot centrally ; tegmina darker, purplish red in colour, with a black spot at base and at apex a broadly black patch ; its apical cell blackish ; legs black ; abdomen blackish and wings black.

Genitalia : Connective subtriangular, medially depressus ; aedeagal shaft terminating in two oarshaped processes ; style with short apical knob, rest cylindrate ; male plate robust, obliquely curvate on lateral margin, uniseriate ; pygofer hook infolded laterally, apical third geniculate. apex acuminate.

Length : 16 mm.

Distribution : India : Manipur (Churachandpur, Ukhrul Dist.), Assam, Maharashtra, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere :

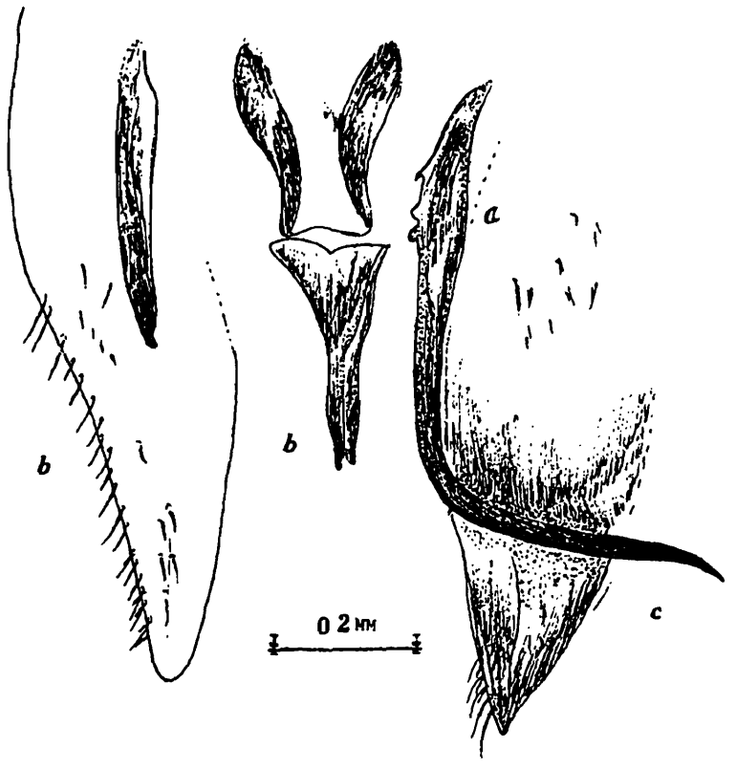

Fig. 9 (a—c) : *Bothrogonia ferruginea* : a, Aedeagus ; b, Male plate, Style ; c, Pygofer.

Borneo, Burma, Sri Lanka, China, Coorg, Dutch, East Indies, Japan, Java, Korea, Malay Peninsula Nepal, Philippines.

2. ***Bothrogonia indistincta*** (Walker)
(Fig. 10a–d)

1851. *Tettigoniella indistincta* Walker, *List. Hom. B.M.* : 739.

1988. *Bothrogonia indistincta* (Walker) : Datta, *Rec. zool. Surv. India. Occ. Paper* No. **90** : 5.

Material examined : 1 ex., Thanlon, Churachandpur Dist., 23. i. 1977, coll. *S. G. Patil* ; 1 ex., Chandel, Chandel Dist., 30. iii. 1999, coll. *D. K. M.* and *S. K. G.*

Diagnosis : Body robust and brownish in colour, vertex with two large black spots, one spot at apex and other at base ; pronotum with three spots, two black spots, at base and one black spot at middle of anterior area ; scutellum with subapical black spots ; face black ; tegmina brownish yellow, its apices pitchy colour, wings black, legs and abdomen black.

Genitalia : Connective 'Y'-shaped ; aedeagus massive, complex structure; style straight, stout, extending two-third of male plate, flattened throughout length, apex uncinate, preapical lobe absent ; Male plate massive, mesal margin linear, lateral margin of two-third convex, convergent apical with a row of microsetae.

Length : 14.5 mm.

Distribution : India : Manipur (Churachandpur, Chandel Dist.), Assam, Meghalaya, Uttar Pradesh.

Elsewhere : Borneo, Burma, China, (Western and Northern), Ceylon, Fukien, Java, Philippines, Sumatra, Szechwan.

2. Genus ***Cicadella*** Latreille

1817. *Cicadella* Latreille, *Contenant Crustaces Arachnid Insectes* **3** : 406.

3. ***Cicadella spectra*** (Distant)
(Fig. 11a–c)

1853. *Tettigonia albeda* Signoret, *Ann. Soc. Ent. Fr.* **21** : 663.

1910. *Cicadella spectra* (Distant), *Insect. Trans.*, **10** : 224.

1988. *Cicadella spectra* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 26.

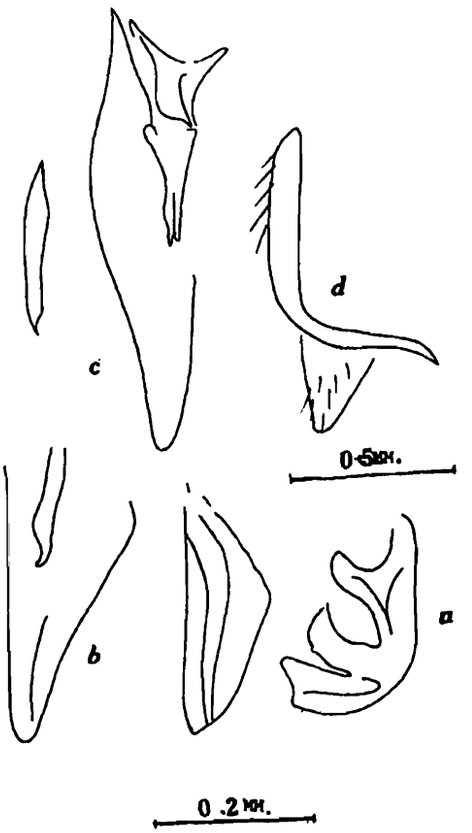

Fig. 10 (a—d) : *Bothrogonia indistincta* : a, Aedeagus ; b, Style ; c, Male plate ; d, Pygofer.

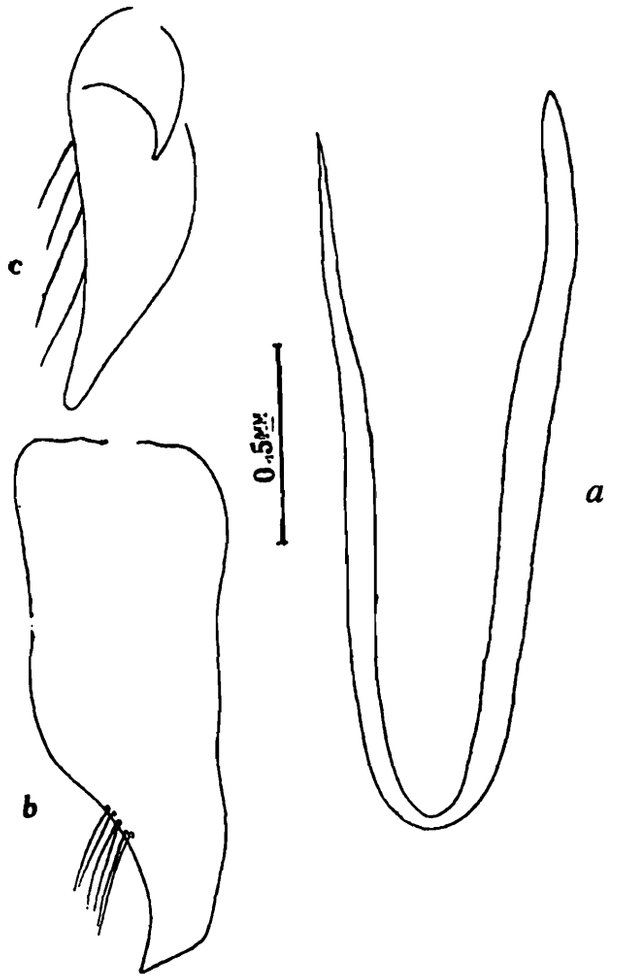

Fig. 11 (a—c) : *Cicadella (Tettigella) spectra* : a, Aedeagus ; b, Style ; c, Male plate.

Material examined : 22 exs., Manipur, Churachandpur, Churachandpur Dist., 2. vi. 1992, coll. *R. Mathew* ; 8 exs., Tamenglong, Tamenglong Dist., 21. xi. 1992, coll. *A. K. Mandal* ; 7 exs., Lamjang Dist., 3. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body white with flavoustint, vertex with four black spots, one at base and at apex, another two at central, other two black spots on the lateral margin at basal angles of face ; face darker in colour, a central line and transverse striation ; tegmina and its vein very pale fuscous ; legs and abdomen brownish yellow in colour.

Genitalia : Connective 'Y'-shaped, arm short, aedeagal shaft linear, converging apical, marginal folded forming sulcate area beyond middle ; style shaft foot-shaped, mesal apical extension directed lateral, preapical lobe developed, male plate gradually connivent, robust ; pygofer beyond middle densely spinulate.

Length : 9 mm.

Distribution : India—Manipur, Churachandpur, (Tameglong), Assam, Bihar, Karnataka, Maharastra, Madhya Pradesh, Meghalaya, Orissa. Elsewhere : Australia, Bangladesh, Nepal, Sri Lanka.

Remarks : The species is commonly found on paddy during winter. It also feeds on wild grasses.

3. Genus *Cofana* Melichar

1926. *Cofana* Melichar, *Ann. Mus. Nat. Hist.*, **23** : 345.

4. *Cofana mimica* (Distant) (Fig. 12a–c)

1908. *Kolla mimica* Distant, *Fauna Brit. India, Rhynchota* **4** : 225.

1988. *Cofana mimica* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 12.

Material examined : 7 exs., Manipur ; 5 exs.,

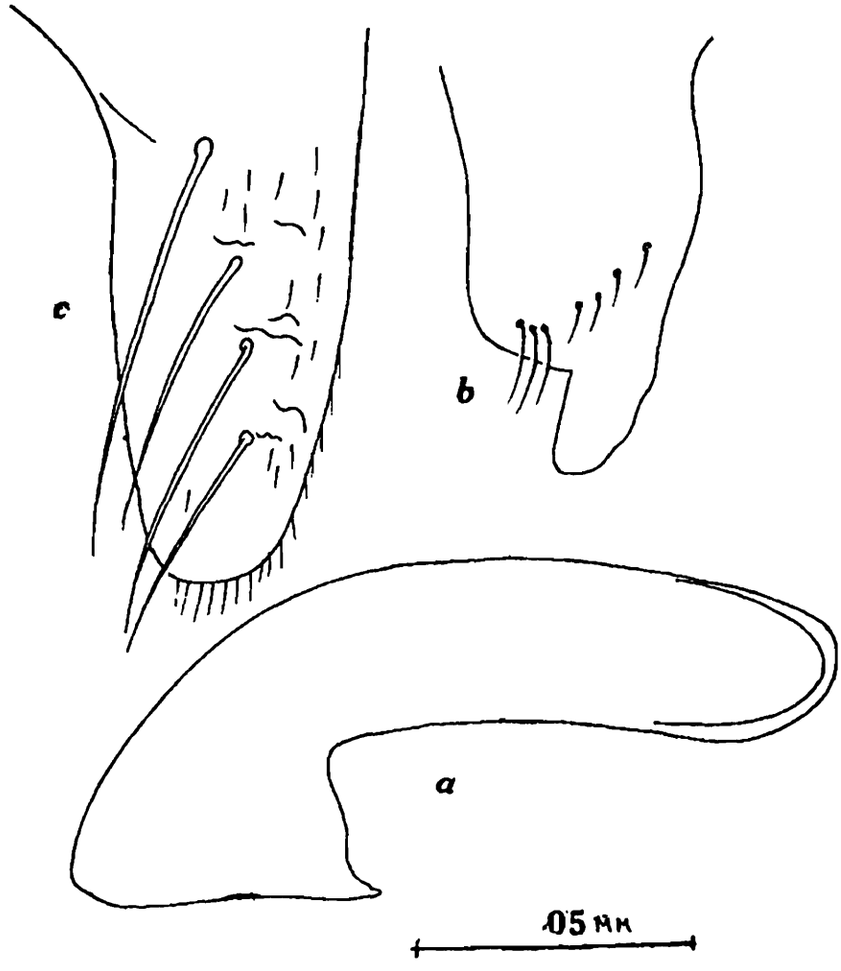

Fig. 12 (a—c) : *Cofana (Kolla) mimica* : a, Aedeagus ; b, Style ; c, Male plate.

Churachandpur, Churachandpur Dist., 3. vi. 1992, coll. *R. Mathew* ; 2 exs., Ukhrul, Ukhul Dist., 8. iv. 1992, coll. *A. K. Sanyal.*

Diagnosis : Body light whitish, tementose, head and pronotum light green in colour ; vertex with transverse series of black spots ; at central one black spot and others two near ocellus ; a small black spot near inner margin of each eyes ; scutellum yellowish in colour, with distinct, dark longitudinal line ; tegmina greyish white, its vein distinctly and obsoletely infuscate ; wings pale milky colour or semihyaline ; legs light green in colour ; abdomen yellowish.

Genitalia : Connective 'Y'–shaped, arm very short ; aedeagus with developed basal strut, strongly geniculate basically, directed caudad, at apex membranous process ; style dorsoventrally compressed, mesal apical extension short, apex truncate obliquely, male plate robust, lateral margin uniseriate ; pygofer simple rectangulate, apical margin densly setose.

Length : 5.5 mm.

Distribution : India—Manipur (Churachandpur, Ukhrul), Bihar, Meghalaya, Sikkim, Uttar Pradesh, West Bengal.

4. Genus *Kolla* Distant

1988. *Kolla* Distant, *Fauna Brit. India, Rhynchota,* **4** : 223.

Key to the species of genus *Kolla*

1(2) Tegmina with longitudinal fasciae ; but not pale costal margin ; pronotum with a waved transverse brownish yellow fascia ; scutellum with a large black spot at each basal angle ..... *insignis*

2(1) Tegmina without longitudinal fasciae ; but with pale costal margin 3

3(4) Vertex with three black spots, two spots on anterior margin and one transverse spot at basal margin 5

4(3) Vertex with two large spots, one at base and other at apex ..... *mungphuensis*

5(6) Pronotum with a broad transverse black spot ; scutellum with a large black spot in each basal angle ..... *opponens*

6(5) Pronotum with a central longitudinal black spot ; scutellum with a central sanguineous spot ..... *gregalis*

5. *Kolla gregalis* Distant

1908. *Kolla gregalis* Distant, *Fauna Brit. India, Rhynchota,* **4** : 226.

1965. *Kolla gregalis* Distant : Metcalf, *General Catalogue of the Homp.,* **VI** : 450.

Material examined : 6 exs., Manipur ; 4 exs., Senapati, Senapati Dist., 3. xv. 1992, coll. *A. K. Hazra* ; 2 exs., Tamenglong, Tamenglong Dist., 31. xi. 1992, coll. *A. K. Hazra.*

Diagnosis : Body reddish in colour ; vertex with three black spots, one large black at apex and two small spots at base ; face broadly black margined ; a central longitudinal black spot on pronotum which widened at anterior margin and connected with its basal margin ; scutellum with a reddish spot ; tegmina blackish-red in colour, with two broad longitudinal reddish fasciae one near its costal margin and other near inner margin ; legs brownish ; abdomen black.

Length : 7.5 mm.

Distribution : India—Manipur (Senapati ; Tamenglong Dist.), Assam, Meghalaya, West Bengal. Elsewhere : British India.

6. *Kolla insignis* Distant

1908. *Kolla insignis* Distant, *Fauna Brit. India, Rhynchota,* **4** : 223.

1988. *Kolla insignis* Distant : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 11.

Material examined : 2 exs., Manipur, Ukhrul, Ukhrul Dist., 3. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body brownish yellow in colour ; vertex with two large black spots united anteriorly ; at centre three angulated spots connected by an oblique line and a transverse black spot in the front of each eyes ; pronotum bronzy black, near its anterior margin a transverse waved brownish fascia, with finely striation ;

scutellum brownish yellow, with a large black spot on each basal angle, and a strong transverse impression present, tegmina bronzy black, its costal area brownish yellow ; legs pale brownish ; abdomen brownish.

Length : 6.5 mm.

Distribution : India—Manipur (Ukhrul), Assam, Meghalaya, Uttar Pradesh, West Bengal.

Elsewhere : Nepal.

7. ***Kolla mungphuensis*** Distant

1908. *Kolla mungphuensis* Distant, *Fauna Brit. India, Rhynchota*, **4** : 225.

1965. *Kolla mugphuensis* Distant : MetCalf, *General Catalogue of Homp.*, **1** : 443.

Material examined : 2 exs., Manipur, Kampang, Chandel Dist., 9. iv. 1992, coll. *A. K. Sanyal and party.*

Diagnosis : Body bright yellow in colour, one large black spot at base of vertex and one black large spot at apex of vertex; a central logitudinal black fascia on face ; scutellum with a large black spot near each basal angle ; tegmina greyish, two longitudinal brownish red fasciae, one in claval area and other in subcostal margin, wings subhyaline, legs brownish yellow.

Length : 6 mm.

Distribution : India—Manipur, (Chandel), Eastern Himalayas.

8. ***Kolla opponens*** (Walker)
(Fig. 13a–b)

1857. *Tettigonia opponens* Walker, *List. Hom. B.M.*, **3** : 757.

1988. *Kolla opponens* (Walker) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 12.

Material examined : 2 exs., Manipur ; Kampang, Chandel Dist., 9. iv. 1992, coll. *A. K. Sanyal.*

Diagnosis : Body brownish red ; vertex with three black spots ; two spots at anterior margin and one transverse spot at base of vertex ; pronotum black, with a broad longitudinal black fascia centrally connected with an angulated basal margin ; scutellum with a large black spot at its

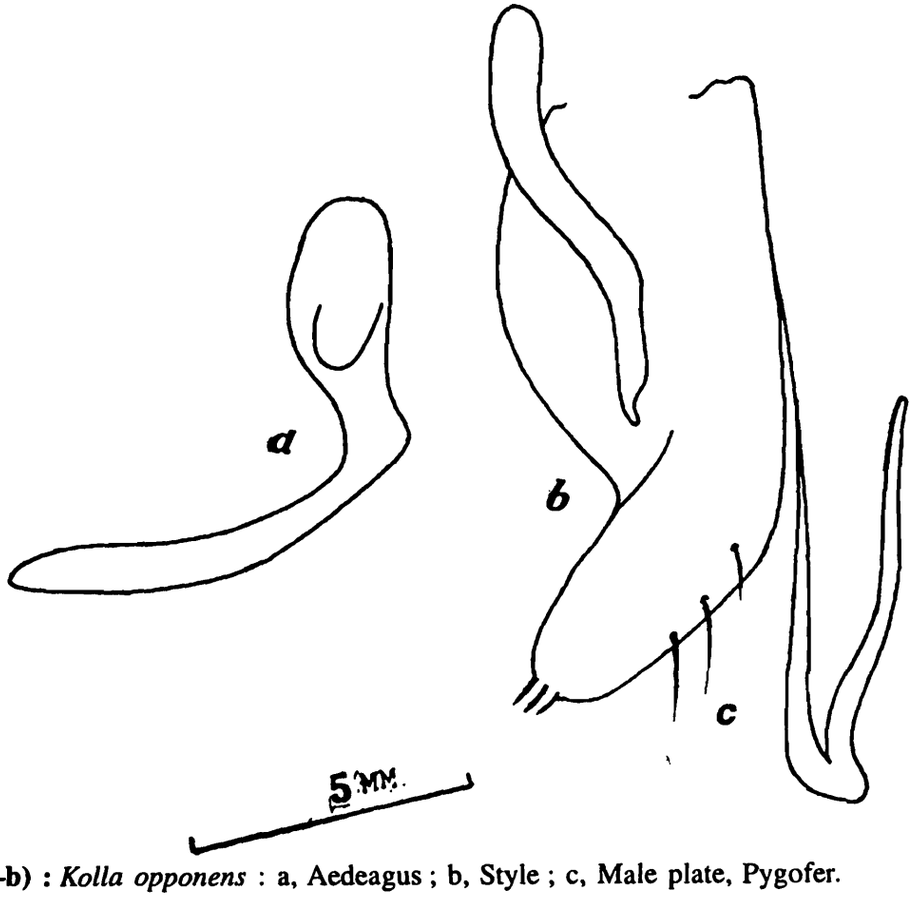

Fig. 13 (a—b) : *Kolla opponens* : a, Aedeagus ; b, Style ; c, Male plate, Pygofer.

basal angle ; tegmina with its claval and costal area, broad black longitudinal fascia ; legs brownish yellow ; abdomen with black tansverse fascia.

Genitalia : Connective rectangulate, aedeagal shaft rod-shaped, gradually connivent, apically foot-shaped ; style at base curved, at margin infolded and apex beak-shaped ; male plate robust, dagger-shaped, narrowed beyond middle, apex rounded ; pygofer quadrate, robust, dagger-shaped, geniculate based.

Length : 8.5 mm.

Distribution : India—Manipur (Chandel), Assam, Meghalaya, Uttar Pradesh, West Bengal.

Elsewhere : Burma, Netherlands.

5. Genus *Tettigella* China & Fennah

1945. *Tettigella* China and Fennah, *Ann. Mag. Nat. Hist.*, **12** (11) : 711.

9. *Tettigella bellona* Distant

1908. *Tettigonialla bellona* Distant, *Fauna Brit. India, Rhynchota*, **iv** : 212.

1965. *Tettigella bellona* Distant : Metcalf, *General Catalogue of Homp.*, **1** : 135.

Material examined: 1 exs., Manipur, Ukhrul (Ukhrul), 8. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body yellow in colour, vertex with a prominent black spot at anterior portion, ocelli slightly red in colour ; a longitudinal ridge on each side of the vertex and broadly obliquely furrowed ; pronotum yellow in colour ; its clavus side distinctly wrinkled ; tegmina golden yellow, its base pale saffron yellow ; legs saffron yellow, abdomen yellow in colour.

Length : 8 mm.

Distribution : India—Manipur (Ukhrul), Meghalaya, South India.

Family EVACANTHIDAE

Sub-family EVACANTHINAE

6. Genus *Evacanthus* Lep. & Serv.

1825. *Evacanthus* Lep. & Serv., *Enc. Meth.*, **x** : 612.

Key to the species of the genus *Evacanthus*

1(2) Pronotum pale yellow, with a broad black central fascia and two black spots occupy the whole of the lateral area ..... *extremus*

2(1) Pronotum brownish yellow, lateral margin black with spots ; no central fascia, but transversly striate ..... *repexus*

10. *Evacanthus extremus* Walker

1851. *Tettigonia extremus* Walker, *List. Hom.*, **iii** : 761.

1963. *Evacanthus extremus* Walker : Metcalf, *General Catalogue of Homp.*, **vi** : 25.

Material examined : 5 exs., Manipur ; 4 exs., Temenlong, Temenlong Dist., 7. xi. 1992, coll. *P. H. Ray* ; 1 exs., Imphal, Imphal Dist., 29. xii. 1992, coll. *A. K. Hazra.*

Diagnosis : Body black in colour, anterior and lateral margin pale yellow ; with a brownish ridge at central area ; pronotum pale yellow with a broad central black fascia, scutellum black, tegmina pitchy black in colour, inner and whole claval area pale yellow, apical area much paler, wings bronzy brown, legs brownish.

Length : 7.5 mm.

Distribution : India—Manipur (Temenlong, Imphal), Assam, Northern India, Punjab, Sikkim, West Bengal; *Elsewhere* : Pakistan.

11. *Evacanthus repexus* Distant
(Fig. 14a–f)

1908. *Eucanthus repexus* Distant, *Fauna Brit. India, Rhynchota*, **iv** : 228.

1988. *Evacanthus repexus* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 55.

Material examined : 3 exs., Manipur, (Ukhrul), 3. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body black in colour, anterior and posterior margin of vertex brownish yellow, vertex with fine and distinct ridge, face smooth, with distinct central longitudinal ridge ; pronotum brownish yellow, with finely transversely striate ; scutellum black, strongly transverse impressed before apical area ; tegmina finely punctate, costal

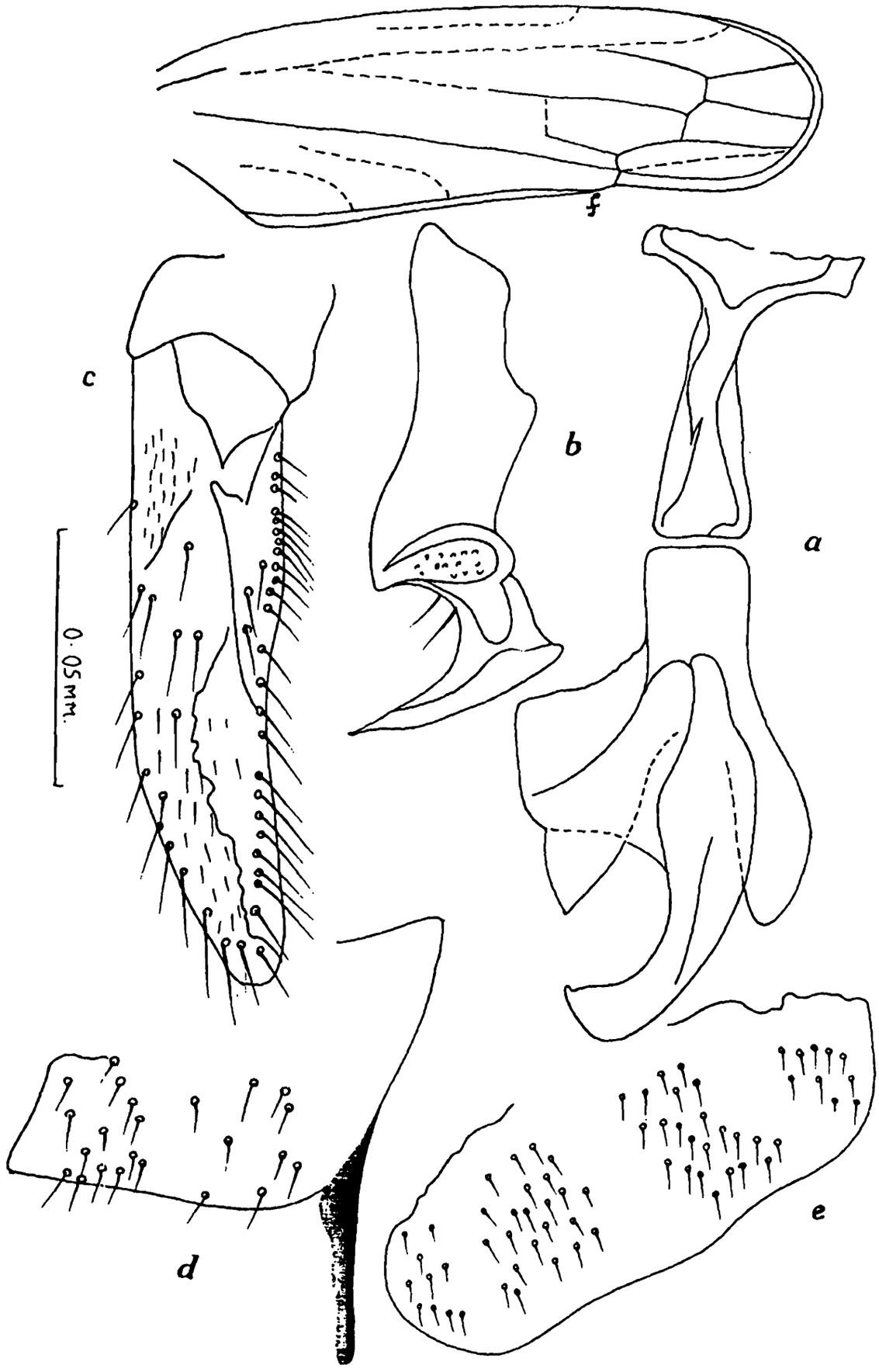

Fig. 14 (a—f) : *Evacanthus repexus* : a, Aedeagus ; b, Style ; c, Male plate ; d, Pygofer ; e, 7th Sternite ; f, Forewing.

and inner claval margin pale yellowish in colour, upper surface pubescent ; legs brownish, posterior tibiae longly spinulose.

Genitalia : Connective'Y'-shaped, aedeagus with a pair of apophyses, shaft concavus along margin, apex obliquely truncate ; style, its mesal apical extension strongly pointed, directed caudad ; male plate cucumiform, at margin uniseriate ; pygofer square-shaped, hook rod-shaped, straight, apex pointed.

Length : 7.5 mm.

Distribution : India—Manipur (Ukhrul), Himachal Pradesh, North Bengal, Punjab, Sikkim, Uttar Pradesh and West Bengal.

Family HECALIDAE

Sub-family HECALINAE

7. Genus *Parabolocratus* Fieber

1866. *Parabolocratus* Fieber, *Zool. Bot. Gesellwien Verhand.*, **16** : 502.

12. *Parabolocratus albomaculatus* (Distant) (Fig. 15a-e)

1908. *Parabolocratus albomaculatus* (Distant), *Fauna Brit. India, Rhynchota*, vi.

1988. *Parabolocratus albomaculatus* Distant : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 85.

Material examined : 8 exs., Manipur ; 4 exs., Molvailup, (Ukhrul Dist.), 1. iv. 1992, coll. *A. K.*

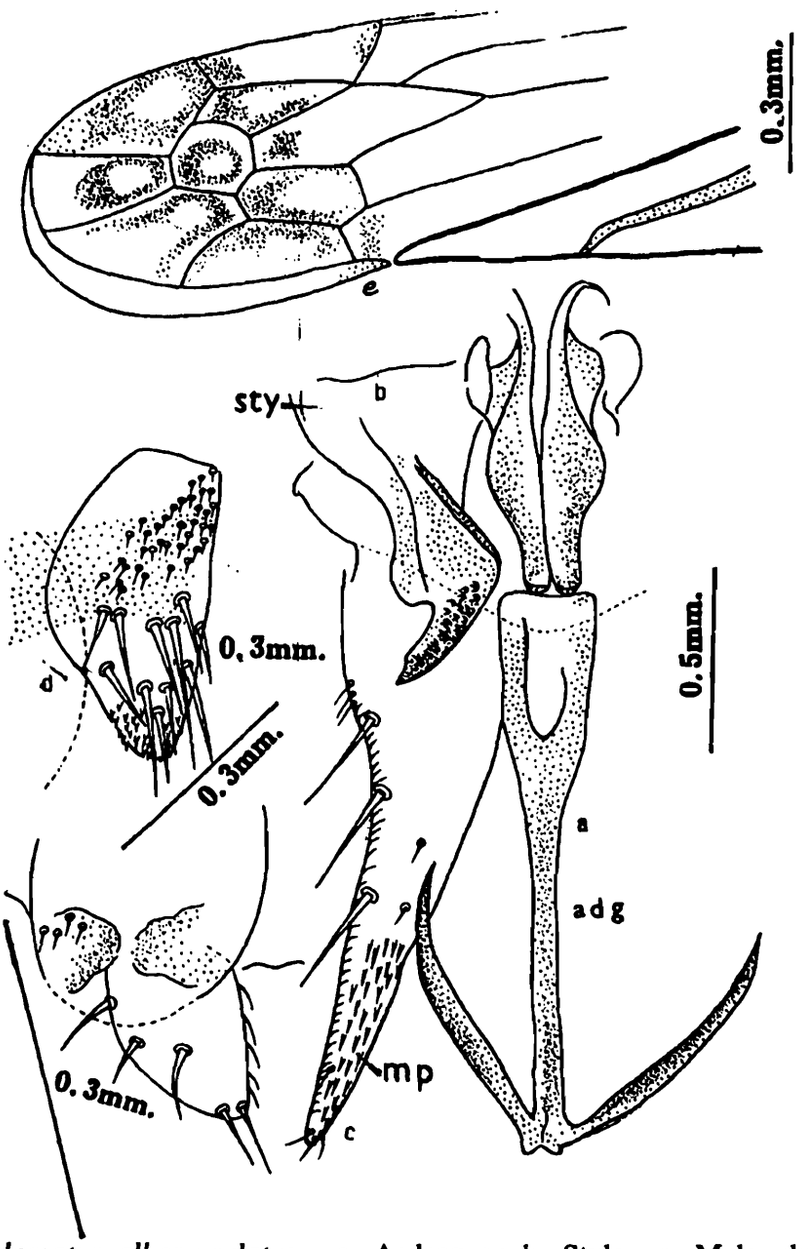

Fig. 15 (a—e) : *Parabolocratus albomaculatus* : a, Aedeagus ; b, Style ; c, Male plate ; d, 7th Sternite ; e, Forewing.

Sanyal ; 2 exs., Ukhrul, Ukhrul Dist., 8. iv. 1992, coll. *A. K. Hazra* ; 2 exs., Churachandpur, Churachandpur Dist., 5. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body greenish yellow, lateral and apical margin of vertex strongly reflexed, extreme apical margin blackish red, pronotum with finely transversely striae ; scutellum with an angulate line before apical area and with two dark black spots at each basal area ; tegmina greenish, apical area brownish with white spots ; legs brownish ; abdomen black.

Genitalia : Connective 'U'-shaped, aedeagal-shaft tubelike ; a pair of elongate sharply terminal process laterally directed ; style pointed, obliquely truncate, ventrally spinulate ; maleplate conivent gradually, ventral surface spinulate, pygofer simple.

Length : 5 mm.

Distribution : India—Manipur (Ukhrul and Churachandpur), Assam, Meghalaya, Orissa, Sikkim, Tamil Nadu, West Bengal; *Elsewhere* : Bengian, Congo, Luzon, Philippines Island.

Family DELTOCEPHALIDAE

Sub-family DELTOCEPHALINAE

Key to genera of the Subfamily of *Deltocephalinae*

1(2) Vertex as long as broad, pointed or acutely angularly produced 3

2(1) Vertex shorter than long ; vertex neither pointed nor acutely angularly produced 7

3(4) Tegmina longer, covering the abdomen round off behind, with distinct veins ...5

4(3) Tegmina shorter, parchment-like, not covering the abdomen, rarely developed, without distinct vein ..... ***Chiasmus***

5(6) Pronotum wider than long as base ; face symetrically hexagonal .... *Deltocephalus*

6(5) Pronotum about half as long as broad ; face very long ..... ***Dio***

7(8) Head shorter than pronotum ; pronotum striped or wrinkled 9

8(7) Head longer than pronotum ; pronotum without carina or striation 13

9(10) Tegmina usually punctate ; clypeus rectangular at base somewhat narrower ..... ***Goniagnathus***

10(9) Tegmina usually not punctate, rather hyaline, clypeus not as above 11

11(12) Clypeus quadrangular, broadest at base, extending beyond the margin of cheek ; vertex without any fascia .... ***Nephotettix***

12(11) Clypeus almost parallel, rounded at tip, twice longer than broad at base ; vertex with some obscure longitudinal orange-red fasciae ..... ***Thomsoniella***

13(14) Wings with two anteapical cells ..... ***Balclutha***

14(13) Wings with three anteapical cells.....15

15(16) Vertex with a black curved transverse fascia between eyes ; apices of tegmina rectangular ..... ***Exitianus***

16(15) Vertex without such fascia ; apices of tegmina rectangular ..... ***Cicadula***

8. Genus ***Balclutha*** Kirkaldy

1901. *Balclutha* Kirkaldy, *Entomologist.*, **34** : 338.

13. ***Balclutha punctata*** (Thunb.)
(Fig. 16a–c)

1784. *Cicada punctata* Thunb., *Act. Ups.* **iv** : 21.

1967. *Balclutha punctata* Thunb : Metcalf, *General Catalogue of Homp.*, **x** : 2414.

Material examined: 2 exs., Manipur, Churachandpur, Churachandpur Dist., 4. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body greyish yellow in colour (in male specimen) and two oblique bands being arranged by a few black spots, one on the basal third and other next the angular veins ; (in female specimen), body pale green in colour, two black spots on the elytra reduced to two on the clavus,

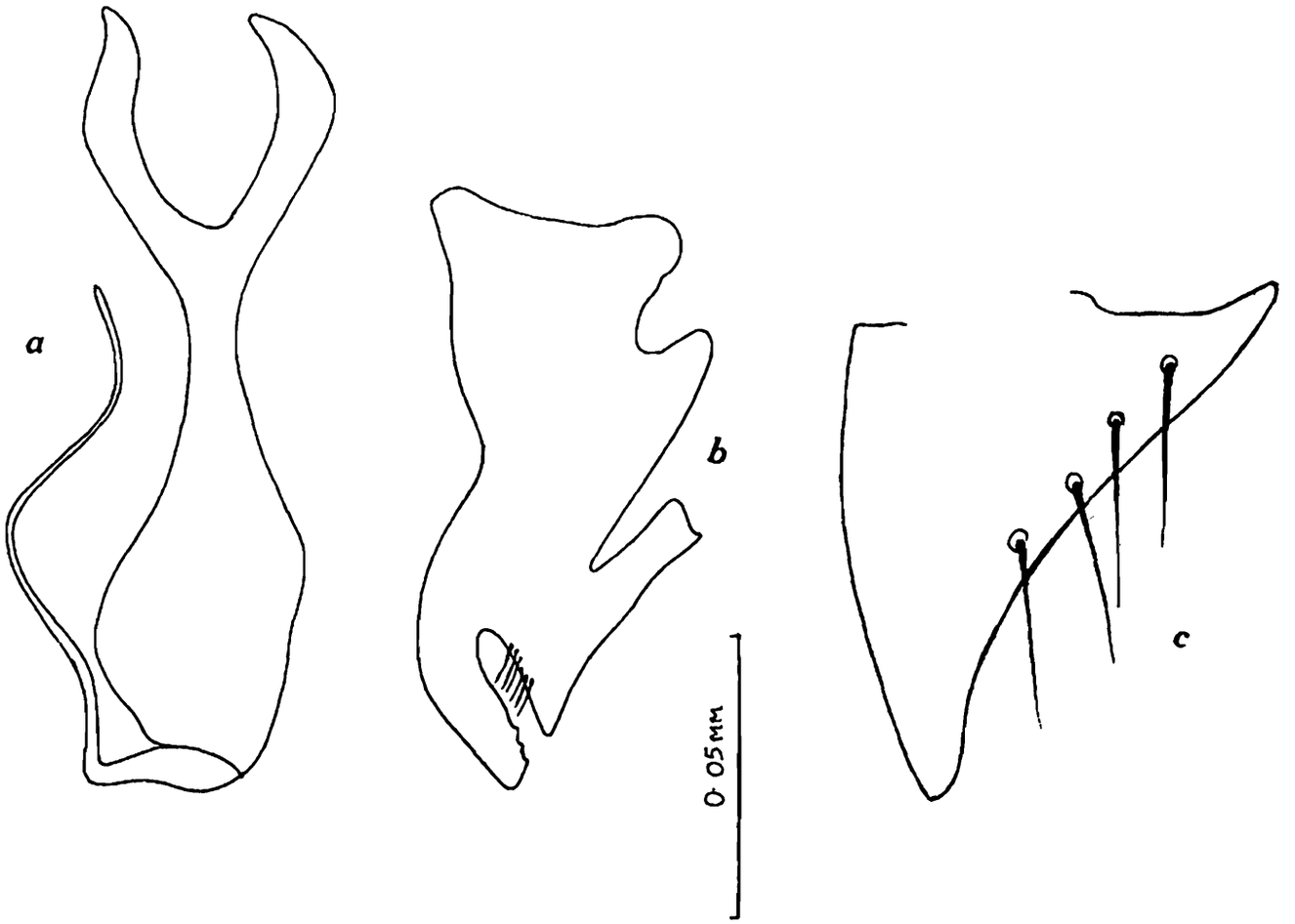

Fig. 16 (a—c) : *Balclutha punctata* : a, Aedeagus ; b, Style ; c, Male plate.

one at the apex, other at base and one on corium next the angular vein ; head, pronotum and scutellum marked with dark brown colour streak, abdomen black, legs pale black.

Genitalia : Connective 'Y'-shaped ; aedeagal shaft broaden basally, abruptly narrowed in long flagellate form ; style calliperate, preapical lobe well differentiated, mesal apical extention longer, apex obliquely truncate, posterolaterally serrate ; male plate broaden basad, gradually tapering to round apex, a uniseriate row of long macrosetae on lateral margin, pygofer simple, with dispersed setae across median plane.

Length : ♂: 3.5, ♀ : 4 mm.

Distribution : India—Manipur (Churachandpur); *Elsewhere* : Japan, New Guinea, throughout the Palaearctic and Nearactic region.

9. Genus *Cicadula* Zetterstede

1840. *Cicadula* Zetterstede, *Insecta Lappoinica*, **1** : 296.

14. *Cicadula indrina* Singh-Pruthi (Fig. 17a–b)

1930. *Cicadula indrina* Singh-Pruthi, *Mem. Indian Mus.*, **11** : 58.

1988. *Cicadula indrina* Singh-Pruthi : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 110.

Material examined : 1 ex., Manipur, Ukhrul (Ukhrul Dist.), 9. iv. 1992, coll. *A K. Hazra.*

Diagnosis : Body short, pale brownish yellow in colour, vertex much shorter than breadth, anteriorly rounded, two black spots at base, two fine transverse stripes just beyond middle and a black marking on each side of the apex ; frons dark brown with longitudinal stripes in middle, several oblique brown striae in lateral margin ; pronotum much longr than vertex, yellow in colour, scutellum greenish yellow, with a distinct transverse impression ; tegmina pale reddish in colour, subhyaline, vein distinct ; legs brown, abdomen black.

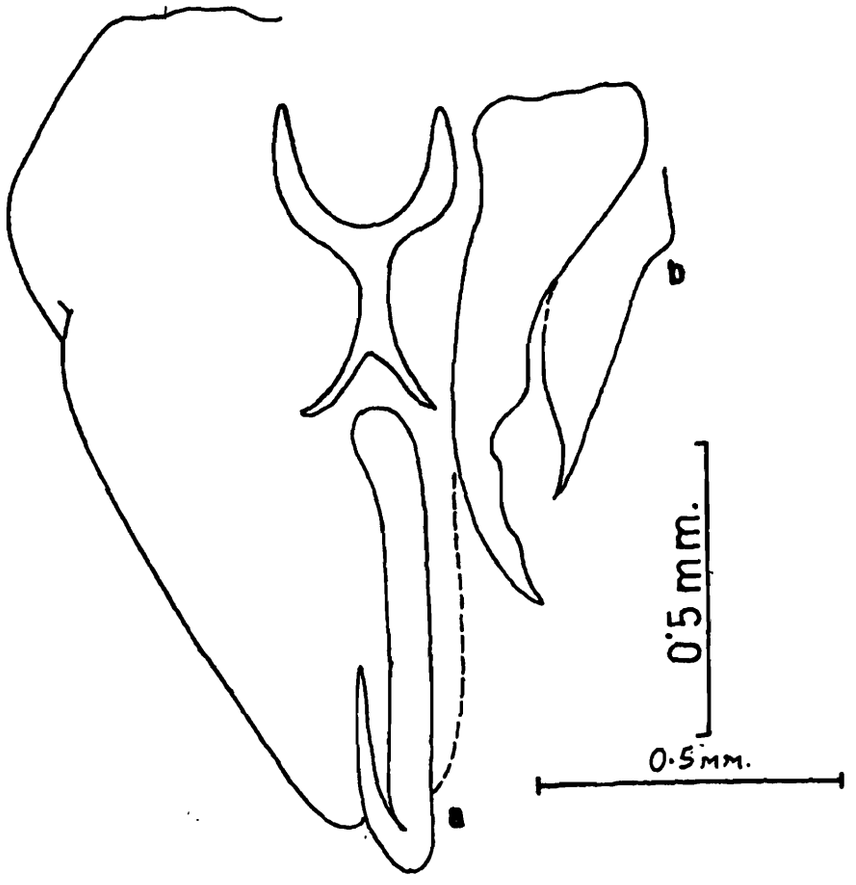

Fig. 17 (a—b) : *Cicadula indrina* : a, Aedeagus ; b, Style.

Genitalia : Connective 'Y'-shaped ; aedeagus cylindrical, extreme tip, feebly notched, a pair of terminal processes directed cephalad ; style broader beyond middle, mesal apical extension abruptly narrowed, apex truncate obliquely, male plate gradually connivent, setose, lateral margin having hair-like setae ; pygofer simple.

Length : 3 mm.

Distribution : India : Manipur Ukhrul Dist., Punjab.

10. Genus *Chiasmus* Muls. & Rey

1855. *Chiasmus* Muls. & Rey, *Ann. Sco. Linn. Lyon.*, p. 215.

15. *Chiasmus jagodishi* Singh-Pruthi (Fig. 18a)

1930. *Chiasmus jagodishi* Singh-Pruthi, *Mem. Indian Mus.*, : 11.

1963. *Chiasmus jagodishi* Singh-Pruthi : Metcalf, *General Catalogue of Hom.*, vii : 213.

Material examined : 1 ex., Manipur, (Churachandpur), 1. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body small in size, brownish yellow in colour, vertex two-third of its breadth, with numerous black spots and patches all over, face brownish mottled with dark brown, pronotum about half of the length of vertex, dark brown in colour with light patches in the anterior margin ; scutellum almost as long as pronotum, brownish colour ; tegmina coriaceous, short, brownish yellow, with irregular dark patches, vein marked with white ; legs long, posterior thickly spinulose, abdomen blackish red in colour.

Genitalia : Connective 'V'-shaped ; aedeagal shaft tube-like, basal part broader, gradually tapering to a point ; style with inner lobe narrowed, slender, preapical lobe prominent ; male plate simple in structure ; pygofer simple.

Length : 2.5 mm.

Distribution : India : Manipur (Churachandpur), West Bengal.

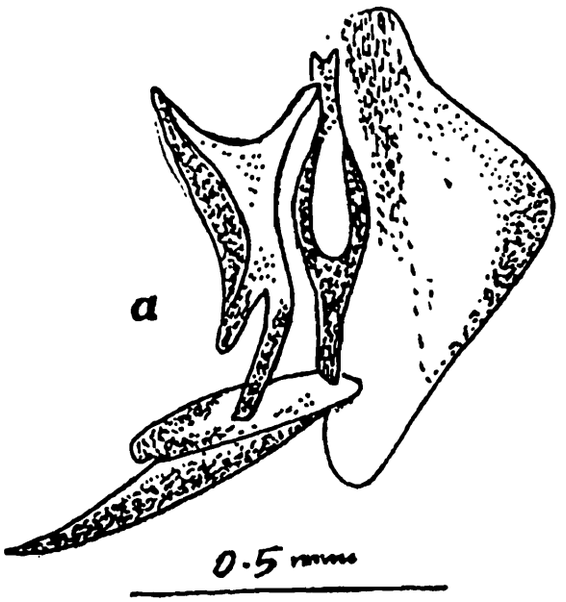

Fig. 18 (a) : *Chiasmas jagadishi* : a, Aedeagus, Style.

11. Genus ***Deltocephalus*** Burmeister

1838. *Deltocephalus* Burmeister, *Genera Inscetorum*, 1 : 15.

Key to the species of the genus *Deltocephalus*

1. Vertex of the head subconically produced ; face finely transversely striate and with a distinct central longitudinal raised line .... *coloratus*
2. Vertex of the head not subconically produced ; about as long as breadth, face not transversely striate and not with distinct central line ; with black spots ..... *nigrifacialis*

16. ***Deltocephalus coloratus*** Distant

1918. *Deltocephalus coloratus* Distant, *Fauna Brit. India, Rhynchota*, vii : 82

1967. *Deltocephalus coloratus* Distant : Metcalf, *General Catalogue of Hemip.*, x : 1123.

Material examined : Manipur, Ukhrul, Ukhrul Dist., (National Coll.).

Diagnosis : Body brownish yellow in colour, a sublateral blood red fascia on each side of the vertex ; clypeus with two central linear black spots, greyish white in colour ; pronotum brownish colour, with central longitudinal line and a curved black fascia on each side, and also very finely somewhat indistinctly granulose ; scutellum blackish, tegmina bronzy brown, costal margin broadly light brownish inside margin black, its vein pale brownish ; legs brownish yellow ; abdomen brownish.

Length : 4 mm.

Distribution : India : Manipur (Ukhrul).

17. ***Deltocephalus nigrifascialis*** Distant (Fig. 19a–e)

1918. *Deltocephalus nigrifascialis* Distant, *Fauna Brit. India, Rhynchota*, vii : 81.

1988. *Deltocephalus nigrifascialis* Distant : Datta, *Rec. zool. Surv. India. Occ. Paper* No. 90 : 119.

Material examined : 1 ex., Manipur ; Kumbai, Imphal Dist., 2. iv. 1992, coll. *A K. Hazra.*

Diagnosis : Vertex dull brownish in colour, with two large pale brownish yellow spots between the eyes, and in its apical margin a greyish narrow fascia which cortaining two central dark spots ; pronotum with four dark longitudinal brownish fasciae ; scutellum with a brownish spot at each basal angle and a spot at its apex ; face with three black spots and black striation ; tegmina pale brownish yellow, with dark spots, and before apical area greyish ; legs brownish yellow, abdomen brownish.

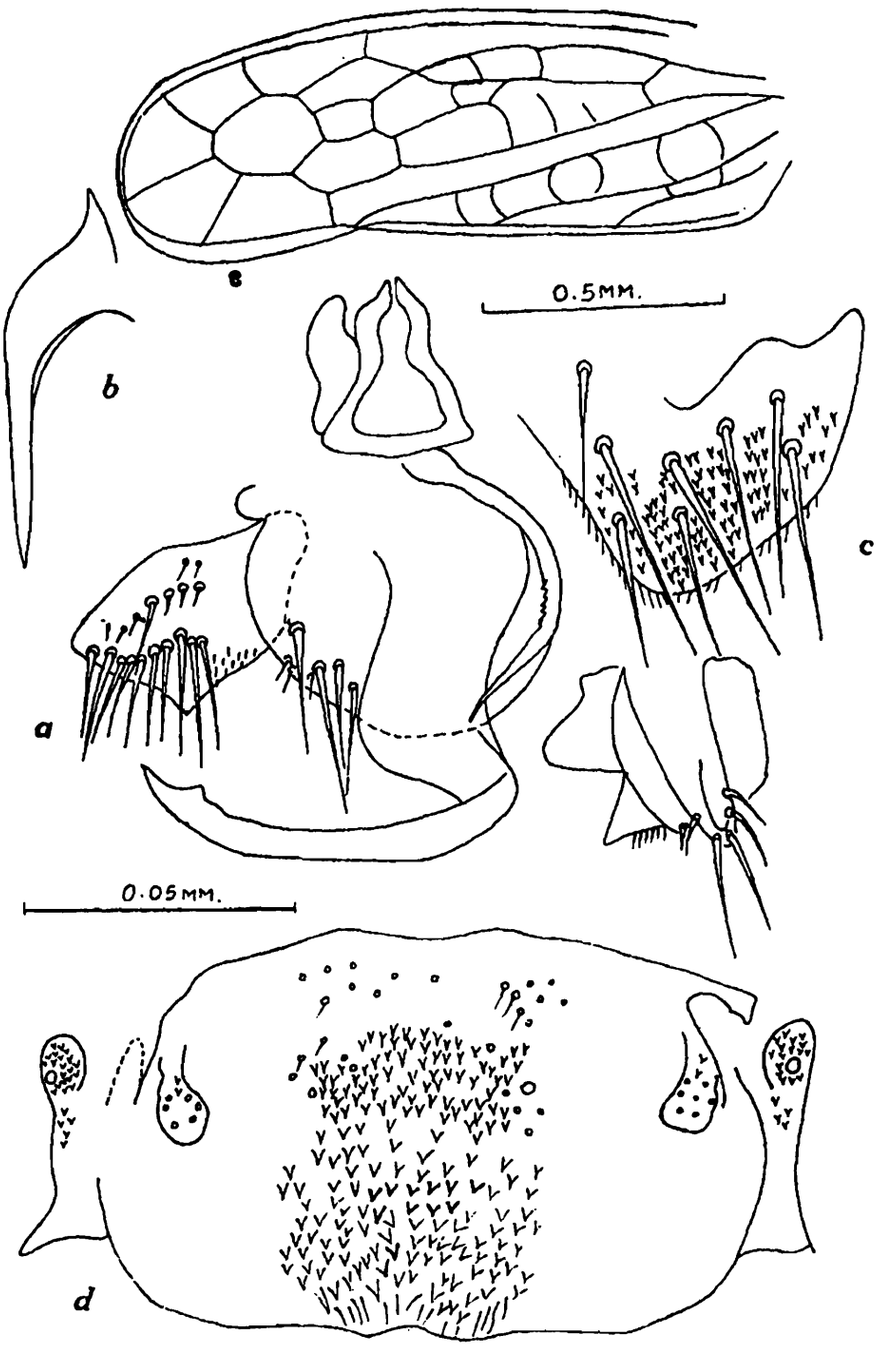

Fig. 19 (a—e) *: Deltocephalus nigrifacialis* : a, Aedeagus ; b, Style ; c, Pygofer ; d, 7th Sternite ; e, Forewing.

Genitalia : Connective 'V'-shaped ; aedeagal shaft elongate, slender, apex obtuse ; elongate, slender, distinctly serrate on inner margin, apex acute ; male plate massive, broad at base, abruptly geniculate, apex sharp, densely spined ; pygofer ovoid arcute, distinctly setose.

Length : 3.5 mm.

Distribution : India : Manipur : (Imphal), North Bengal, Sikkim.

12. Genus *Dio* Distant

1918. *Dio* Distant, *Fauna Brit. India,* Rhynchota, **VII** : 56.

18. *Dio facialis* Distant
(Fig. 20a-c)

1918. *Dio facialis* Distant, *Fauna Brit. India,* **7** : 56.

1988. *Dio facialis* Distant, : Datta, *Rec. zool. Surv. India, Occ. Paper* No **90** : 125.

Material examined : 1 ex., Manipur, Kumbi, Imphal Dist., 2. iv. 1992, coll. *A. K. Hazra.*

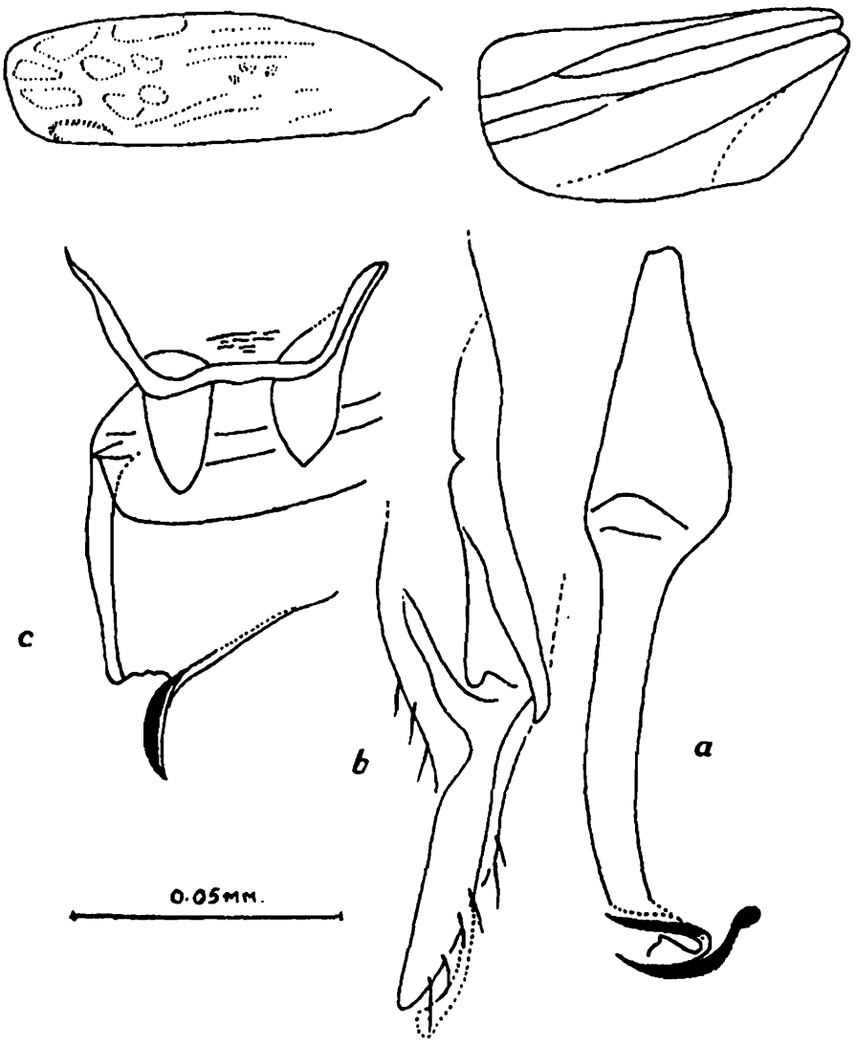

Fig. 20 (a—c) : *Dio facialis* : a, Aedeagus ; b, Style ; c, Pygofer.

Diagnosis : Body small, greenish, brown in colour, numerous black spots around vertex not extending to the base of pronotum ; face pale brownish, with very small irregular black spots at upper area and minute black striations at lateral area ; scutellum multilated ; tegmina greenish brown, darker checkered marking, and an oblong large spot at middle of costal area, legs greenish yellow, abdomen piceous.

Genitalia : Connective 'Y'-shaped ; aedeagal shaft elongate, slender, arcuate with subapically projection at apex pointed ; style slightly narrow in the middle, flattened apically, mesal apical extension very short directed caudad, preapical lobe pointed ; male plate subquadrate, lateral margin converging uniseriate, apex rounded ; pygofer hook-shaped, short, directed caudad, densely spiniferous.

Length : 2.5 mm.

Distribution : India—Manipur : Imphal, Eastern Himalaya, Meghalaya, Sikkim.

13. Genus ***Exitianus*** Ball

1929. *Exitianus* Ball, *Trans. Amer. Ent. Soc.*, **53** : 5.

Key to species of the genus *Exitianus*

1(2) Pronotum dark greyish, an arcuated series of black spots before anterior margin 3

2(1) Pronotum not dark, greyish to pale greyish, and not arcuated series of black spots, only two piceous spots on each side near anterior margin ..... *nanus*

3(4) Scutellum with two small central oblique black spots on the disk ..... *atkinsoni*

4(3) Scutellum without central oblique linear black spots ..... *indicus*

19. ***Exitianus atkinsoni*** (Distant)
(Fig. 21a–d)

1908. *Athysanus atkinsoni* Distant, *Fauna Brit. India, Rhynchota*, **4** : 345.

1988. *Exitianus atkinsoni* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 134.

Material examined : 6 exs., Manipur, Churachandpur, Churachandpur Dist., 1. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Vertex brownish yellow in colour, with a bow-like black transverse fascia between eyes, and two black spots at apical margin ; pronotum greyish in colour, with a series of linear transverse black spots at anterior margin, scutellum brownish, with a large subtriangular black spot at each basal angle and two small central oblique black linear spots at disk and a transverse impression before apical area, tegmina subhyaline, its vein darker, legs pale brownish, abdomen fuscous.

Genitalia : Connective 'Y'-shaped ; aedeagal shaft massive, subapically sulcate, a pair of sharp lateral process arising mesad. directed caudad, apex pointed ; style mesal apical extension very short, obliquely truncate, apex acute, directed lateral, rugose ; male plate densely spinulate, apex rotundate, pygofer, posterolaterally thickly spinulose, subapical spur spatulate, twice length of terminal spur.

Length : 5 mm.

Distribution : India—Manipur (Churachandpur), Bihar, Tamil Nadu, Sikkim, Uttar Pradesh, West Bengal.

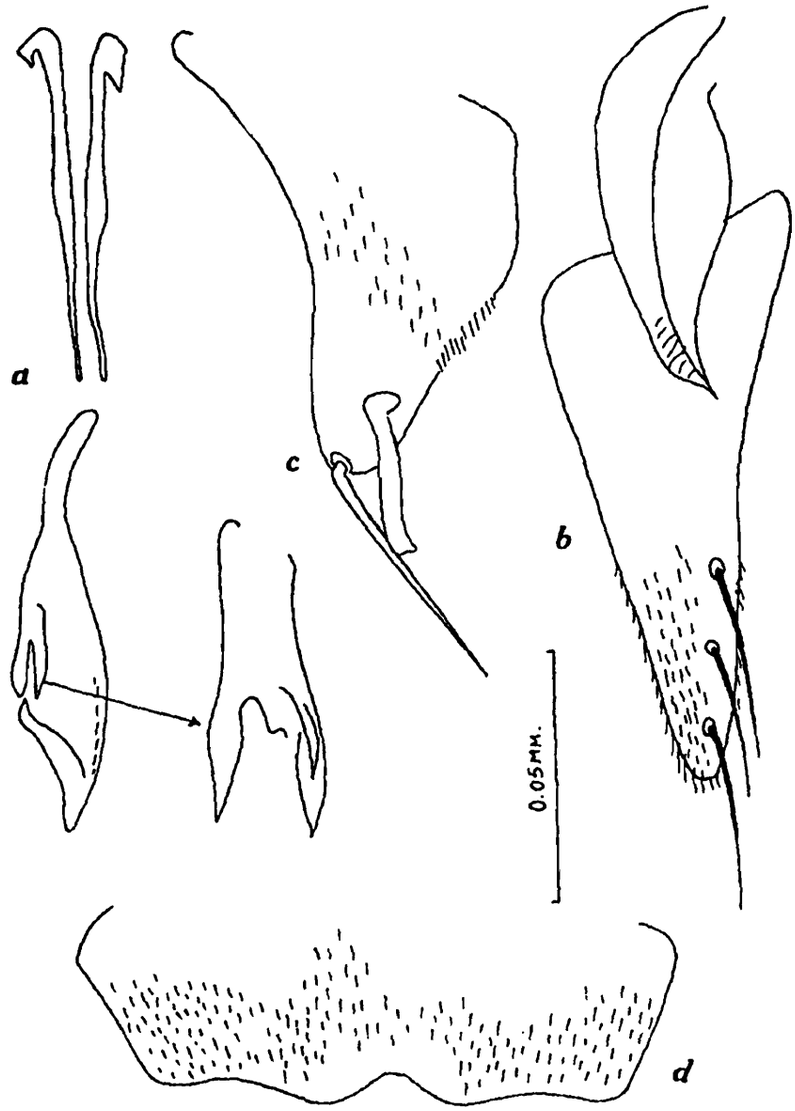

Fig. 21 (a—d) : *Exitianus atkinsoni* : a, Aedeagus ; b, Style ; c, Pygofer ; d, 7th Sternite.

20. ***Exitianus indicus*** (Distant)
(Fig. 22a–d)

1908. *Athysanus indicus* Distant, *Fauna Brit. India, Rhynchota*, **4** : 344.

1988. *Exitianus indicus* (Distant) : Datta, *Rec. zool. Surv. India. Occ. Paper* No. **90** : 136.

Material examined : Material examined : 12 exs., Manipur ; 7 exs. ; Churachandpur, Churachandpur Dist., 1. iv. 1992, coll. *A. K. Hazra* ; 5 exs., Ukhrul, Ukhrul Dist., 9. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body pale brownish, vertex with bow-like pitchy black fascia between the eyes, and a distinct longitudinal line at base ; pronotum pale greyish colour, with two small pitchy black spots on each side at anterior margin ; scutellum brownish yellow in colour, with a black spot at each basal angle, tegmina subhyaline, its vein brownish, legs with brownish streaks ; abdomen pale brown.

Genitalia : Connective 'Y'-shaped ; aedegal shaft massive compressed lateral, subapical sulcate, apex acute, style with massive apical extension obtuse, angulate, apex sharply pointed ; male plate posteriorly converging to angulate apex, with row of macrosetae along lateral margin, disc and mesal margin densely spinulate ; pygofer

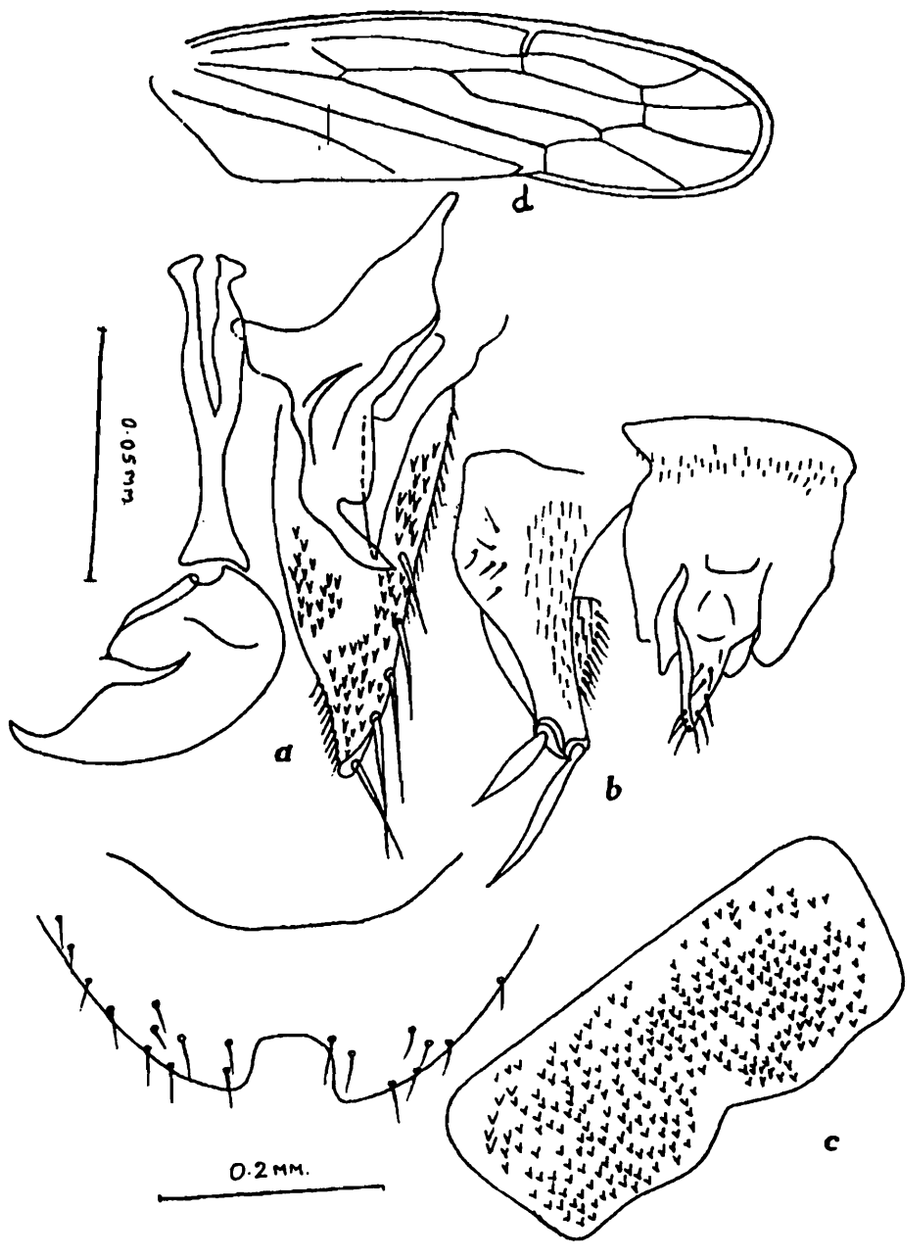

Fig. 22 (a—d) : *Exitianus indicus* : a, Aedeagus ; b, Pygofer ; c, 7th Sternite, d, Forewing.

gradually narrowed apically with a pair of apical prominent spur, terminal spur twice the length of subapical one, disc and mesal margin densely spinulate.

Length : 4.5 mm.

Distribution : India—Manipur (Churachandpur, Ukhrul), Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

21. ***Exitianus nanus*** (Distant)
(Fig. 23a–e)

1908. *Athysanus nanus* Distant, *Fauna Brit.* India, *Rhynchota*, **4** : 345.

1988. *Exitianus nanus* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 137.

Material examined : 5 exs., Manipur ; 3 exs., Churachandpur, Churachandpur Dist, 4. iv. 1992,

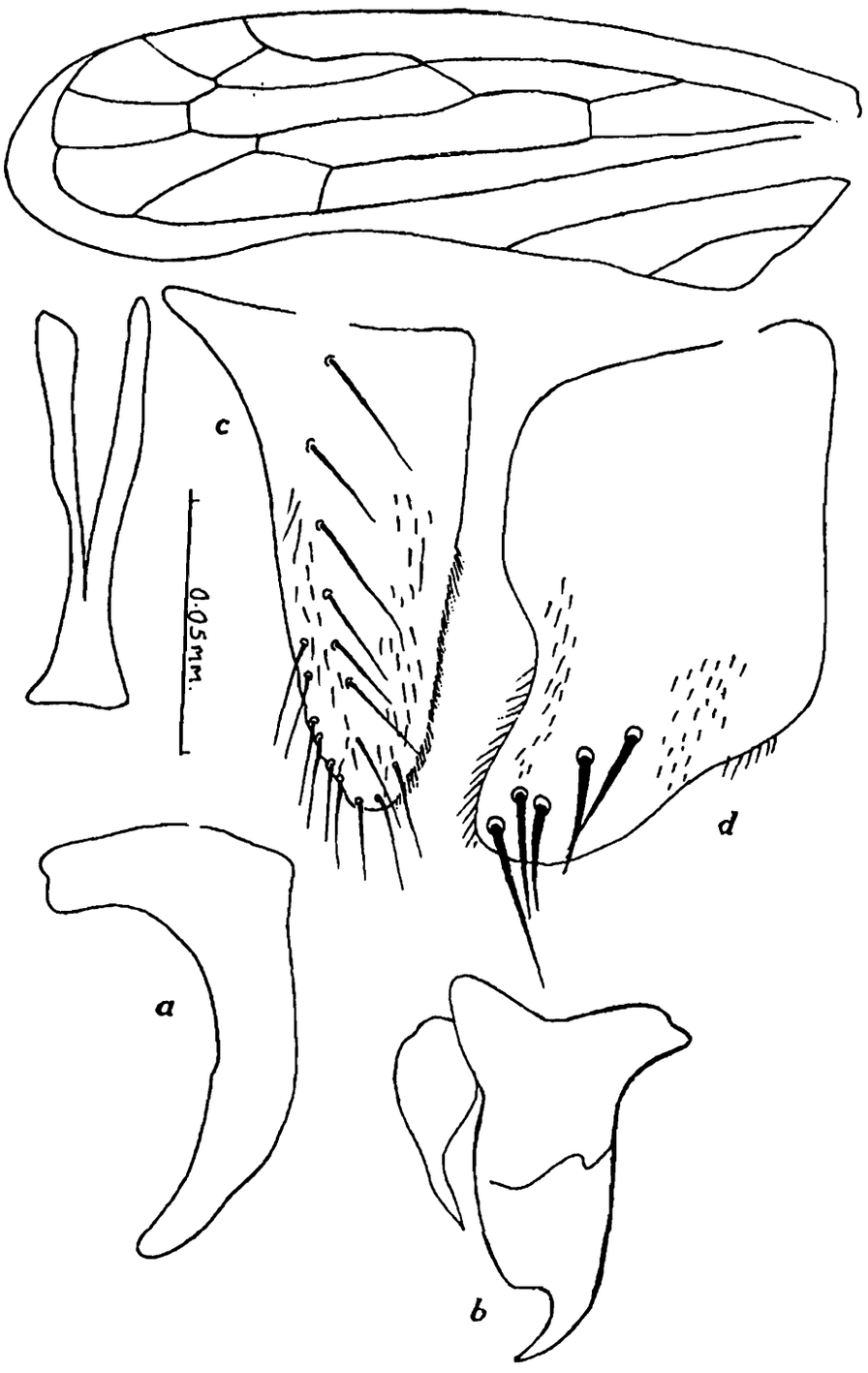

Fig. 23 (a—e) : *Exitianus nanus* : a, Aedeagus ; b, Style ; c, Male plate ; d, Pygofer ; e, Forewing.

coll. *A. K. Hazra* ; 2 exs., Claton ; Tamenglong Dist., 12. vi. 1993, coll. *R. S. Barman.*

Diagnosis : Body pale brownish yellow in colour, vertex pale brownish, with a blackish red line between eyes, pronotum greyish colour, with small blackish red spots on its each anterior margin ; scutellum pale brownish, with a small rounded black spot on each basal angle ; tegmina subhyaline, its vein brownish ; legs pale brownish yellow, at its intermediate coxae a blackish red spot ; abdomen pale brownish.

Genitalia : Connective 'Y'-shaped ; aedeagal shaft simple, massive, subapically curvate, style short, sharp, beak-shaped, mesal apical extension slightly curvate laterad ; male plate rotundate, apical half densely spined, multiseriate ; pygofer with short spur-like setae, terminal spur slightly longer.

Length : 4.5 mm.

Distribution : India—Manipur (Churachandpur and Tamenlong), Bihar, Himachal Pradesh, Meghalaya, Orissa, Sikkim, Tamil Nadu, West Bengal.

14. Genus ***Goniagnathus*** Fieber

1866. *Goniagnathus* Fieb., *Vesh. c-b. Ges. Wien.*, **16** : 506.

22. ***Goniagnathus punctifer*** (Walker) (Fig. 24a–b)

1858. *Bythoscopus punctifer* Walker, *Insecta Saundersiana* : 108.

1988. *Goinagnathus punctifer* (Walker) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 139.

Material examined : 2 exs., Manipur, Kasomkhullen, Ukhrul Dist., 14. iv. 1998, coll. *R. S. Barman.*

Diagnosis : Body brownish ; vertex with some obscure dark spots ; face with transverse fine striation interrupted by a longitudinal stripe ; pronotum with finely striate ; tegmina brownish,

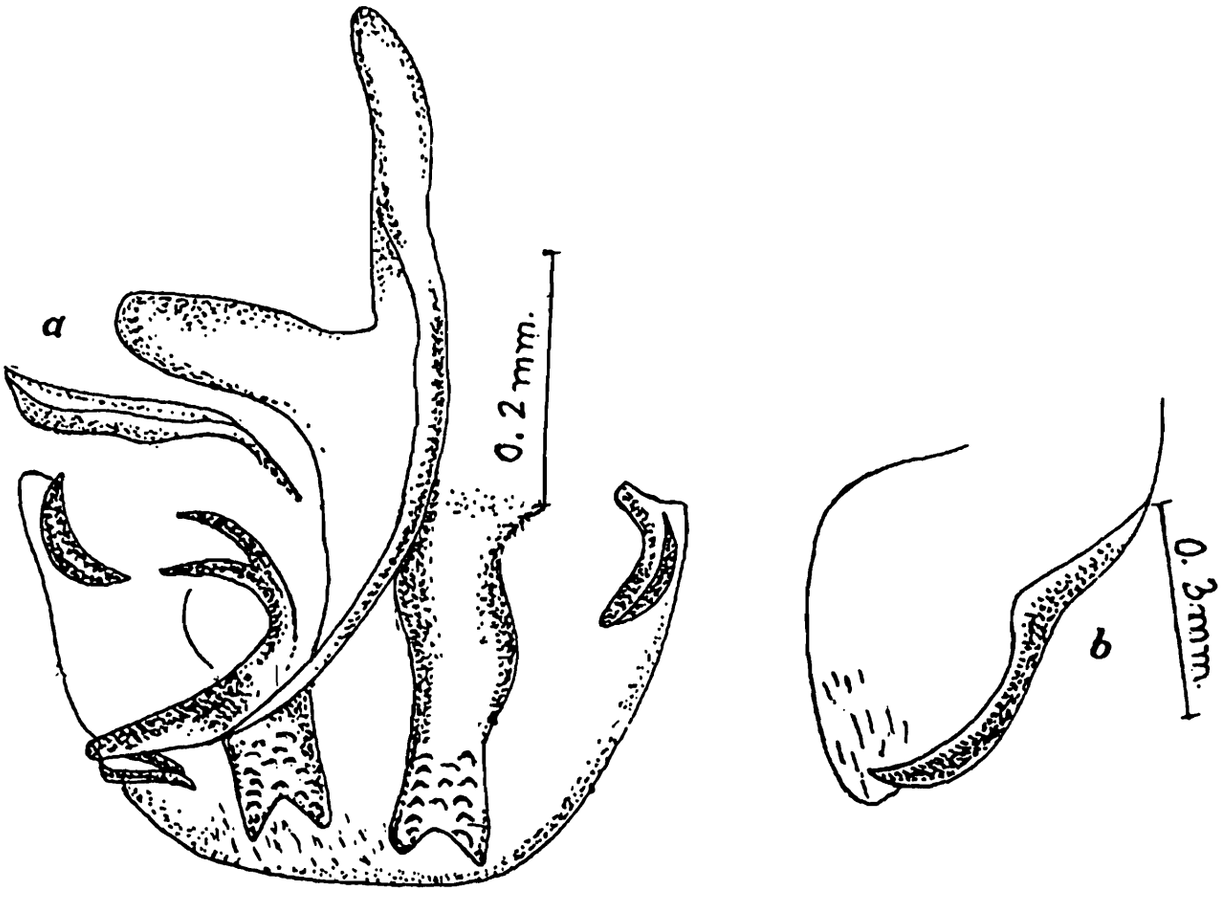

Fig. 24 (a—b) : *Goniagnathus punctifer* : a, Aedeagus, Male plate ; b, Pygofer.

its vein and costal margin dark with dark brown spots ; wings smoky with grey-white streak at radial area ; legs castaneous brown, with pitchy black fascia, abdomen black.

Genitalia : Connective 'V'-shaped ; aedeagus with prominent apodeme, shaft concavus laterally a pair of sharp terminal process, slender, acute, directed caudad ; style with mesal apical extension dorsoventrally laminate, apical margin distinctly bifurcate, apical third rugose; male plate simple; pygofer with apical densely spined, hook dagger-shaped.

Length : 6 mm.

Distribution : India—Manipur Ukhrul Dist., Bihar, Maharashtra, Sikkim, Uttar Pradesh, West Bengal. *Elsewhere* : Burma, Maldive, Malagasy, Sri Lanka.

15. Genus *Nephotettix* Matsumura

1902. *Nephotettix* Matsumura, *Term Fuzetek.*, **25** : 356.

Key to the species of Nephotettix

1(2) Head obtusely rounded ; tegmina with a black spot before middle extending to the claval suture ..... *nigropicta*

2(1) Head not obtusely rounded ; tegmina with a black spot before middle, not extending to the claval sutures ..... *virescens*

23. *Nephotettix nigropicta* (Stal) (Fig. 25)

1870. *Thamnotettix nigropicta* Stal, *Ofv.-vet. A. K. Forth* : 74.

1908. *Nephotettix apicalis* Distant, *Fauna Brit. India, Rhynchota*, **iv** : 360.

Fig. 25 : *Nephotettix nigropicta* : Male genitallic armature.

1988. *Nephotettix nigropicta* (Stal) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 146.

Material examined : 28 exs., Manipur : 15 exs., Imphal, Imphal Dist., 29. i. 1992, coll. *P. H. Roy* ; 7 exs., Churachandpur, Churachandpur Dist., 4. iv.1992, coll. *A. K. Hazra* ; 1 ex., Molvailup, Ukhrul Dist., 1. iv. 1992, coll. *A. K. Sanyal* ; 6 exs., Tamenglong, Tamenglong Dist., 7. xii. 1992, coll. *P. H. Roy.*

Diagnosis : Body shining smooth, yellowish green in colour ; vertex with subimpressed transverse line between anterior margin of eyes ; face black ; anterior margin of pronotum with a black line ; tegmina greenish yellow, commissural margin of clavus black, a black spot before the middle extending to the claval suture and three acutely produced ; legs black ; posterior tibiae with spinuled black spot ; abdomen black.

Genitalia : Connective 'V'-shaped ; aedeagus with well developed strut ; aedeagal shaft stout, elongate, cylindrical, three pairs of superior processes arising from middle, directed caudad, sharp, first pair shorter than rest ; style with mesal apical extension obliquely truncate ; male plate beyond middle spinulate on both margins ; pygofer gradually connivent to rounded apex, mesal margin spinulate, discal setae sparse.

Length : 4.5 mm.

Distribution : India—Manipur (Churachandpur, Ukhrul, Tamenglong), Bihar, Meghalaya, Orissa, Punjab, Sikkim, West Bengal.

Elsewhere : East Africa, Philippines, Sri Lanka.

24. *Nephotettix virescens* (Fabricius)

1803. *Nephotettix virescens* Fabricius, *Syst. Rhyn.*, : 78.

1917. *Nephotettix virescens* Fabricius : Ghauri, *Bull. Ent. Res.*, **60** : 481-512.

1988. *Nephotettix virescens* (Fabricius) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 147.

Material examined : 25 exs., Manipur ; 6 exs., Imphal, (Imphal Dist.), 29. i. 1992, coll. *H. P. Roy* ; 4 exs., Tamenglong, Tamenglong Dist., 7. xxi. 1992, coll. *H. P. Roy* ; 5 exs., Molvailup, Ukhrul Dist., 1. iv. 1992, coll. *A. K. Sanyal* ; 5 exs., Lamjang, 3. iv. 1992, coll. *A. K. Hazra* ; 5 exs., Ukhrul, Ukhrul Dist., 3. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body greenish yellow in colour, shining and smooth ; face with lateral transverse darker line and a black spot on each side of clypeus ; tegmina with a black spot before the middle and apical two-fifth black, in female specimen usually without discal spot at tegmina ; legs black ; abdomen black.

Length : 4.5 mm.

Distribution : India—Manipur (Tamenlong, Imphal, Ukhrul), Bihar, Meghalaya, Orissa, Sikkim, Tripura, West Bengal; *Elsewhere* : Ethiopian region, Indonesia, Japan, Korea, Malayasia, Nepal.

16. Genus ***Thomsoniella*** Signoret

1879. *Thomsoniella* Signoret, *Ann. Soc. Ent. de France*, **9** (5) : 51.

25. ***Thomsoniella porrecta*** (Walker) (Fig. 26a–d)

1858. *Accocephalus porrectus* Walker, *List. Hom. Suppl.*, : 262.

1988. *Thomsoniella porrecta* (Walker) : Datta, *Rec. zool. Surv. India, Occ. Paper* No. **90** : 188.

Material examined : 8 exs., Manipur, Molvailup, Ukhrul Dist., 1. iv. 1992, coll. *A. K. Sanyal* ; 2 exs., Ukhrul, Ukhrul Dist., 8. iv. 1992, coll. *A. K. Hazra* ; 1 ex., Chaton, Tamenglong Dist., 12.vi.1993, coll. *R. S. Barman* ; 1 ex., Churachandpur, Churachandpur Dist., 14. iv. 1992, coll. *A. K. Hazra.*

Diagnosis : Body pale greenish in colour, vertex with four longitudinal orange fascia, and its anterior margin blackish ; pronotum with six longitudinal fasciae present and scutellum with three longitudinal orange fasciae ; tegmina pale greenish, with a small spot at the apex ; claval and its apical area black ; legs pale brownish ; abdomen also pale brownish.

Genitalia : Connective 'U'-shaped ; aedeagal

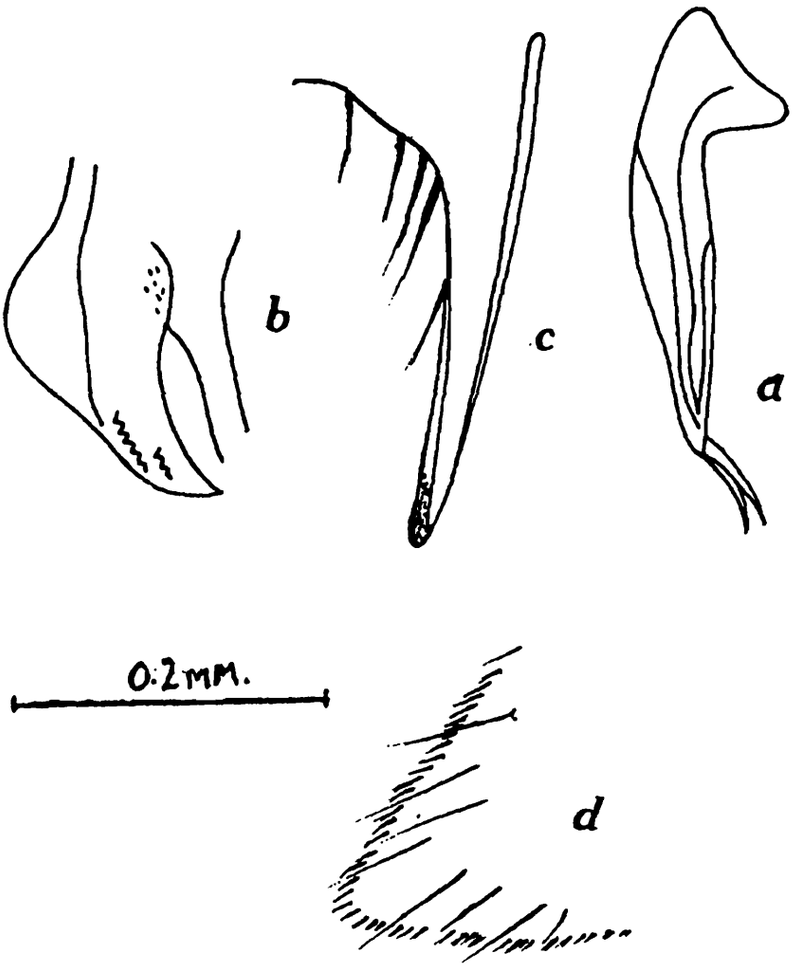

Fig. 26 (a—d) : *Thomsoniella porrecta* : a, Aedeagus ; b, Style ; c, Male plate ; d, Pygofer.

shaft with a pair of unbranched apical processes directed laterad ; style connivent, foot-shaped, apical margin spined ; male plate gradually tapered to rotundate apex, apical half transversely spinulose ; pygofer triangulate on posterior half and spinulate, discal setae present.

Length : 5.5 mm.

Distribution : India—Manipur (Ukhrul, Tamenglong, Churachandpur), Meghalaya, Orissa, Punjab, Sikkim, Tripura.

Subfamily IASSINAE

17. Genus *Iassus* Fabricius

1803. *Iassus* Fabricius, *Systema Rnynchotorum* : 85.

26. *Iassus indicus* (Walker)

1892. *Macropsis indica* Walker, *Bull. Zool. Soc. France* : 209.

1988. *Iassus indicus* (Walker) : Datta, *Rec. zool. Surv. India. Occ. Paper* No. **90** : 218.

Material examined : 2 exs., Manipur, Churachandpur ; Churachandpur Dist., 25. iii. 1993, coll. *D. K. M. & S. K. G.*

Diagnosis : Body dull whitish yellow ; vertex with a narrow central carination, lateral margin of face brownish ; pronotum pitchy black, at former part with dull granules ; scutellum black, former more or less spotted ; tegmina dull yellowish smoky colour, the vein suffused with dark brown, at costal area whitish subtriangular spot ; legs yellowish ; abdomen black.

Genitalia : Connective 'Y'-shaped ; aedeagus long, shaft with a superior process, elongate, distinctly bifid, directed cephalad, two pairs of apical processes ; style at tip beak-shaped ; male plate appearing cylindrical, elongate, apex with fine hair-like setae ; pygofer with sparse discal

and marginal setae ; hook short, arising from median plane.

Length : 7.5 mm.

Distribution : India—Manipur (Churachandpur), Andaman Islands, Karnataka, Mysore, Meghalaya; *Elsewhere* : Africa, Buru, Philippine Island, Samoa, Sri Lanka, Sumbawa, Upolu.

18. Genus ***Krisna*** Kirkaldy

1900. *Krisna* Kirkaldy, *Entomologist*, **33** : 243.

27. ***Krisna strigicollis*** (Spinola) (Fig. 27a-e)

1850. *Siva strigicollis* Spinola, *Mem. Soc. Ital Modern*, **25** (1) :

1988. *Krisna strigicollis* (Spinola) : Datta, *Rec. Zool. Surv. India, Occ. Paper* No. **90** : 222.

Material examined : 2 exs., **Manipur**, Churachandpur, Churachandpur Dist., 22. iii. 1993, coll. *D. K. M. & S. K. G.*

Diagnosis : Body brownish yellow, vertex with two small black spots at apex and one at apex of each clavus, anterior margin of vertex red blood colour ; pronotum strongly transversely striated ; scutellum with an oblique impression at each lateral margin and an arcute strongly transversely impression before apical area ; tegmina punctate and rugulose ; wings milky white in colour, legs reddish brown and abdomen brown.

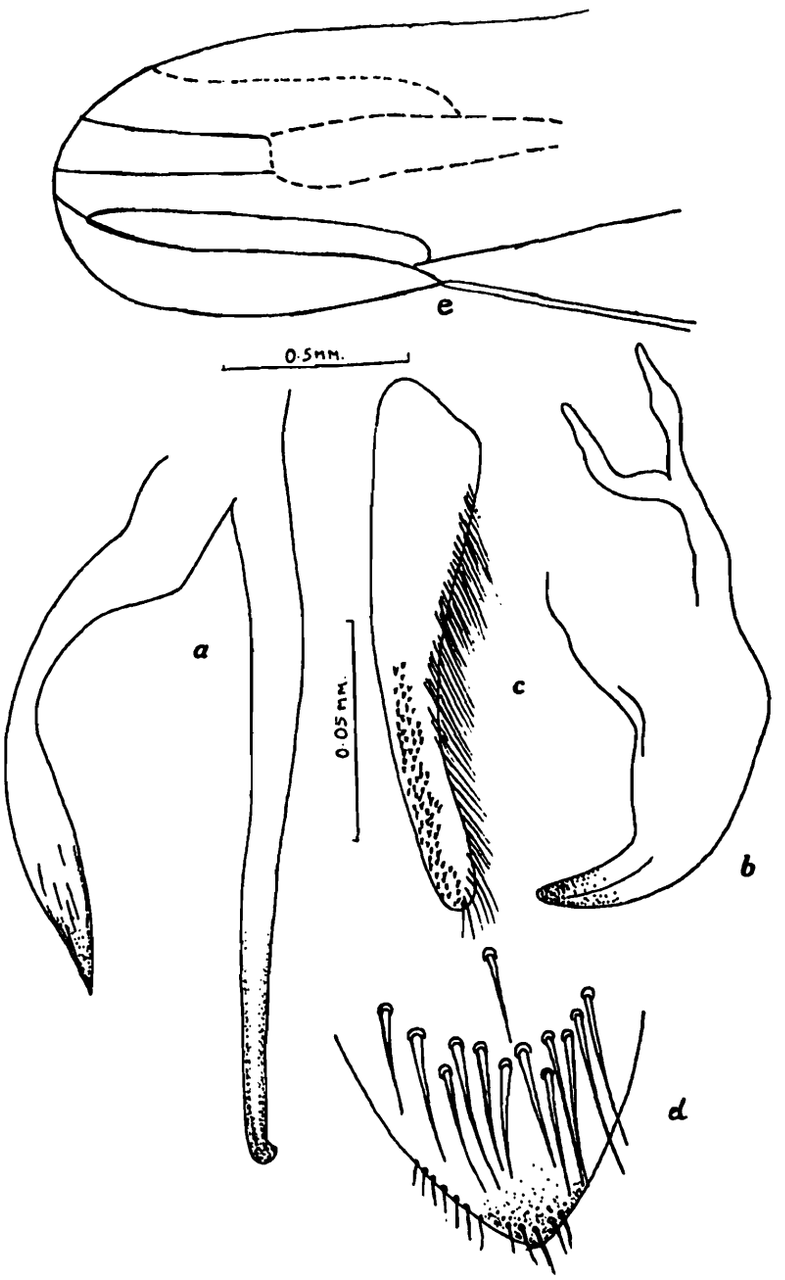

Fig. 27 (a—e) : *Krisna strigicollis* : a, Aedeagus ; b, Style ; c, Male plate ; d, Abdominal portion ; e, Forewing.

Genitalia : Connective 'Y'-shaped ; aedeagus with strut, simple ; style slender, elongate, extreme apical part appearing spatulate ; male plate broadened basally, gradually connivent to rounded apex, mesal margin with rugal projection lateral margin having dense row of fine long setae along with very few minute setae ; pygofer hook dagger-shaped on posterior part with longitudinal impressed lines.

Length : 9.5 mm.

Distribution : India—Manipur, (Churachandpur Dist.), Bihar, Maharashtra, Meghalaya, Sikkim, Uttar Pradesh; *Elsewhere* : Africa, Belgium, Biliran Is. and Borneo, Burma, Campuchia, China, Dutch, East Indies, Indochina, Java, Japan, Luzon, Malay peninsula, Malaysia, Sri Lanka.

Family AGALLIDAE

Subfamily AGALLINAE

19. Genus ***Agallia*** Curtis

1833. *Agallia* Curtis, *Ent. Mag.*, **i** : 193.

28. ***Agallia campbelli*** Distant

1916. *Agallia campbelli* Distant, *Fauna Brit. India, Rhynchota,* **VII** : 229.

1966. *Agallia campbelli* Distant : Metcalf, *General Catalogue of Homp.* **vi** : 22.

Material examined : 1 ex., Manipur ; Kampang, Chandel Dist., 8. iv. 1992, coll. *A. K. Sanyal.*

Diagnosis : Body brownish yellow in colour, vertex with a longitudinal line at central and two dark purplish brown spots on each side of the line ; pronotum purplish brown, with four brown spots, two spots near anterior margin and two spots behind middle ; scutellum purplish yellow, with two spots at apex ; tegmina dark purplish brown in colour, with distinct brownish yellow fascia from base to about middle of claval area ; legs brownish, posterior tibiae strongly spinulose ; abdomen brownish yellow.

Length : 3 mm.

Distribution : India—Manipur (Chandel), South India.

Family TYPHLOCYBIDAE

Subfamily TYPHLOCYBINAE

20. Genus ***Emponara*** Distant

1918. *Emponara* Distant, *Fauna Brit. India, Rhynchota,* **vi** : 106.

29. ***Emponara lineolata*** Distant

1918. *Emponara lineolata* Distant, *Fauna Brit. India,* **vi** : 106.

1968. *Empoanara lineolata* Distant : Melcalf, *General Catalogue of Homp.*, **vi** (17) : 610.

Material examined : Manipur (Matopma Coll.).

Diagnosis : Body brownish olivaceous in colour ; vertex with a central longitudinal line and two small brown at base and two sinuate spots near each eyes ; pronotum with two broad longitudinal dark fascia on each side ; scutellum brownish ; finely transversely incised at middle, tegmina greyish white, its veins darker ; legs brownish ; abdomen with upper side black and lower portion brownish.

Length : 4 mm.

Distribution : India—"Manipur"

SUMMARY

The paper deals with the account of 29 species under 20 genera belonging to 8 subfamilies of Family Cicadellidae of Hemiptera from the State of Manipur. All the species except two (marked*) have been recorded for the first time from Manipur. Taxonomic keys to subfamilies, genera and species are given in the paper. Also, diagnosis of each species together with description of genitallic armature wherever possible, is provided. The paper is the first comprehensive account of the leafhopper species under eight subfamilies from Manipur.

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Table I : Distribution of Cicadelloidea in different districts of Manipur

Name of species	CHURACHANDPUR	UKHRUL	TAMENGLONG	IMPHAL	LAMJANJ	CHANDEL	SENAPATI
1. *Bothrogonia ferruginea* (Fabricius)	+	+	—	—	—	—	—
2. *Bothrogonia indistincta* (Walker)	+	—	—	—	—	+	—
3. *Cicadella spectra* (Distant)	+	—	+	—	+	—	—
4. *Cofana mimica* Distant	+	+	—	—	—	—	—
5. *Kolla gregalis* Distant	—	—	+	—	—	—	+
6. *Kolla insignis* Distant	—	—	+	—	—	—	+
7. *Kolla mungphuensis* Distant	—	—	—	—	—	+	—
8. *Kolla opponens* (Walker)	—	—	—	—	—	+	—
9. *Tettigella bellona* Distant	—	+	—	—	—	—	—
10. *Evacanthus extremus* Walker	—	—	+	+	—	—	—
11. *Evacanthus repexus* Distant	—	+	—	—	—	—	—
12. *Parabolocratus albomaculatus* Distant	+	+	—	—	—	—	—
13. *Balclutha punctata* (Thunb.)	+	—	—	—	—	—	—
14. *Cicadula indrina* Singh-Pruthi	—	+	—	—	—	—	—
15. *Chiasmus jagadishi* Singh-Pruthi	+	—	—	—	—	—	—
16. *Deltocephalus coloratus* Distant	—	+	—	—	—	—	—
17. *Deltocephalus nigrifascialis* Distant	—	—	—	+	—	—	—
18. *Dio facialis* Distant	—	—	—	+	—	—	—
19. *Exitianus atkinsoni* (Distant)	+	+	—	—	—	—	—
20. *Exitianus indicus* (Distant)	+	+	—	—	—	—	—
21. *Exitianus nanus* Distant	+	—	+	—	—	—	—
22. *Goniagnathus punctifer* Walker	—	+	—	—	—	—	—
23. *Nephotettix nigropicta* Stal	+	+	+	+	—	—	—
24. *Nephotettix virescens* (Fabricius)	—	+	+	+	—	—	—
25. *Thomsoniella porrecta* Walker	+	+	+	—	—	—	—
26. *Iassus indicus* (Walker)	+	—	—	—	—	—	—
27. *Krisna strigicollis* (Spinola)	+	—	—	—	—	—	—
28. *Agallia campbelli* Distant	—	—	—	—	—	+	—
29. *Empoanara lineolata* Distant "Manipur"	—	—	—	—	—	—	—

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INSECTA : HEMIPTERA : REDUVIIDAE

B. BISWAS AND ANIMESH BAL
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Reduviids are commonly known as Assassin-bugs because of their predaccious nature. Some of them are pathogenic and transmit various types of diseases to man and animals. This group of insects are characterised by having dorsoventrally flattened body with a constricted neck, and cuticle may be smooth, hairy or spiny.

The family Reduviidae is represented by more than 3000 species belonging to 29 subfamilies in the world (Richards & Davis 1977). About 450 species under 129 genera of 14 subfamilies are so far known from the Indian subregion (Distant 1904; Samuel & Joseph 1953; Miller 1959; Muraleedharan 1976; Cook 1977; Wyddzinsky & Lent 1967, 1980; Ambrose & Livingstone 1986; Livingstone & Murugan 1987; Livingstone & Ravichandran 1990; Biswas et al. 1993; Biswas & Ghosh 1994).

Our knowledge on Reduviid fauna of Manipur is almost nil since no taxonomic account on this group of hemipteran insects from Manipur is reported so far. Therefore, the present work is the first comprehensive taxonomic studies on the fauna of Reduviidae from Manipur with all 14 species under 12 genera have been recorded for the first time from the state. The present study for the paper is based on the recent collections made by different survey parties of Zoological Survey of India.

MATERIAL AND METHODS

Reduviids being predaceous in nature are found generally in association with other insects or in houses partially concealed under floor debris, in crevices or in cracks, in tree trunks. These specimens can be collected by sweeping or light trapping as well as picking up directly by a pair forceps. As some specimens are pathogenic and can inflict a painful bite, the specimens should not be handled with bare hand.

The collected materials are killed in a killing jar using benzene or chloroform vapour and preserved dry in the insect envelop with paradichlorobezene and Napthelene. The insect envelopes are lebelled properly mentioning locality, altitude, date of collection and name of the collector. After carrying back the specimens to the laboratory they are set and pinned with the legs and antennae spread for the easy handling of the specimens under the binocular microscope during identification.

SYSTEMATIC ACCOUNT

Family REDUVIIDAE

Subfamily I. STENOPODINAE

Genus 1. ***Oncocephalus*** Klug

1. *Oncocephalus annulipes* Stal
2. *Oncocephalus impudicus* Reuter

Subfamily II. SALYAVATINAE

Genus 2. ***Valentia*** Stål

3. *Valentia apetala* de vuill

Subfamily III. PIRATINAE

Genus 3. ***Ectomocoris*** Mayr

4. *Ectomocoris atrox* (Stal)

Subfamily IV. HARPACTORINAE

Division 1. Harpactoraria

Genus 4. ***Sphedanolestes*** Stal

5. *Sphedanolestes mendicus* (Stal)
6. *Sphedanolestes pubinotum* Reuter

Division 2. Velinaria

Genus 5. ***Cosmolestes*** Stal

7. *Cosmolestes annulipes* Distant

Genus 6. ***Velinus*** Stal

8. *Velinus annulatus* Distant

Division 3. Yolinaria

Genus 7. ***Agriosphodrus*** Stal

9. *Agriosphodrus dohrni* (Sign)

Division 4. Euagorasaria

Genus 8. ***Euagoras*** Burm.

10. *Euagoras plagiatus* (Burm.)

Genus 9. ***Epidaus*** Stal

11. *Epidaus famulus* (Stal)

Genus 10. ***Isyndus*** Stal

12. *Isyndus obscurus* (Dall)

Division 5. Polididusaria

Genus 11. ***Polididus*** Stal

13. *Polididus armatissimus* Stal

Division 6. Sycanaria

Genus 12. ***Sycanus*** Amy. & Serv.

14. *Sycanus croceovittatus* Dohrn

Key to the subfamilies of the family REDUVIIDAE

1(2) Hemelytra without a quadrangular cell at interior area of corium near base of the membrane 3

2(1) Hemelytra with a quadrangular cell at interior area of corium near base of membrane, first joint of rostrum generally elongate, space between the eyes transverse ..... HARPACTORINAE

3(4) Hamelytra with a triangular or sexangular cell touching base of membrane .... STENOPODINAE

4(3) Hemelytra without a discoidal cell 5

5(6) Pronotum constricted before or near middle; anterior tarsi two jointed..... ..... SALYAVATINAE

6(5) Pronotum constricted behind middle..... ..... PIRATINAE

Subfamily STENOPODINAE

Genus ***Oncocephalus*** Klug

1830. *Oncocephalus* Klug, *Symb. Phys.*

Key to the species of the genus *Oncocephalus*

1(2) Anteocular and postocular portion of head almost equal in length; lateral angle of pronotum prominently subspinous..... ..... *impudicus*

2(1) Anteocular portion of head twice or more than twice the length of postocular area; lateral margine of pronotum armed medially with a small tubercle or tooth .... *annulipes*

1. ***Oncocephalus annulipes*** Stal

1955. *Oncocephalus annulipes* Stal, *Ofv. Vet.-AK. Forth*, : 44.

1902. *Oncocephalus annulipes* : Distant, *Fauna Brit. India*, **2** : 231.

Material examined : 2exs., Churachandpur, 19.v.1993, coll. A.K. Pandit.

Diagnostic characters : Pale brownish, ochraceous; lateral margin of pronotum armed medially with a small tubercle; anteocular portion of head more than twice the length of postocular; first joint of antennae as long as anteocular portion of head.

Length : 14-24 mm.

Distribution : Manipur (Churachandpur), Maharashtra, Jammu and Kashmir, Elsewhere : Mayanmar, Sri Lanka.

2. ***Oncocephalus impudicus*** Reuter

1833. *Oncocephalus impudicus* Reuter, *Act. Soc. Fenn.*, **12** : 715.

1902. *Oncocephalus impudicus* Distant, *Fauna Brit. India,* **2 :** 229.

Material examined : 1 ex., Manipur 6.vi.1904

Diagnostic characters : Body ochraceous with legs, antennae, body beneath luteous; pronotum with three fuscous fasciae to anterior lobe; cellular area of corium, a small spot behind it, a central spot to clavus castaneous; sternum, anterior and posterior femora, apices of the intermediate femora, three annulations to tibiae, lateral areas and apex of abdomen fuscous brown, apex of third antennal joint black, anteocular portion of head almost twice as long as postocular portion; apical spine of scutellum long, acute; anterior and posterior lateral angles of pronotum subspinous.

Length : 12-13 mm.

Distribution : Manipur, West Bengal, Elsewhere : Borneo, Java, Philippine, Sumatra.

Subfamily II. SALYAVATINAE

Genus 2. ***Valentia*** Stål

1865. *Valentia* Stal, *Hem. Afr.,* **9 :** 144.

3. ***Valentia apetala*** (de Vuill)

1864. *Petalocheirus apetala* de Vuill, *Ann. Soc. Ent. Fr.,* : 142.

1902. *Valentia apetala* : Distant, *Fauna Brit. India,* **2 :** 240.

Material examined : 1 ex., Churachandpur, 17.vi.1992, coll. R.S. Burman and party.

Diagonistic characters : Head, scutellum, pronotum, sternum, fuscous; a small rounded luteous spot on inner margin of corium; first joint of antennae ochraceous its apex fuscous, second joint fuscous with its apex ochraceous, spines to connexivum backwardly directed, lateral pronotal spines a little obliquely upwardly directed, scutellar spine long, erect; tibiae apically compressed.

Length : 17-18 mm.

Distribution : Manipur (Churachandpur), Elsewhere : Bangladesh, Java, Malay Peninsula, Siam.

Subfamily III. PIRATINAE

Genus 3. ***Ectomocoris*** Mayr

1865. *Ectomocoris* Mayr, *Verh. z.-b. Ges. Wien,* 15 : 438.

4. ***Ectomocoris atrox*** (Stål)

1855. *Pirates atrox* Stal, *Ofv. Vet.-AK. Forh.*

1902. *Ectomocoris atrox* : Distant, *Fauna Brit. India,* **2 :** 296.

1994. *Ectomocoris atrox* : Biswas, Sen and Ghosh, *State fauna series* **3 :** *Fauna of West Bengal Part 5* : 384.

Material examined : 1 ex., Imphal, 8.v.1995, 23.ix.1945, coll. M.C. Roonwal; 2 exs., Sankai, 25.i.1977, coll. S.G. Patil.

Diagonistic characters : Black to piceous black; spot at base of membrane, connexivum, legs and apices of the coxae, pale ochraceous; hemelytra, trochanters, anterior femora, apical halves of the intermediate and posterior femora black; antennae finely pilose, its base yellowish brown, and first joint black.

Length : 12-18 mm.

Distribution : Manipur (Imphal), Sikkim, Bengal. *Elsewhere* : Malay Peninsula, Myanmar, North China.

Subfamily IV HARPACTORINAE

Key to the Division of the subfamily HARPACTORINAE

1(2) Legs and body generally spinous, anterior femora granulate, generally nodose or nodulose ..... POLIDIDUSARIA

2(1) Legs and body not spinous, anterior femora not granulate 3

3(4) Head armed with spine or tubercle behind the base of each antennae; lateral pronotal angles spinous or at least prominent..... ..... EUAGORASARIA

4(3) Head without any spine, lateral pronotal angle not spinous 5

5(6) Head distinctly longer than pronotum.... 2

6(5) Head more or less as long as pronotum.. 7

7(8) Pronotum with the anterior lobe posteriorly impressed beyond the anterior area of posterior lobe; abdomen on each side much dilated but not elevated ..... SYCANARIA

8(7) Lateral margins of the abdomen strongly dilated and the lateral segmental area more or less globosely elevated ... YOLINARIA

9(10) Scutellum not lobate nor abdominal segments lobately dilated .... HARPACTORARIA

10(9) Lateral margins of the 4th and 5th abdominal segments moderately dilated, the apical arms of femora nodulose or subnodulose ..... VELINARIA

Division 1. HARPACTORARIA

Genus 4. *Sphedanolestes* Stål

1860. *Sphedanolestes* Stal, *Ofv. Vet.-AK. Fort.* : 284 & 288

Key to the species of the genus *Sphedanolestes*

1(2) Pronotum black, unicolorus, or palely pubescent, head without any spot..... ..... *pubinotum*

2(1) Pronotum with anterior lobe and posterior margins sanguineous, head with a large black spot behind eyes ..... *mendicus*

5. *Sphedanolestes mendicus* (Stal)

1866. *Reduvius mendicus* Stal, *Ofv. Vet.-AK. Forh.* : 286.

1902. *Sphedanolestes mendicus* : Distant, *Fauna Brit. India,* **3 :** 341.

Material examined : 1 ex., Aurungtang, Ukrul, i.v.1975, coll. M.S. Shishodia; 1 ex., Bungmul, Chorachandpur, 19.5.1975, coll. M.S. Shishodia.

Diagonistic characters : Head, anterior lobe of pronotum; lateral and posterior margins of posterior lobe of pronotum, apex and lateral margin of scutellum, coxae, trochenters sanguineous or blood red, head about as long as pronotum with a large black spot behind eyes, posterior lobe of pronotum distinctly impressed, membrane longly extending abdominal apex.

Length : 11-14 mm.

Distribution : Manipur (Ukrul, Churachandpur), Assam, Meghalaya, Elsewhere : Malay Peninsula, Mayanmar.

6. *Sphedanolestes pubinotum* Reuter

1881. *Sphedanolestes pubinotum* Reuter, *Act. Soc. Sc. Genn.,* **12 :** 289.

1902. *Sphedanolestes pubinotum* : Distant, *Fauna Brit. India,* **2 :** 339.

1994. *Sphedanolestes pubinotum* Biswas, Sen and Ghosh, State fauna Series 3 : Fauna of West Bengal, part-5 : 394.

Material examined : 2 exs., Sougsang area, Mao, Senapati, 13.ix.1975, coll. M.S. Shishodia; 3 exs., Mao, Senapati, 16.ix.1975, coll. M.S. Shishodia.

Diagonistic characters : Shining black, abdomen sanguineous with three or four black trnasverse fasciae beneath, anteocular portion of head and first joint of rostrum a little longer than postocular area, a central impression to pronotum continued to about middle of the posterior lobe, membrane passing the abdominal apex.

Length : 15-16.5 mm.

Distribution : Manipur (Senapati), Assam, Meghalaya, Sikkim, West Bengal. Elsewhere : Mayanmar.

Division 2. VELINARIA

Key to the genera of the division VELINARIA

1(2) First joint of antennae is about as long as anterior femora; apex of the scutellum spatulately dilated ..... ***Cosmolestes***

2(1) First joint of antennae very much longer than anterior femora; apex of the scutellum not spatulately dilated ..... ***Velinus***

Genus 5. *Cosmolestes* Stål

1866. *Cosmolestes* Stal, *Ofv. Vet.-AK. Forh.* : 285.

7. *Cosmolestes annulipes* Distant

1879. Cosmolestes annulipes : Distant, *Fauna Brit. India,* **2 :** 346.

Material examined : 1 ex., Koirengli, Imphal, 15.iii.1993, coll. D.K. Mondal and party.

Diagonistic characters : Pronotum with anterior lobe luteous and a slume spot on each lateral angle of posterior lobe; head luteous with an oblique fascia infront of eyes; scutellum with the broad spalulate apex and a central discal line luteous; apical margin of corium elevated and luteous.

Length : 10 mm.

Distribution : Manipur (Imphal), Assam, Meghalaya. Elsewhere : Mayanmar.

Genus 6. *Velinus* Stal

1865. *Velinus* Stal, *Hem. Afr.*, **3** : 52.

8. *Velinus annulatus* Distant

1879. *Velinus annulatus* Distant, *A.M.N.H.* (5) **3** : 131.

1902. *Velinus annulatus* : Distant, *Fauna Brit. India*, **2** : 347.

Material examined : 1 ex., Turibari, Senapati, 8.xi.1992, coll. A.K. Mondal and party.

Diagonistic characters : Head above, antennae, scutellum, spots to the connexivum, annulations to femora, apices of the tibiae and tersi black, areas infront of eyes and a linear spot behind eyes, annulations to basal joint of antennae, and apex of scutellum luteous; membrane bronzy black, corium purplish red.

Length : 15-16 mm.

Distribution : Manipur (Senapati), Assam, Meghalaya, Nagaland, Elsewhee : Mayanmar, Yunnan.

Division 3. YOLINARIA

Genus 7. *Agriosphodrus* Stål

1866. *Agriosphodrus* Stal, *Ofv. Vet.-AK. Forh.* : 279.

9. *Agriosphodrus dohrni* (Sign.)

1862. *Eulys dohrni* Sign., *Ann. Soc. Ent. Fr.* : 126.

1902. *Agriosphodrus dohrni* : Distant, *Fauna Brit. India*, **2** : 359.

Material examined : 1 ex., 9 km. west of Moreh, Chandel, 25.ix.1975, coll. M.S. Shishodia.

Diagonistic characters : Body black; lateral margins of the abdomen ivory white and dilated with large black spots; apex of the last abdominal segment more prominent in female than in male; pronotum medially longitudinally impressed.

Length : 19-22 mm.

Distribution : Manipur (Chandel), Deccan. Elsewhere : China.

Division 4. EUAGORASARIA

Key to the genera of the division EUAGORASARIA

1(2) Anterior lobe of pronotum prominently tuberculous on each side ..... ***Isyndus***

2(1) Anterior lobe of pronotum not prominently tuberculous on each side 3

3(4) Posterior lobe of pronotum not discally spined; first joint of rostrum considerably shorter than second ..... ***Euagoras***

4(3) Posterior lobe of pronotum discally spined; rostrum with the first joint a little shorter than remaining joints together .... ***Epidaus***

Genus 8. *Euagoras* Burm.

1885. *Euagoras* Burm., *Handb.*, **2** : 226.

10. *Euagoras plagiatus* (Burm.)

1835. *Zelus plagiatus* Burm., *Nov. Act. Ac. Nat. Cur.* **14**(1) : 303.

1902. *Euagoras plagiatus* : Distant, *Fauna Brit. India*, **2** : 363.

Material examined : 1 ex., Tamenglong, 20.xi.1992, coll. A.K. Mondal and party.

Diagonistic characters : Head, pronotum, scutellum, reddish ochraceous; a black central longitudinal spot to the posterior pronotal lobe, hemelytra and starnum; femora linearly streaked with subapical black annulation, abdomen beneath with black fascia on lateral area; antennae fuscous, annulated with ochraceous; rostrum luteous its

apex black, posterior spine of pronotum curved and reflexed.

Length : 13-14 mm.

Distribution : Manipur (Tamenglong), Assam, Meghalaya, Elsewhere : Mayanmar.

Genus 9. ***Epidaus*** Stål

1859. *Epidaus* Stal, *Ofv. Vet.-AK. Forh.* : 193.

11. ***Epidaus famulus*** (Stal)

1863. *Endochus famulus* Stal, *Ann. Soc. Ent. Fr.*, : 27.

1902. *Epidaus famulus* : Distant, *Fauna Brit. India,* **2** : 372.

Material examined : 1 ex., Tamenglong, 20.xi.1992, coll. A.K. Mondal and party.

Diagonistic characters : Anterior lobe of pronotum sculptured and medially impressed, posterior lobe with two discal spines, lateral spines long horizantal notched at base, lateral and posterior areas of pronotum, a basal spot to clavus and a large subapical spot to corium white; scutellum tumid rounded.

Length : 20-22 mm.

Distribution : Manipur (Tamenglong), Assam, Meghalaya. Elsewhere : Mayanmar.

Genus 10. ***Isyndus*** Stål

1861. *Isyndus* Stal, *Ofv. Vet.-A.K. Forh.*, : 445.

12. ***Isyndus obscurus*** (Dall.)

1881. *Harpactor obscurus* Dall., *Jr. E.S. new ser.*, **1** : 7.

1902. *Isyndus obscurus* : Distant, *Fauna Brit. India,* **2** : 377.

Material examined : 1 ex., Ukrul, 30.ix.1975, coll. M.S. Shishodia.

Diagonistic characters : Fuscous brown, connexivum spotted with ochraceous, membrane bronzy, antennae with three annulations on second joint, first joint as long as anterior femora, anterior lobe of pronotum with a prominent tubercle on each lateral margin; an impressed, central fuscous longitudinal line on abdomen.

Length : 22-26 mm.

Distribution : Manipur (Ukrul), Assam, Meghalaya, Elsewhere : Japan.

Division 5. POLIDIDUSARIA

Genus 11. ***Polididus*** Stål

1858. *Polididus* Stal, *Ofv. Vet.-AK. Forh.*, : 448.

12. ***Polididus armatissimus*** Stal

1859. *Polididus armatissimus* Stal, *Ofv. Vet.-AK. Forh.*, : 376.

1994. *Polididus armatissimus* : Biswas, Sen and Ghosh, *State Fauna Series* **3** : Fauna of West Bengal, Part 5 : 402.

Material examined : 1 ex., Churachandpur, 4.vi.1992, coll. R. Mathews and party.

Diagonistic characters : Head with a long spine behind the base of each antenna and with a number of smaller discal spines; pronotum spinous, the longest being two erect one on anterior lobe and the lateral spines to the posterior lobe; anterior pronotal lobe with greyish narrow vittae, abdomen beneath piceous; sublateral fascia on each side, tibiae and femora spinous.

Length : 10 mm.

Distribution : Manipur (Churachandpur), Maharashtra, Sikkim, West Bengal. Elsewhere : China, Japan, Mayanmar, Philippines.

Division 6. SYCANARIA

Genus 12. ***Sycanus*** Amy. & Serv.

1843. *Sycanus* Amy. & Serv., *Hem.*, 360.

14. ***Sycanus croceovittatus*** Dohrn

1859. *Sycanus croceovittatus* Dohrn, *Stett. ent. Zeit.*, **20** : 97.

1902. *Sycanus croceovittatus* Distant, *Fauna Brit. India,* **2** : 352.

Material examined : 1 ex., 3 km W. of Moreh, Chandel, 25.ix.1975, coll. M.S. Shishodia and party.

Diagonistic characters : A black species, with the posterior lobe of pronotum piceous; basal margin of membrane and apical half of corium

golden-yellow; antennae of same colour and second and third joint of rostrum pale castaneous; scutellar spine a little obliquely curved backward with its apex bifid, abdominal margin upwardly reflexed with second, third, fourth and fifth segments having a distinct tuberculous elevation on upper surface.

Length : 22 to 25 mm.

Distribution : Manipur (Chandel), Meghalaya, Elsewhere : Burma, China, Hainan islands.

SUMMARY

This paper provides a first time account of 14 species under 12 genera distributed over 4 subfamilies of the family Reduviidae from the State of Manipur. Key to taxa, geographical distribution of each species from India and elsewhere and literature references and districtwise distribution are also provided.

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INSECTA : HEMIPTERA : WATER-BUGS

ANIMESH BAL and R.C. BASU
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

North-eastern part of India is very important from the view point of faunal diversity. The present paper is dealt with the water-bugs (order-Hemiptera) of the State of Manipur. Since there was no comprehensive taxonomic study on water-bugs of Manipur so far, it can be claimed that the present study on the water-bugs of Manipur is first of its kind to record them through systematic scientific studies. Distant (1902, 1906, 1910) had not included any of the water-bug species from localities of Manipur in his Fauna of British India, Rhynchota volumes which, in turn, had recorded sum of 200 species of water-bugs from Indian subcontinent. Approximately 270 species of water-bugs have, so far, been recorded from India. The present paper has recorded 27 species under 14 genera belonging to ten families of water-bugs, namely Ochteridae, Corixidae, Nepidae, Notonectidae, Belostomatidae, Naucoridae, Mesoveliidae, Hydrometridae, Gerridae and Veliidae. Of these ten families firsts six families are belonging to the series Hydrocorisae while rest four are of the series Amphibicorisae (Classification is based upon Richards and Davies, 1977).

The work has been based upon the materials collected by various survey parties of the Zoological Survey of India and the unnamed collections of the National Zoological Collection. Taxonomic keys for different taxa and diagnostic characters for each species have been provided in the present paper. Distribution of water-bugs in different districts of Manipur have been shown in the chart and their avialability in other parts of India as well as in the World have, also, been given in this paper. All the species are recorded for the first time from the State of Manipur.

MATERIAL AND METHODS

The water-bugs of the order—Hemiptera are mainly of two major categories according to their habitat, the aquatic bugs live beneath the water while the semi-aquatic bugs dwell on the surface of water. The Manipur samples of aquatic bugs comprise families like Corixidae, Nepidae, Notonectidae, Belostomatidae and Naucoridae. Semiaquatic bugs of Manipur are of four families, namely Mesoveliidae, Hydrometridae, Gerridae and Valiidae. The water-nets, made up of close meshed Nylon threads, have been used to collect the water-bugs from the water pools and streams. The collected materials are preserved in the 70% Ethyl alcohol or Rectified Spirit in the field. In the laboratory the specimens have been studied under the sterescopic Binocular Microscope. After setting and pinning properly in the laboratory the studied materials are kept in dry insect cabinet with proper labels. In the Insect Cabinet Naphthalene powder and Carbolic acid (mixed with Camphor) are used as preservative and antifungul chemicals respectively. A good number of water-bug specimens are also kept as wet collection in 70% Ethyl alcohol or Rectified Spirit with proper labels after changing the alcohol in the laboratory.

SYSTEMATIC ACCOUNT

Following is the systematic list of all the species dealt in the present paper.

Series HYDROCORISAE

Family 1. OCHTERIDAE

Genus 1. ***Ochterus*** Latreille

1. *Ochterus marginatus* (Latreille)

Family II. CORIXIDAE

Subfamily MICRONECTINAE

Genus 2. ***Micronecta*** Kirkaldy

2. *Micronecta (Basileonecta) scutellaris scutellaris* (Stal)
3. *Micronecta (Dichaetonecta) haliploides* Horvath

Subfamily CORIXINAE

Genus 3. ***Cymatia*** Flor

4. *Cymatia apparens* (Distant)

Genus 4. ***Agraptocorixa*** Kirkaldy

5. *Agraptocorixa (Agraptcorixa) hyalinipennis* (Fabricius)

Genus 5. ***Corixa*** Geoffroy

6. *Corixa (Tropocorixa) distorta* Distant

Family III. NEPIDAE

Subfamily NEPINAE

Genus 6. ***Laccotrephes*** Stal

7. *Laccotrephes ruber* (Linnaeus)

Subfamily RANATRINAE

Genus 7. ***Ranatra*** Fabricius

8. *Ranatra gracilis* Dallas
9. *Ranatra sordidula* Dohrn
10. *Ranatra varipes* Stal

Family IV. NOTONECTIDAE

Subfamily ANISOPINAE

Genus 8. ***Anisops*** Spinola

11. *Anisops batillifrons* Lundblad
12. *Anisops sardea* Harrich-Shaffer

Subfamily NOTONECTINAE

Genus 9. ***Enithares*** Spinola

13. *Enithares mandalayensis* Distant
14. *Enithares ciliata* (Fabricius)

Family V. BELOSTOMATIDAE

Subfamily LETHOCERINAE

Genus 10. ***Lethocerus*** Mayr

15. *Lethocerus indicus* (Lepeletier and Serville)

Genus 11. ***Diplonychus*** Laporte

16. *Diplonychus rusticus* (Fabricius)
17. *Diplonychus molestus* (Dufour)

Family VI. NAUCORIDAE

Subfamily CHEIROCHELINAE

Genus 12. ***Gestroiella*** Montandon

18. *Gestroiella insignis* Distant

Subfamily LACCOCORINAE

Genus 13. ***Heliocoris*** Stal

19. *Heliocoris strabus* Montandon

Series AMPHIBICORISAE

Family VII. MESOVELIIDAE

Subfamily MESOVELIINAE

Genus 14. ***Mesovelie*** Mulsant and Rey

20. *Mesovelia vittigera* Horvath

Family VIII. HYDROMETRIDAE

Subfamily HYDROMETRINAE

Genus 15. ***Hydrometra*** Latreille

21. *Hydrometra greeni* Kirkaldy

Family IX. GERRIDAE

Subfamily PTILOMERINAE

Genus 16. ***Prilomera*** Amyot & Serville

22. *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda

Subfamily GERRINAE

Genus 17. ***Gerris*** Fabricius

23. *Gerris lepcha* Distant
24. *Gerris adelaidis* Dohrn

Genus 18. ***Limnogonus*** Stal

25. *Limnogonus (Limnogonus) nitidus* (Mayr)
26. *Limnogonus (Limnogonus) fossarum* (Fabricius)

Family X. VELIIDAE

Subfamily MICROVELINAE

Genus 19. ***Microvelia*** Westwood

27. *Microvelia douglasi* Scott.

A key to families

1. Antennae shorter than head and concealed in cavities beneath eyes, not visiable from above (except Ochteridae)...Series-Hydrocorisae ...2

   Antennae as long as or longer than head and not concealed, clearly visible, from above... Series-Amphibicorisae 7

2. Ocelli present ; middle and hind legs without fringe of swimming hairs ; antennae small and exposed, can be seen from above ; front legs similar to middle legs..... OCHTERIDAE

   Ocelli absent ; middle and hind legs provided with more or less extensive frings of long swimming hairs ; antennae concealed, not seen from above ; front legs raptorial with broad and grooved femora 3

3. Rostrum very short and broad with no distinct segmentation ; front tarsi spatulate and developed into comblike palae ; base of head overlapping the anterior margin of pronotum ..... CORIXIDAE

   Rostrum cylindrical or cone shaped with distinctly 3-4 segmented ; front tarsi normal and not modified into palae ; base of head inserted into pronotum 4

4. Abdomen with a pair of long, slender posterior appendages ; hind coxae short, free and rotatory ..... NEPIDAE

   Abdomen without paired long slender posterior appendages ; hind coxae broadly jointed to the thoracic pleura 5

5. Body elongated ; head spherical ; hind legs long, slender and oarlike without distinct claws ..... NOTONECTIDAE

   Body dorso-ventrally flattened, head otherwise ; hind legs otherwise ; with distinct paired claws 6

6. Membrane of hemelytra with reticulate veins ; abdomen with a pair of short, flat, retractile posterior appendages ; head nearly triangular at the anterior margin... BELOSTOMATIDAE

   Membrane of hemelytra with reticulate veins ; abdomen without any straplike appendages ; head strongly curved posteriorly at the anterior margin ..... NAUCORIDAE

7. Claws apical ; apex of the last tarsal segment entire 8

   Claws of at least front tarsi pre-apical ; apex of last tarsal segment with cleft or bifid 9

8. Head shorter than pronotum ; scutellum minute ; femora with stiff, erect bristles .... MESOVELIIDAE

   Head long, as long as entire thorax ; body slender and cylindrical; antennae and legs filiform ..... HYDROMETRIDAE

9. Hind femora long, surpassing the end of abdomen ; middle legs inserted closer to hind legs than to fore legs ; head without central groove ..... GERRIDAE

   Hind femora short, scarcely surpassing the end of abdomen ; middle legs inserted about midway between front and hind legs ; head with a central groove..... VELIIDAE

Series HYDROCORISAE

Family I. Ochteridae

Genus 1. ***Ochterus*** Latreille

1807. *Ochterus* Latreille, *Gen. Crust. Ins.*, **3** : 142.

1. ***Ochterus marginatus*** (Latreille)

1804. *Acanthia marginata* Latreille, *Gen. Crust. Ins.*, **3** : 143.

1807. *Ochterus marginatus* : Latreille, *Gen. Crust. Ins.*, **3** : 143.

1906. *Pelogonus marginatus* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 14.

1971. *Ochterus marginatus* : Kormilov, *Pacif. Insects*, **13** (3-4) : 433.

1979. *Ochterus marginatus* : Polhemus, *Bull. Fish Res. Stn., Sri Lanka*, **29** : 91.

Material examined : 1 ex. (♀). Turibari, 1250 Mtr. alt., 5km. West of Kangpokpi, Senapati Dist., 11.xi.1992, A.K. Mondal and party coll.

Diagnosis : Adult insect may attain a length of 4-6 mm ; body moderately depressed ; antennae short and 4-jointed, inserted beneath the eyes ; pronotum transverse and hexangular, lateral margins of pronotum distinctly convex ; costal margins of hemelytra bordered with yellow, widened at the extreme base and usually also at three other places forming three pale submarginal spots ; hemelytra totally covering the abdomen.

Distribution : India : Manipur (District-Senapati), Assam, Bihar, Maharashtra, Meghalaya, Orissa, Tamilnadu, Uttar Pradesh, West Bengal.

Elsewhere : Abyssinia ; Cochin-China ; France ; Japan ; Myanmar ; Sri Lanka ; Sumatra.

Family II. CORIXIDAE

Key to subfamilies and genera

1. Antennae 3-segmented ; scutellum exposed ; in male 9th segment of abdomen and upper paramere not forming supports for the aedeagus ; small species hardly over 4.5 mm in length..... ... Subfamily Micronectinae and genus ***Micronecta.***

   Antennae 4-segmented ; scutellum hidden under posteriorly produced pronotum ; in male the posterior projection of 9th segment of abdomen and the modified upper paramere forming supports for the aedeagus ; larger species, rarely under 4.5 mm.....Subfamily CORIXINAE 2

2. Rostrum without transverse sulcations ; palae subcylindrical in cross-section ; pronotum with very obscure markings ; elytra with transverse bands more regular at the bases of claws..... ..... ***Cymatia***

   Rostrum with transverse sulcation ; palae triangular in crossection pronotum and elytron otherwise 3

3. Pronotum and elytra unicolorous, hyaline brown ; incomplete pleural suture well developed .....***Agraptocorixa***

   Pronotum and elytra marked with transverse alternating yellow and dark vermiculations or bands ; pleural suture more or les obsolate.. ..... ***Corixa***

Subfamily MICRONECTINAE

Genus 2. *Micronecta* Kirkaldy

1897. *Micronecta* Kirkaldy, *Entomologist,* **30** : 260.

Key to species of the genus *Micronecta*

1. Large, size about 4 mm in length ; elytra with obscure dark pattern .... *M. (Basileonecta) scutellaris scutellaris*

   Small, size about 3 mm in length ; elytra pale with punctiform black spots..... ..... *M. (Dichaetonecta) haliploides*

2. *Micronecta (Basileonecta) scutellaris scutellaris* (Stål)

1858. *Sigara scutellaris* Stal, *Ofvers. K. Vet.-Akad, Forh.,* **15** : 339.

1910. *Micronecta dione* : Distant, *Fauna Brit, India, Rhynchota,* **5** : 348.

1996. *Micronecta (Basilenecta) scutellaris scutellaris* : Bal and Basu *State Fauna Series 6* : *Fauna of Delhi* : 264.

Material examined: 1 ex., (♀), Gularthol, Imphal Dist., 4.iii.1993, S. K. Saha and party coll.

Diagnosis : Adult insect about 4 mm in body length. It is the largest known *Micronecta* from India. In males, the pronotum is grey or greyish brown, paler margins and with obscurely marked elytra.

Distribution : India : Manipur (District-Imphal), Andhra Pradesh, Bihar, Delhi, Karnataka, Kerala, Tamilnadu, Uttar Pradesh, West Bengal.

Elsewhere : Africa ; China ; Indonesia ; Malayasia ; South Arabia ; Sri Lanka ; Vietnam.

3. *Micronecta (Dichaetonecta) haliploides* Horvath

1904. *Micronecta haliploides* Horvath, *Ann. Hist. nat. Mus. Hung. Budapest,* **2** : 594.

1910. *Micronecta merope* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 351.

1934. *Micronecta haliploides* : Lundblad, *Arch. hydobiol. Suppl.*, **12** : 104.

1940. *Micronecta (Dichaetonecta) haliploides* : Hutchinson, *Conn. Acad. Arts Sci.*, **33** : 377.

Material examined : 1 ex., Thanga, Loktak Lake, Bishenpur Dist., 2.ii.1993, S.K. Saha and party coll.

Diagnosis : Adult insect may attain a length of about 3 mm ; pronotum transverse and narrow, lateral margins very short ; elytra pale with punctiform black spots and lateral margins moderately convexly rounded.

Distribution : India : Manipur (Bishenpur), Meghalaya, Tripura, West Bengal.

Elsewhere : Bangladesh; Java.

Subfamily CORIXINAE

Genus 3. *Cymatia* Flor

1860. *Cymatia* Flor, *Die Rhynch. Livlands*, **1** : 783.

4. *Cymatia apparens* (Distant)

1910. *Corixa apparens* Distant, *Fauna Brit. India, Rhynchota*, **5** : 343.

1928. *Cymatia apparens* : Jaczewski, *Ann. Mus. Zool. Polon.*, **7** : 107.

1904. *Cymatia apparens* : Hutchinson, *Conn. Acad. Arts Sci.*, **33** : 405.

Material examined : 4 exs. (1♂ 3♀♀), Sendra. Loktak Lake, Bishenpur Dist., 19.xi.1993, S. K. Saha & party coll.

Diagnosis : Adult insect with body length from 4.7 to 5.8 mm; pronotum with obscure markings; rostrum with no transverse sculcation; elytra with transverse bands more regularly developed at the base of the clavus having relatively unbroken yellow bands narrower than the intermediate black spaces; pronotum and elytra non-rastrate; a well defined longitudinal carine on the pronotum; pala subcylindrical in both male and female but male pala with a long spatula like process at the distal end and pegs absent.

Distribution : India : Manipur (District–Bishenpur), Jammu & Kashmir, Tamilnadu, West Bengal; *Elsewhere* : China.

5. *Agraptocorixa (Agraptocorixa) hyalinipennis* (Fabricius)

1803. *Sigara hyalinipennis* Fabricius, *Syst. Rhyn.*, : 105.

1918. *Corixa unicolor* : Paiva, *Rec. Indian mus.*, **14** : 30.

1922. *Corixa paivana* : Paiva and Dover, *Rec. Indian Mus..*, **24** : 333.

1996. *Agratocorixa (Agraptocorixa) hyalinipennis* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi*, : 264.

Material examined : 12 exs., (5♂♂, 7♀♀), Thinghat, Churachandpur Dist., 22.ii.1993, S.K. Saha 7 party coll.

Diagnosis : Adult may be 6.5–8.00 mm in body length ; pronotum and elytra unicolorous, hyaline brown, incomplete pleural sutures well developed ; strigil small (abdominal 6th dorsum brearing the strigil), composed of 5-6 combs ; pala with atleast 21 pegs in male.

Distribution : India ; Manipur (District–Churachandpur), Delhi, Himachal Pradesh, Orissa, Punjab, Tamil Nadu.

Elsewhere : Myanmar ; Taiwan ; Java ; New Guinea ; Pakistan.

Genus 5. *Corixa* Geoffroy

1762. *Corixa* Geoffroy, *Hist. abreg. Ins.* **1** : 477.

6. *Corixa (Tropocorixa) distorta* Distant

1910. *Corixa distorta* Distant, *Fauna Brit, India Rhynchota*, **5** : 343.

1910. *Corixa affinis* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 341.

1933. *Sigara (Sigara) distorta* : Hutchinson, *Rec. Indian Mus.*, **35** : 403.

1940. *Corix (Tropocorixa) distorta* : Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 440.

1996. *Corixa (Tropocorixa) distorta* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi*, : 265.

Material examined : 2 exs., (♀♀), Moirang, Liktak Lake, Bishenpur Dist., 10.xii.1992, P.H. Roy & party coll.

Diagnosis : Adult may reach upto 5.5 mm in length ; head yellowish rather elongate, anterior margin of vertex evenly rounded, posterior margin with a blunt median carina between two rows of 5 punctures, also a few scattered punctures between this row and internal margin of each eye ; pronotum black with 6 regular transverse yellowish lines ; pala in male with 38 pegs, the peg row is almost parallel with the flexor margin, distal 5 pegs rather elongate and more pointed.

Distribution : India : Manipur (District– Bishenpur), Bihar Delhi, Himachal Pradesh, Maharashtra, Punjab.

Eleswhere : China ; Denmark : Nepal.

Key to subfamilies and genera

1. Body elongately suboval and flattened ; pronotum about as long as or a 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 a little incrassate but without any groove below ; one or two pairs of sharp teeth on the anterior femora ; anterior coxae very long .... Subfamily RANATRINAE and Genus ***Ranatra***

Subfamily NEPINAE

Genus 6. ***Laccotrephes*** Stal

1865. *Laccotrephes* Stal, *Hem, Africa,* **3** : 186.

7. ***Laccotrephes ruber*** (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.,* : 165.

1868. *Laccotrephes ruber* : Stal, *Hem.. Fabr.,* **1** : 135.

1906. *Laccotrephes ruber* : Distant, *Fauna Brit. India, Rhynchota,* **3** : 18.

1989. *Laccotrephis ruber* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper,* **118.**

1996. *Laccotrephes ruber* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi,* : 268.

Material examined : 2 exs.,(♂ & ♀), Manipur River, 2 miles north of Imphal Dak Bunglow, 10.i.1953 ; 2 exs. (♂♂), 9 kms. from Miao towards Karang, Senapati Dist., 10.i.1976, A.K. Ghosh coll. ; 1 ex. (♀), Sankai, 25.i.1977, S.G. Patil coll. ; 1 ex. (♀), Chandel, 65 kms. east of Imphal, Chandel Dist., 6.ii.1992, A.K. Poddar and party coll. : 3 exs. (2♂ ♂, 1♀), Thongouroh, 5 kms. from Bishenpur, Bishenpur Dist., 31.v.1992, R. Mathew and party coll.; 1 ex. (♀), Khonjam (2700 ft.) on National highway No. 39, Thoubal Dist., 11.vi.1992, R. mathew and party coll. ; 2 exs. (♀♀), Kumbipukri (2800 ft.), 2 kms. north of Churachandpur, Churachandpur Dist., 7.vi.1992, R. Mathew and party coll. ; 1 ex. (♀), Moirang, Bishenpur Dist., 26.iii.1993, D.K. Mondal and party coll. ; 9 exs., (4♂♂, 5♀♀), Loktak canal, Bishenpur Dist., 14.ii.1993, A. Bhattacharyya and party coll. ; 2 exs. (♀♀), Bishenpur, Bishenpur Dist., 13.ii.1993, A. Bhattacharyya and party coll.

Diagnosis : Adult insects 30-35 mm in length excluding abdominal appendages, breadth between posterior pronotal angles 7-9 mm ; abdomen reddish yellow above ; prosternum convex at the middle provided with a small tube at the anterior region ; abdominal appendages longer than the body.

Distribution : India : Manipur (Districts– Bishenpur, Chandel, Senapati, Thoubal, Churachandpur), Bihar, Delhi, Gujarat, Jammu and Kashmir, Kerala, Maharashtra, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : China : Taiwan ; Japan ; Nepal ; Pakistan.

Subfamily RANATRINAE

Genus 7. ***Ranatra*** Fabricius

1790. *Ranatra* Fabricius, *Skr. nat. Selsk.,* **1** (1) : 227.

Key to Species of the genus *Ranatra*

1. Abdominal appendages very short, nearly one fourth of the body length ; head with an acute

tubercle between the eyes ; anterior femora with six minute teeth arranged linearly beneath the basal half and two large teeth at the middle ..... *gracilis*

Abdominal appendages much longer in length, head with no tubercle between the eyes ; anterior femora not provided with minute teeth on the basal half 2

2. Body length about 23-24 mm, abdominal appendages about 19-20 mm in length ; metasternal process posteriorly projectile with lateral concavity on each side and midlongitudinally slightly carinated .... *sordidula*

Body length about 19-20 mm, abdominal appendages about 12-13 mm in length ; metasternal process posteriorly blunt and slightly rounded with no lateral concavity and midlongitudinally carination less distinct..... ..... *varipes*

8. ***Ranatra gracilis*** Dallas

1849. *Ranatra gracilis* Dallas, *Trans, ent, Soc. London,* : **10.**

1906. *Ranatra gracilis* : Distant, *Fauna Brit. India, Rhynchota,* **3** : 22.

1934. *Ranatra gracilis* : Lundblad, *Arch. Hydrobol. Suppl.,* **12** : 29.

Material examined : 1 ex. (♂), Samenkeai Road (2800 ft.), 10-11 km east of Churachandpur, Churachandpur Dist., 3.vi.1992, R. Mathew and party coll. ; 1 ex. (♀), Tuilaphai (2600 ft.) 26 kms west of Churachandpur on way to Tipaimuku, Churachandpur Dist., 6.vi.1992, R. Mathew and party coll.

Diagnosis : Adult insect may attain a length of about 34 mm. Other diagnostic characters as in key.

Distribution : India : Manipur (District-Churachandpur), Meghalaya.

Elsewhere : Bhutan.

9. ***Ranatra sordidula*** Dohrn

1860. *Ranatra sordidula* Dohrn, *Stettin. ent. Ztg.,* **21** : 409.

1906. *Ranatra sordidula* : Distant, *Fauna Brit. India, Rhynchota,* **3** : 22.

1994. *Ranatra sordidula* : Bal and Basu, *State Fauna Series 3, Fauna of West Bengal,* Part **5** : 543.

1996. *Ranatra sordidula* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi* : 267.

Material examined : 8 exs. (1♂, 7♀♀), near Tehmu Fish Ferm, Loktak lake, 3 kms. east of Moirang, Bishenpur dist., 15.iii.1994, K.R. Rao coll. ; 11 exs. (3♂♂, 8♀♀), Loktak Lake, Moirang, Bishenpur Dist., 10.xii.1992.

Diagnosis : Characters as in key.

Distribution : India : Manipur (District-Bishenpur), Delhi, Meghalaya, Orissa, West Bengal.

Elsewhere : Malay Peninsula ; Sri Lanka ; Thailand.

10. ***Ranatra varipes*** Stal

1861. *Ranatra varipes* Stal, *Ofvers. K. Vet.–Akad Forh.,* **18** : 203.

1910. *Ranatra varipes* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 316.

1974. *Ranatra varipes* : Fernandoo & Cheng, *Edn. Mus. J.,* **19** : 32.

1994. *Ranatra varipes* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper,* **165** : 23.

1994. *Ranatra varipes* : Bal and Basu, *State Fauna Series 3* : *Fauna of West Bengal,* Part-**5** : 543.

Material examined : 7 ex., (5♂♂, 2♀♀), near Tahmu Fish Farm, Loktak lake, 3 kms east of Moirang, Bishenpur Dist., 15.iii.1974, K.R. Rao coll. ; 13 exs. (7♂♂, 6♀♀), Kumbipukri (2800 ft.), 2 kms. north of Churachandpur, Churachandpur Dist., 7.vi.1992, R. Mathew and party coll. ; 1 ex. (♀), 2 kms. from Morch (1200 ft.) on wya to Tengnoupal, Chandel Dist., 13.vi.1992, R. Mathew and party coll. ; 2 exs. (♀♀), Bishenpur, Bishenpur Dist., 3.ii.1993, A. Bhattacharyya and party coll.

Diagnosis : Anterior femora broad with irregular markings. Other diagnostic characters as in key.

Distribution : India : Manipur (Districts–Bishenpur, Chandel, Churachandpur), Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Australia : Indonesia ; Malaysia, Myanmar ; Taiwan ; Sri Lanka.

Family IV. NOTONECTIDAE

Key to subfamilies and genera

1. Hemelytra commissure with a definite hairlined pit at the anterior end just behind the scutellum. Pronotum more longer than wide without any foveatly 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 ***Aniosops.***

   Hemelytra commissure without any hairlined pit at the anterior end. Pronotum more wider than long with its anterior angles foveately excavate ; middle femur with an anteapical pointed protuberance ; anterior leg of both sexes with three tarsal segments..... ..... Subfamily NOTONECTINAE and genus ***Enithares***

Subfamily ANISOPINAE

Genus 8. *Anisops* Spinola

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.*, : 58.

Key to the species of the genus *Anisops*

1. Small in size, body length of males 5.6–6.4 mm; cephalic horn short among males, with frons excavate triangularly with rounded apex, bordered on each side by two carinae, inner two cariane meet apically to form a median commissure ; rostral prong slightly longer than the 3rd rostral segment..... *batillifrons*

   Large in size, length of males 7.5-8.4 mm ; cephalic horn much prominent among males with frons excavate of its entire length and bordered laterally by two carinae ; rostral prong slightly shorter than the 3rd rostral segment ..... *sardea*

11. *Anisops batillifrons* Lundblad

1933. *Anisops batillifrons* Lundblad, *Ann. Mag.* nat. Hist., (10) **12** : 463.

1951. *Anisops batillifrons* : Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 420.

1996. *Anisops batillifrons* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi*, : 272.

Material examined: 3 exs. (2♂♂, 1♀) Gularthol, Imphal Dist., 4.iii.1993, S.K. Saha and party coll.

Diagnosis : Females are slightly smaller in size than males ; greatest body width at about two-fifth of the body length ; general body colour pale yellowish or greyish ; stridulatory comb of male on the inner surface of anterior tibia composed of 13 teeth, basal 6 teeth much longer than the rest. Other diagnostic characters as in key.

Distribution : India : Manipur (District–Imphal), Assam, Delhi, Tripura, West Bengal.

Elsewhere : China ; Myanmar ; Taiwan ; Japan ; Phillipines.

12. *Anisops sardea* Herricch-Shaffer

1850. *Anisops sardeus* Herrich-Shaffer, *Die Wanz. Ins.*, **9** : 41.

1906. *Anisops sardea* : Distant, *Fauna Brit. India, Rhynchota* **3** : 45.

1996. *Anisops sardea* : Bal and Basu, *State Fauna Series* 6 : *Fanua of Delhi* : 272.

Material examined: 1ex. (♂), Thinghat, Churachandpur Dist., 22.ii.1993, S.K. Saha and party coll.

Diagnosis : Females are slightly smaller in size than males ; gratest body width at about middle of the body length ; general body colour pale yellow or brownish yellow ; stidulatory comb of male composed of 18 teeth ; each basal angle of labrum bearing a tuft of erect hairs with tips cuved medianly and meet one another, forming a loop. Other diagnostic characters as in key.

Distribution : India : Manipur (District–Churachandpur), Bihar, Delhi, Himachal Pradesh, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal.

Eleswhere : Afghanistan ; Africa ; Albania ; Canary Islands ; Myanmar ; Syria ; Turkey.

Subfamily NOTONECTINAE

Genus 9. *Enithares* Spinola

1837. *Enithares* Spinola, *Ess. Ins. Hemipt.*, : 60.

Key to the species of the genus *Enithares*

1. Males little smaller in size while females attain 7.5-8.0 mm in body length ; males with outer claw of mid-tibia conspicuously thickened and bent inwards ; meso-trochanter rounded with no black patch of spicules on the ventral margin ; male first mid tarsus elongated in shape ..... *mandalayensis*

   Both sexes attain 9.0-9.6 mm. in body length ; males with both the claws of mid-tibia normal ; male meso-trochanter rounded with a patch of black spinules on the ventral margin ; male first mid-tarsus roughly triangular in shape.. ..... *ciliata*

13. *Enithares mandalayensis* Distant

1810. *Enithares mandalayensis* Distant, *Fauna Brit., India, Rhynchota,* **5** : 331.

1933. *Enithaes mandalayensis* : Hutchinson, *Rec. Indian Mus.*, **35** : 397.

1968. *Enithares mandalayensis* : Lansbury, *Pacific Ins.*, **10**(2) : 380.

Material examined : 2 exs. (♂, ♀), Chandel, 65 kms. east of Imphal, Chandel Dist., 6.ii.1992, A.K. Poddar and party coll. ; 2 exs. (♂ ♂), Sandra, Loktak lake, Bishenpur Dist., 19.ii.1993, S.K. Saha and party coll.

Diagnosis : Pronotum with posterior margin almost straight. Other diagnostic characters as in key.

Distribution : India : Manipur (Districts– Bishenpur, Chandel).

Elsewhere : Myanmar ; Malaya ; Thailand ; Vietnam.

14. *Enithares ciliata* (Fabricius)

1798. *Notonecta ciliata* Fabricius, *Suppl. Ent. Syst.*, : 524.

1906. *Enithares indica* : Distant, *Fauna Brit, India, Rhynchota,* **3** : 42.

1919. *Enithares lactea* : Paiva, *Rec. Indian Mus.*, **19** : 55.

1938. *Enithares abbreviata* : Hafiz & Mathai, *Rec., Indian Mus.*, **40** : 210.

1938. *Enithares ciliata* : Lansbury, *Pacific Ins.*, **10**(2) : 413.

1989. *Enithares ciliata* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper,* **118** : 21.

Material examined : 5 exs. (♀ ♀), Turibari (1250 Mts.), 5 kms. west of Kongpokpi, Senapati Dist., 11.xi.1992, A.K. Mondal and party coll.

Diagnosis : Pronotum with posterior margin convex and medianly emerginate. Other diagnostic characters as in key.

Distribution : India : Manipur (District– Senapati), Andaman Islands, Andhra Pradesh, Bihar, Goa, Kerala, Maharashtra.

Elsewhere : Bhutan ; Malaya ; Mauritius ; Sri Lanka ; Thailand ; Vietnam.

Family V. BELOSTOMATIDAE

Key to subfamilies and genera

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 by any suture like fold ; 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***

Subfamily LETHOCERINAE

Genus 10. *Lethocerus* Mayr

1853. *Lethocerus* Mayr. *Verh. zool.-bot. Ver.* Wien., **2** (1852) : 17.

15. *Lethocerus indicus* (Lepeletier and Serville)

1825. *Belostoma indica* Lepeletier and Serville, *Encycl. Meth.*, : 272.

1909. *Lethocerus indicus* : Montandon, *Bull. Soc., Sci. Buc.*, **17** : 138.

1996. *Lethocerus indicus* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi*, ; 269.

Material examined : 2 exs. (♀♀), Loktak Lake, Moirang, Bishenpur Dist., 19.i.1953 ; 1 ex.(♂), Mantripukhri, 18.i.1977, H. Khajuria coll.

Diagnosis : The giant Indian water bug may be 62-85 mm in body length ; head with parallel sides between the eyes ; pronotum with a transversee fasciae at the basal end and a fine mid-longitudinal carination ; hemelytra with distinct membrane provided with longitudinal veins ; posterior tibiae and tarsi completely compressed ; intermediate and posterior legs provided with thick sets of swimming hairs on the ventral side.

Distribution : India : Manipur (District–Bishenpur), Assam, Bihar, Kerala, Maharashtra, Meghalaya, Mizoram, Orissa, Uttar Pradesh, West Bengal.

Elsewhere : China ; Japan ; Malay Peninsula ; Myanmar ; Pakistan ; Phillipines ; Sri Lanka ; Sumatra.

Subfamily BELOSTOMATINAE

Genus 11. *Diplonychus* Laporte

1833. *Diplonychus* Laporte, *Guerin's Mag. Zool.*, **2** : 18.

Key to the species of the genus *Diplonychus*

1. Anterior tarsal claws very small ; ventro-lateral stripe of fine hairs on the abdomen is narrower ..... *rusticus*

   Anterior tarsal claws moderately well developed and longer ; ventrolateral stripe of fine haris on the abdomen is broader .... *molestus*

16. *Diplonychus rusticus* (Fabricius)

1803. *Nepa rustica* Fabricius, *Syst. Rhyngo.*, : 106.

1906. *Sphaerodema rusticus* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 36.

1979. *Diplonychus rusticus* : Polhemus, *Bull. Fish Res. Stn. Sri Lanka*, **29** : 91.

1996. *Diplonychus rusticus* : Bal and Basu, *State Fauna Series* **6** : *Fauna of Delhi*, : 270.

Material examined : 1 ex. (♀), 2 kms. from Moreh (1200 ft.) on way to Tengnoupal, Chandel Dist., 13.vi.1992, R. Mathew and party coll. ; 1 ex. (♀), Thanga, Loktak Lake, Bishenpur Dist., 20.ii.1993, S.K. Saha and party coll. ; 1 ex. (♂), Sendra, Laktak Lake, Bishenpur Dist., 19.ii.1993, S.K. Saha and party coll. ; 1 ex. (♀), Thanga island, Moirang, Bishenpur Dist., 9.ii.1993, A. Bhattacharyya and party coll.

Diagnosis : Body length of adults may be 15-17 mm. Other diagnostic characters as in key.

Distribution : India : Manipur (Districts–Bishenpur, Chandel), Delhi, Jammu and Kashmir, Kerala, Orissa, Maharashtra, West Bengal.

Elsewhere : China ; Japan ; Java ; Malay Peninsula ; Myanmar, Phillipines ; Sri Lanka ; Sumatra ; Thailand ; New Guinea ; New Zealand.

17. *Diplonychus molestus* (Dufour)

1863. *Appasus molestus* Dufour, *Ann. Soc. ent. Fr.*, : 395.

1906. *Sphaerodema melestus* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 36.

1996. *Diplonychus molestus* : Bal and Basu, *State Fauna Series 6* ; *Fauna of Delhi*, : 271.

Material examined : 1 ex., (♀), Laktak Lake, Moirang, Bishenpur Dist., 17.i.1953 ; 1 ex. (♀), South of floating santuary, Kiebul, Imphal Dist., 4.iii.1992, T. Roy and party coll ; 1 ex. (♀), Loktak Lake, Moirang, Bishenpur Dist., 10.xii.1992, P.H. Roy and party coll. ; 1 ex.(♀), Thanga, Loktak Lake, Bishenpur Dist., 20.ii.1993, S.K. Saha and party coll. ; 8 exs. (3♂♂, 5♀♀), Gularthol, Giribum, Imphal Dist., 4.iii.1993, S.K. Saha and party coll. ; 1 ex. (♀), Sendra, Loktak Lake, Bishenpur Dist., 19.ii.1993, S.K. Saha and party coll.

Diagnosis : Body length of adults may be 13.5-17.5 mm. and a little broader in width than that of *rusticus*. Other diagnostic characters as in key.

Distribution : India : Manipur (Districts–Bishenpur, Imphal), Delhi, Jammu and Kashmir, Orissa, West Bengal.

Elsewhere : Malacca ; Sumatra.

Subfamily VI. NAUCORIDAE

Key to the subfamilies and genera

1. Head more or less prominent and rounded in front of eyes ; pronotum anteriorly strongly concave or sinuate ; posterior pronotal angles accuminate. Eyes are not subparallel and posteriorly immersed in the anterior lateral margins of pronotum ; hemelytra membrane absent ; connexivum posterolaterally well exposed ..... Subfamily CHEIROCHELINAE and Genus ***Gestroiella***

   Head broad and not prominently produced in front of eys ; pronotum anteriorly may or may not be prominently broadly sinuate ; posterior pronotal angles not accuminate. Eyes are subparallel and slightly convergent anteriorly ; hemelytra membrane small ; connexivum posteriorly marginally visible ... . Subfamily LACCOCORINAE and Genus ***Heliocoris***

Subfamily CHEIROCHELINAE

Genus 12. *Gestroiella* Montandon

1897. *Gestroiella* Montandon, *Ann. Mus. civ. Gen.*, **37** : 371.

18. *Gestroiella insignis* Distant

1910. *Gestroiella insignis* Distant, *Fauna Brit. India. Rhynchota*, **5** : 318.

Material examined : 3 exs., (1♂, 2♀♀), Sankai, Churachandpur Dist., 25.i.1977, S.G. Patil coll.

Diagnosis : Body length may be 17.5 mm. head slightly longer than breadth between eyes ; pronotum centrally depressed at the anterior margin ; lateral margins of pronotum oblique slightly rounded and posterior angles broadly acute and directed backward over the base of the hemelytra ; male anterior femur strongly dialated with a concavity at the distal end.

Distribution : India : Manipur (District–Churachandpur), Assam.

Subfamily LACCOCORINAE

Genus 13. *Heliocoris* Stal

1876. *Heliocoris* Stal, *K. svenska Vet.-Akad. Handl.*, **16** : 142, 146.

19. *Heliocoris strabus* Montandon

1897. *Heliocoris strabus* Montandon, *Ann. Mus. civ. Gen.*, **37** : 372.

1906. *Heliocoris strabus* : Distant, *Fauna Brit. India, Rhynchota* **3** : 29.

Material examined: 4 exs. (3♂♂, 1♀), Around Kongpokpi (3900 ft.), Senapati Dist., 13.i.1976, A. K. Ghosh Coll.

Diagnosis : Body length may be 11.0 mm ; eyes converging anteriorly wholely ; lateral pronotal angles obliquely truncated ; lateral margins of hemelytra abruptly and strongly sinuate behind the embolium where it is trucately cut.

Distribution : India : Manipur (District–Senapati).

Elsewhere : Myanmar.

Series AMPHIBICORISAE

Family VII MESOVELIIDAE

Subfamily MESOVELIINAE

Genus 14. *Mesovelia* Mulsant and Rey

1852. *Mesovelia* Mulsant and Rey, *Ann. Soc. Linn. Lyon*, : 138.

20. *Mesovelia vittigera* Horvath

1895. *Mesovelia vittigera* Horvath, *Rev. d. Ent.*, **14** : 160.

1901. *Mesovelia orientalis* : Kirkaldy, *Ann. Mus. Cin. Genova*, **20** : 808.

1902. *Mesovelia mulsanti* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 169.

1934. *Mesovelia vittigera* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 186.

1994. *Mesovelia vittigera* : Bal and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part **5** : 513.

Material examined : 3 exs. apterous (♀♀), Gularthol, Giribum, Imphal Dist., 4.iii.1993, S.K. Saha and party coll.

Diagnosis : Adults attain a length between 2.5-3.00 mm ; body elongate with prominent

head ; eyes large and almost touching the anterior margin of pronotum ; two ocelli equally distant from eyes as far from each other ; 4th segment of antenna longer than 3rd segment ; pronotum with lateral angles tuberculously sub-prominent ; hemelytra may be absent (apterous forms), when present may be fully developed (macropterous froms) or half developed (brachypterous forms) ; in females middle femur spiny below ; in males the last abdominal segment with a single medium spine in a group and two sets of brush like hairs laterally.

Distribution : India : Manipur (District-Imphal), Andaman Islands, Bihar, Karnataka, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Africa ; Australia ; Egypt ; Indonesia ; Malayasia ; Palastinae ; Phillipines ; Samoa Island ; Sri Lanka.

Family VIII HYDROMETRIDAE

Subfamily HYDROMETRINAE

Genus 15. ***Hydrometra*** Latreille

1796. *Hydrometra* Latreille, *Prec. Car. Ins.*, : 86.

21. ***Hydrometra greeni*** Kirkaldy

1898. *Hydrometra greeni* Kirkaldy, *Entomologist*, **31** : 2.

1902. *Hydrometra vittata* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 170

1919. *Hydrometra vittata* : Paiva, *Rec. Indian Mus.*, **16** : 153.

1928. *Hydrometra greeni* : Dover, J. *Bombay nat. hist. Soc.*, **32** : 614.

1934. *Hydrometra greeni* : Hungerford and Evans, *Ann. Mus. Nat. Hung.*, **38** : 79.

1994. *Hydrometra greeni* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, **165** : 29.

Material examined : 4 exs. (♂ ♂), Turibari, (1250 mts.), 5 kms. west of Kangpokpi, Senapati Dist., 11.xi.1992, A.K. Mondal and party coll.

Diagnosis : Adult insect may attain upto 11.0-12.0 mm in length ; head very long, much longer than pronotum and dilated distally ; eyes placed considrably far from both the ends on the much elongated head ; 1st antennal segment shortest, 2nd and 4th segments subequal ion length while 3rd segment longest ; hemelytra extends upto 5th abdominal segments in both the sexes ; in males a transverse depression on the 6th ventral abdominal segment which is also fringed with short erect hairs on the dorsal margin.

Distribution : India : Manipur (District-Senapati), Orissa, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Japan ; Malayasia ; Myanmar ; Phillipines ; Sri Lanka.

Family IX. GERRIDAE

Key to the subfamilies and genera

1. Metacetabular groove dorsally reaching anterior end of first abdominal tergum ; pronotal love reduced in apterous forms ; lateral suture between meso-thorax and meta-thorax distinct ; fore tarsi very long, atleast one-half length of anterior tibia .... Subfamily PTILOMERINAE and genus ***Ptilomera***

   Metacetabular groove not reaching anterior end of first abdominal tergum ; pronotal lobe not reduced in apterous forms ; lateral suture between meso-thorax and meta-thorax indistinct ; fore tarsi short .... Subfamily GERRINAE.....2

2. Antennae shorter, nearly one-half or shorter than one-half the body length ; dorsal surface of head almost uniformly dark ..... ***Gerris***

   Antennae moderately long, usually shorter than body length ; dorsal surface of head light, or dark with longitudinal light stripes or elongated markings ..... ***Limnogonus***

Subfamily PTILOMERINAE

Genus 16. ***Ptilomera*** Amyot and Serville

1843. *Ptilimera* Amyot and Serville, *Hemipteres*, : 413.

22. ***Ptilimera (Ptilomera) assamensis*** Hungerford and Matsuda.

1965. *Ptilomera (Ptilomera) assamensis* Hungerford and Matsuda, *Kans. Univ. Sci. bull.*, **45**(5) : 421.

Material examined : 12 exs., (apterous 5♂♂, 4♀♀ ; macropterous 2♂♂, 1♀), Chiron Village, Moreli, Chandel Dist., 13.iv.1992, A.K. Sanyal and party coll. ; 1 ex. (apterous ♀), Tuilaphai (2600 ft.) 26 kms. west of Churachandpur on way to Tipaimuku Churachandpur Dist., 6.vi.1992, R. Mathew and party coll.

Diagnosis : Apterous males and females may be 13-15 mm and 14-15 mm in body length respectively while macropterous forms may attain a little more in length ; ground colour of the body yellowish to reddish brown ; males with pygofer relatively short, its tip roundly pointed and dorso-lateral projections short and broad at base as seen ventrally, paramere resembling superficially with that of *laticaudata* ; in females connexival spines not very long, and flattened slightly beneath the dorsal margin of dorso-lateral lobe of 7th abdominal segment.

Distribution : India : Manipur (Districts-Chandel, Churachandpur), Assam.

Subfamily GERRINAE

Genus 17. *Gerris* Fabricius

1794. *Gerris* Fabricius, *Ent. Syst.*, **4** : 187

Key to the species of the genus *Gerris*

1. Anterior lobe of pronotum indistinct ; head with no semi-lunar pale yellow spot ; antennae with 1st segment longest and 2nd segment shortest while 3rd and 4th segments almost subequal in length ; hemelytra longer than the posterior femora ; connexival spines small in both sexes ..... *lepcha*

   Anterior lobe of pronotum distinct ; head with a basal semi-lunar pale yellow spot ; antennae with 1st segment longest and 3rd segment shortest while 2nd and 4th segments almost subequal in length; hemelytra shorter than the posterior femora ; connexival spines moderately long in both sexes ..... *adelaidis*

23. *Gerris lepcha* Distant

1910. *Gerris lepcha* Distant, *Ann, Mag, nat, Hist.*, (8) **(5)** : 140.

1910. *Gerris lepcha* : Distant, *Fauna Brit. India, Rhynchota* **5** : 142.

1994. *Gerris lepcha* : Bal and Basu, *State Fauna Series* **3** : *Fauna of West Bengal,* Party **5** : 527

Material examined : 8 exs., (6♂♂, 2♀♀) ; Sherui Hills, Ukrul Dist., 13.vi.1993, R.S. Burman and party coll. ; 3 exs. (2♂♂, 1♀) Sherui Hills, Ukrul Dist., 14.vi.1993, R.S. Burman and party coll.

Diagnosis : Body length of adults may be 11.5-14.0 mm. Other diagnostic characters as in key.

Distribution : India : Manipur (Dist. Ukrul). Sikkim, West Bengal.

24. *Gerris adelaidis* Dohrn

1860. *Gerris adelaidis* Dohrn, *Stettin. ent. Ztg.*, **21** : 408.

1908. *Gerris adelaidis* : Distant, *Fauna Brit, India, Rhynchota,* **2** : 181.

1969. *Gerris adelaidis* : Cheng and Fernando, *oriental Ins.*, **3** (2) : 4.

1994. *Gerris adelaidis* : Bal and Basu, *State Fauna Seires* **3** : *Fauna of West Bengal,* Part-5 : 528.

Material examined : 2 exs. (♀♀), Kasom Village, Litan, Ukrrul, Dist., 21.i.1977, S.G. Patl and party coll. ; 2 exs. (♂♂) 3 kms. north of Singnat Inspection Bunglow, 28.iii.1974, K.R. Rao coll., 1 ex. (♀), Turibari (1250 mts.), 5 kms. west of Kangpokpi, Senapati Dist., 11.xi.1992, A.K. Mondal and party coll.

Diagnosis : Adult insects may be 11.5 mm in body length ; rostrum short, slightly surpassing the base of head ; pronotum with a distinct brownish carina althrough the length. Other diagnostic characters as in key.

Distribution : India : Manipur (Districts– Senapati, Ukrul), Meghalaya, Tamil Nadu, West Bengal.

Elsewhere : Bangladesh ; China ; Indonesia ; Myanmar ; Nepal ; Phillipines ; Sri Lanka ; Thailand ; Vietnam.

Genus 18. *Limnogonus* Stal

1868. *Limnogonus* Stal, *K. svenska vet.-Akad. hand 1.*, **7** : 132.

Key to the species of the genus *Limnogonus*

1. Body length 6.0-8.0 mm ; posterior margin of dorsal vesicle plate remarkably angular ; antennae with 1st and 4th segments longest and subequal while 2nd and 3rd segments shortest and subequal in length ; pronotal lobe without yellow median line ; connexivum terminating into fairly prominent spine .... *nitidus*

   Body length 9.0-10.00 mm ; posterior margin of dorsal vesicle plate concave ; antennae with 1st segment longest while other segments shorter and subequal in length ; pronotal lobe with a median yellow line extending to its entire length ; connexivum not terminating into prominent spine..... *fossarum*

25. *Limnogonus (Limnogonus) nitidus* (Mayr)

1865. *Hydrometra nitida* Mayr. *Verh. zool.-bot. Ges. Wien.*, **15** : 443.

1910. *Gerris nitida* ; Distant, *Fauna Brit. India, Rhynchota* **5** : 142.

1934. *Limnogonus nitidus* : Lundblad, *Arch. hydrobiol. Suppl.*, **12** : 387.

1960. *Limnogonus (Limnogonus) nitidus* : Matsuda, *kans. univ. Sci. Bull.*, **41** : 198.

1989. *Limnogonus (L.) nitidus* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, **118** : 41.

1994. *Limnogonus nitidus* : Bal and Basu, *State Fauna Series* 3 : *Fauna of West Bengal* Part-5 : 525.

1996. *Limnogonus (L.) nitidus* : Bal and Basu, *State Fauna Series 6 : Fauna of Delhi*, : 274.

Material examined : 1 ex. (♀), Loktak lake, Moirang, Bishenpur Dist., 10.xii.1992, P.H. Roy and party coll. ; 4 exs. (2♂♂, 2♀♀), Sendra, Loktak lake, Bishenpur Dist., 19.ii.1993, S.K. Saha and party coll.

Diagnosis : This species is easily identified among all oher known allied species by the presence of fairly prominent connexival spines in both the sexes. Other diagnostic characters as in key.

Distribution : India : Manipur (District–Bishenpur), Assam, Bihar, Delhi, Kerala, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh ; Celebes ; Indonesia ; Malaysia ; Myanmar ; Nepal ; Sri Lanka ; Thailand ; Vietnam.

26. *Limnogonus (Limnogonus) fossarum* (Fabricius)

1775. *Cimex fossarum* Fabricius, *Syst. Ent.*, : 727.

1868. *Limnogonus fossarum* : Stal, *K. svenska Vet.-Akad. Handl.*, **7** : 133.

1902. *Gerris fossarum* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 178.

1969. *Limnogonus fossarum* : Cheng and Fernando, *Oriental Ins.*, **3**(2) : 100.

1999. *Limnogonus (Limnogonus) fossarum* : Bal and Basu, *State Fauna Series* 6 : *Fauna of Delhi*, : 274.

Material examined : 1 ex. (♀), Gularthol, Giribum, Imphal Dist., 4.iii.1993, S.K. Saha and party coll.

Diagnosis : Diagnostic characters as in key.

Distribution : India : Manipur (District-Imphal), all over India.

Elsewhere : China ; Java ; Malacca Islands ; Phillipines ; Sumatra ; Taiwan ; Thailand ; Vietnam.

Family X. VELIIDAE

Subfamily MICROVELIINAE

Genus 19. *Microvelia* Westwood

1834. *Microvelia* Westwood, *Ann. Soc. ent. France*, **3** : 647.

27. *Microvelia douglasi* Scott

1874. *Microvelia douglasi* Scott, *Ann. mag. nat. Hist.*, **14** : 448.

1902. *Microvelia repentina* : Distant, *Fauna Brit. India, Rhynchota.* **2** : 174.

1902. *Microvelia singalensis* : Distant, *Fauna 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* : Thirumalai, *Rec. zool. Surv. India. Occ. Paper,* **165** : 40.

Material examined: 1 ex. (apterous ♂), Thanga, Loktak Lake, Bishenpur Dist., 20.ii.1993, S.K. Saha and party coll.

Diagnosis : Adult insects minute in size, may reach upto 2mm in length ; head, pronotum and body beneath dull black ; anterior margin of pronotum pale yellowish which is centrally interrupted and not reaching anterior angles ; 4th antennal segment longest while 2nd segment slightly shorter than 1st segment and distinctly shorter than 3rd ; tibial comb present only on anterior tibia in males.

Distribution : India : Manipur (District–Bishenpur), Orissa, Tamil Nadu.

Elsewhere : Indonesia ; Japan ; Sri Lanka.

SUMMARY

The present paper has been prepared upon the study of water bug collections, made by different survey parties of the Zoological Survey of India, from the State of Manipur and some unnamed collections housed in the National Zoological Collection, Calcutta. Total 27 species under 19 genera belonging to ten families of water-bugs have been reported in this paper. All the species of the present study are considered as recorded for the first time from the State since there was no previously published faunistic account on water-bugs from Manipur. Necessary taxonomic keys from families, subfamilies, genera and species of the concerned study have been prepared and provided in the present paper. Moreover, synonymic references, distribution within the state, other states in India and elsewhere in the world for each species have been incorporated in this paper.

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The Chart is showing the occurence of water-bugs in different districts of Manipur

NAME OF THE SPECIES	D I S T R I C T S						
	Bishenpur	Churachandpur	Chandel	Imphal	Senapati	Thoubal	Ukrul
1. *Ochterus marginatus*					+		
2. *Micronecta (Basileonecta) scutellaris scutellaris*				+			
3. *Micronecta (Dichaetonecta) haliploides*	+						
4. *Cymatia apparens*	+						
5. *Agraptocorixa (Agraptocorixa) hyalinipennis*		+					
6. *Corixa (Tropocorixa) distorta*	+						
7. *Laccotrephes ruber*	+	+	+		+	+	
8. *Ranatra gracilis*		+					
9. *Ranatra sordidula*	+						
10. *Ranatra varipes*	+	+	+				
11. *Anisops batillifrons*				+			
12. *Anisops sardea*		+					
13. *Enithares mandalayensis*	+	+					
14. *Enithares ciliatus*					+		
15. *Lethocerus indicus*	+						
16. *Diplonychus rusticus*	+		+				
17. *Diplonychus molestus*	+			+			
18. *Gestroiella insignis*		+					
19. *Heleocoris strabus*					+		
20. *Mesovelia vittigera*				+			
21. *Hydrometra greeni*					+		
22. *Ptilomera (Ptilomera) assamensis*		+	+				
23. *Gerris lepcha*							+
24. *Gerris adelaidis*					+		+
25. *Limnogonus (Limnogonus) nitidus*	+						
26. *Limnogonus (Limnogonus) fossarum*				+			
27. *Microvelia douglasi*	+						

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State Fauna Series 10 : Fauna of Manipur, 311-316, 2004

INSECTA : COLEOPTERA : COLYDIIDAE

T. K. PAL

Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Colydiidae are a moderately large family of the superfamily Cucujoidea of the suborder Polyphaga. The family is yet to be sufficiently worked out in both the specific and supraspecific levels. Over the years, the family Colydiidae have been used as a repository of various genera, both Clavicornia and Heteromera, which possessed features like, 4-segmented tarsi and clubbed antennae (Lawrence, 1980). The constitution of the family has changed considerably since the publication of Hetschko's Catalogue in 1930. Crowson (1955) made notable changes in the constitution of the Colydiidae. He transferred Cerylonini, Murmidiinae and Euxestinae to the Clavicorn family Cerylonidae and retained the remaining Colydiids under the Heteromera. In recent past, there was a consideration by some coleopterists dealing with higher taxa (especially J.F. Lawarence) that Colydiidae as delineated by Crowson (1955) to be an assemblage of both clavicorns and heteromerans. The most recent treatment by Pal and Lawrance (1986) has accepted the genera close to *Bothrideres* (Bothriderinae *sensu* Crowson) as a separate family, Bothrideridae under Clavicornia. In the present account however, Crowson's treatment of Colydiidae, as regards the constitution of the family, is followed.

The Colydiids are small to moderately large beetles those occur in both adult and larval stages in dead wood, under barks, leaf litter etc. Several species are predators on wood inhabiting larvae of insects. Since Grouvelle (1908), Pal (1984, 2001), Pal and Slipinski (1984) described four species from India. The present account is based on a small collection made by the author in Manipur from where no Colydiid is hitherto recorded.

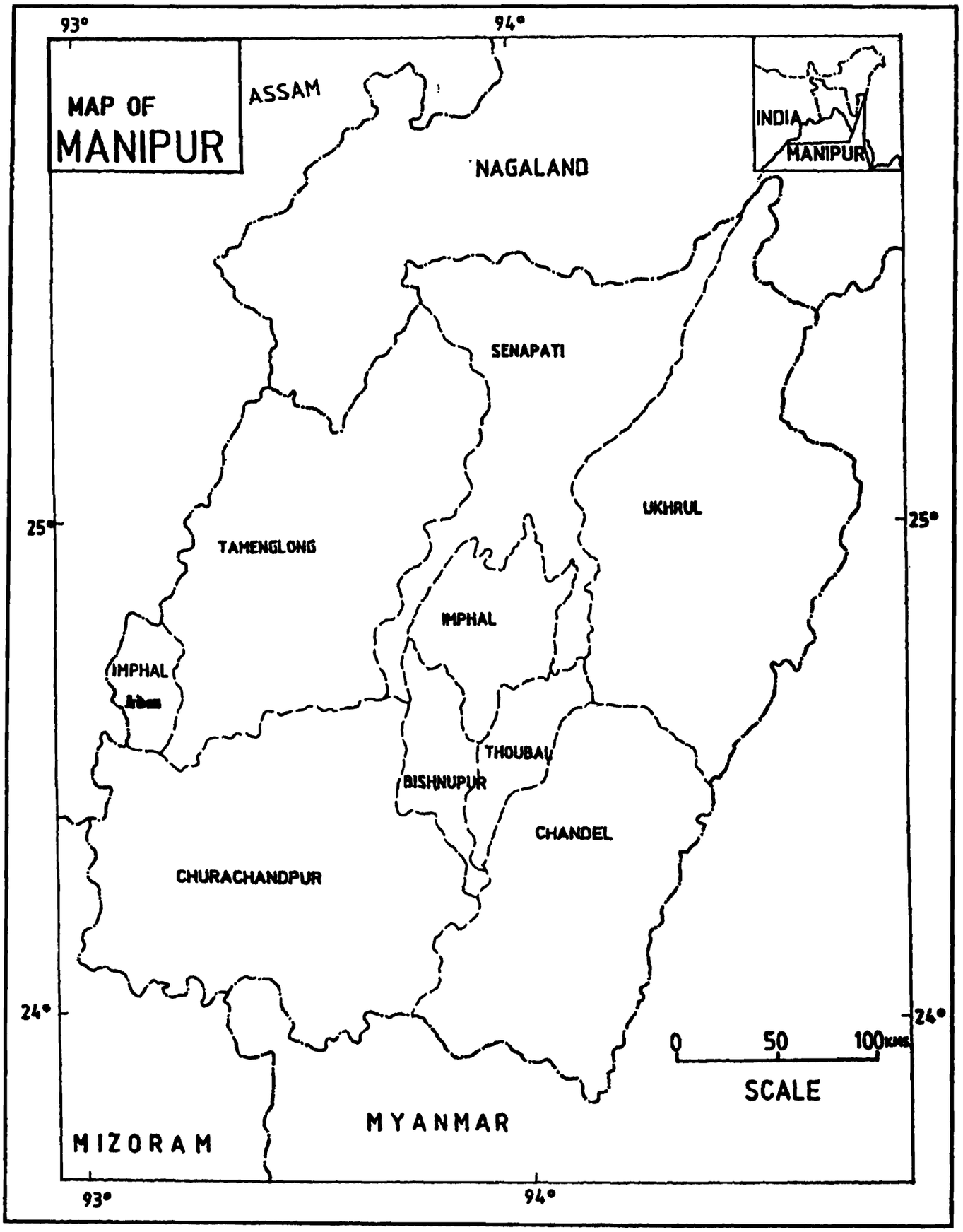
CHARACTERS OF FAMILY COLYDIIDAE (Sensu lato)

General form elongate-oblong to slender and parallel-sided, markedly flattened to sub-convex or cylindrical, glabrous or rugose, shiny or dull.

Head elongate to transverse, eyes small to large, usually constricted behind eyes, fronto-clypeal suture present or absent, antennal insertions dorso-lateral or hidden under projection of frons, antenna 10- or 11-segmented with 1- or 2-segmented club, club occasionally of more segments, gular sutures well separated, with or without antennal grooves on ventral side. Mandible large, with 2 or 3 apical teeth, without dorsal mandibular cavity. Maxilla with well-developed lacinia and galea, lacinia with or without apical spine, apical segment of maxillary palpi elongate. Labium with mentum transverse, apical segment of palpi elongate.

Prothorax strongly elongated to transverse, pronotum with varying grades of sculpture from more less smooth to bearing ridges and furrows, front coxae separated narrowly to moderately widely, trochantins hidden, coxal cavities open or close.

Mesocoxae usually moderately separated, sternal fitting between mesocoxae in straight line


MAP OF
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NAGALAND
INDIA
MANIPUR
SENAPATI
TAMENGLONG
UKHRUL
IMPHAL
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SCALE

or with a knob from metasternum, mesocoxae closed outwardly, metendosternite well developed with anterior tendons well separated, hind coxae moderately to widely separated.

Elytra fully cover abdomen dorsally, puncturation in regular rows, without scutellary striole, epipleura well eveloped. Wing with 3 to 4 anal veins, usually with subcubital fleck.

Legs : trochanters short and simple or may be highly reduced and concealed at base of femora, tibiae usually broadened at apex with a few spurs, tarsal formula 4-4-4, tarsal segments usually simple.

Abdomen : 5 visible ventrites, ventrite 1 usually longer than others, intercoxal process narrow-acuminate to broad truncate, with or without femoral lines, 7 pairs of functional spiracles.

Key to the subfamilies of COLYDIIDAE (Sensu lato)

1. Antennal insertions hidden under projection of frons when viewed from above .... COLYDIINAE
- Antennal insertions dorsal and exposed .... BOTHRIDERINAE

LIST OF TAXA

Family COLYDIIDAE

Subfamily COLYDIINAE

Tribe **Synchitini**

1. *Bitoma siccana* (Pascoe)
2. *Cerchanotus jelineki* (Slipinski)

Subfamily BOTHRIDERINAE

3. *Machlotes elongatus* (Grouvelle)

Key to the genera of Colydiinae

1. Pronotum and elytra with prominent longitudinal carinae or costae; pronotum subquadrate; antennal grooves on ventral side of head shorter and not extening beyond middle of eyes ..... *Bitoma* Herbst
- Pronotum and elytra without longitudinal carinae; pronotum little transverse; antennal cavities on ventral side of head long and extending beyond posterior margin of eyes .. .. *Cerchanotus* Erichson

SYSTEMATIC ACCOUNT

Family COLYDIIDAE

Subfamily COLYDIINAE

Tribe **Synchitini**

Genus ***Bitoma*** Herbst

1793. *Bitoma* Herbst, *Natursystem der Insekten*: Käfer **5** : 25 (Type species: *Bitoma crenata* Fabricius).

1807. *Ditoma* Illiger, *Magazin für Isektenkunde* **6** : 320.

1857. *Euditoma* Gistel, *Vacuna* **2** : 26.

1863. *Coniophaea* Pasco, *J. Ent.* **2** : 90.

1873. *Synchytodes* Crotch, *Checklist Col. North America* : 45.

1882. *Synchitodes*: Retter, *Best-Tab. eur. Col.* **6** : 130.

Diagnosis : Elongated, subparallel, almost cylindrical, pronotum and elytra longitudinally carinate and body sparsely pubescent. Head with prominent eyes, 11-segmented antenna with 2-segmented club, antenna inserted under projection of frons, antennal segments 4-9 subequal in length and shorter than preceding segments, ventrally antennal groove short and extending not beyond middle of eye, mandible with 2 apical teeth, apical segments of labial and maxillary palpi elongate and somewhat fusiform. Prothorax subquadrate, side margins crenulate, pronotum convex medially with sides not explanate, two paris of longitudinal carinae (sublateral and admedian) on pronotum with a pair of short carinae between admendian carinae, front coxae separated not wider than diameter of coxae, front coxal cavities open, mesosternal process little narrower than prosternal apex, metasternum devoid of femoral lines; elytra striate-punctate, alternate interstices feebly carinate, tibiae of legs with two spurs at outer apical angle and with a single one at inner side, tarsal segments 1-3 subequal in length; intercoxal process of first abdominal ventrite narrowed towards apex, no femoral lines.

1. *Bitoma siccana* (Pascoe)

1863. *Xuthia siccana* Pascoe, *J. Ent.* **2** : 128.

1863. *Xuthia rufina* Pascoe, *J. Ent.* **2** : 128.

1863. *Xuthia maura* Pascoe, *J. Ent.* **2** : 129.

1867. *Bitoma lyctiformis* Wollaston, *Col. Hesperidum*: 63.

1885. *Xuthia parallela* Sharp, *J. Linn. Soc. Lond.* **19** : 70.

1892. *Bitoma elongata* Grouvelle, *Annls. Soc. Ent. Fr.* **59** : 296.

1898. *Bitoma rufipes* Kolbe, *Deutsch. Ost.-Afr.* 4 Käfer : 111.

1908. *Xuthia siccana* : Grouvelle, *Annls. Soc. Ent. Fr.* **77** : 399.

1930. *Bitoma siccana* : Hetschko, *Col. Cat.* **107** : 19.

1980. *Bitoma siccana* : Dajoz, *Faune de Madagascar* : 28.

1985. *Bitoma siccana* : Slipinski, *Pol. Pismo Ent.* **55** : 485.

Diagnosis : Elongated, subcylindrical, reddish-brown to dark brown, not shining and finely setose; head transverse, anterior clypeal margin little emarginate medially, frons and vertex slightly impressed laterally, sides of head behind antennal base raised to form carinae-like structure, eyes about half as long as head, rugose granular punctures on dorsal side; quadrate prothorax with anterior margin arcuate medially, two pairs of well developed carinae on pronotum with the additional carinae in anterior half short and rather parallel, side margins finely sinuate and widest in anterior half, puncturation on pronotum almost similar as on vertex of head; elytra little more than twice as long as broad, each elyton with five longitudinal carinae not joined either anteriorly or posteriorly. Length – 2.5 –3.0 mm.

Material : 2 ex. India : Manipur, Churachandpur, 3.x. 1996, T.K. Pal, *ex.* under bark.

Distribution : India : Manipur (new record), Sikkim, West Bengal, Tamil Nadu.

Elsewhere : Bhutan; Nepal; Myanmar, Sri Lanka; Japan; Indonesia; Seychelles; Mascarene Is.; New Guinea; New Caledonia; Madagascar; Reunion; Mauritius; Guinea Bissau; South Africa; Saudi Arabia.

Genus *Cerchanotus* Erichson

1845. *Cerchanotus* Erichson, *Naturg. Ins. Deutschl. Col.* **3** : 257 [Type species: *Syntarsus asperulus* Fairmaire, by subsequent designation].

1869. *Syntarsus* Fairmaire, *Annls. Soc. ent. Fr.* (4) **9** : 205.

Diagnosis : Elongated, subparallel, moderately depressed, dull, covered with squamiform setae. Head with prominent eyes, 10- segmented antenna with 2-segmented club, antenna inserted under projection of frons, ventrally antennal groove long reaching below posterior level of eye, mandible with 2 apical teeth, apical segments of maxillary and labial palpi elongate. Prothorax broader than long, sides dentate, front coxae separated by less than the diameter of coxae, front coxal cavities popen, metasternum devoid of femoral lines, elytra striate punctate, tibia of legs with no distict apical spurs, tarsal segments 1-3 subequal in length and division between segments 1 and 2 not apparently distinct; intercoxal process of first abdominal ventrite narrowed towards apex, no femoral lines.

2. *Cerchanotus jelineki* (Slipinski) **comb. nov.**

1985. *Syntarsus jelineki* Slipinski, *Annls. Zoologici*, **39** : 182.

Diagnosis : Facies as above; head transverse, anterior clypeal margin almost straight, surface flat with slightly rugose punctures, punctures with yellowish squamiform setae, eyes nearly half as long as head and studded with yellowish-white setae; prothorax transverse, sides somewhat parallel and little convergent anterad in anterior fourth, sides explanate and dentate, front angles acute, front margin arcuate medially and sinuate on either side, pronotum coarsely punctate and covered with squamiform setae as on vertex; elytra slightly more than twice as long as broad, parallel-sided and rounded apically, each elytron with 9 rows of strial puctures, with decumbent squamiform setae as on pronotum. Length–2.5-2.8 mm.

Material : 2 ex. India : Manipur, Chuachandpur, 3.x. 1996, T.K. Pal, *ex.* under bark.

Distribution : India : Manipur (new record).

Elsewhere : China.

Remarks : This species resembles *Cerchanotus orientalis* (Slipinski) but can be separated by the prothorax more convergent basad, and squamiform setae on dorsum little darker than *jelineki.*

Subfamily BOTHRIDERINAE

Genus *Machlotes* Pascoe

1863. *Machlotes* Pascoe, *J. Ent.* **2** : 36 [Type species: *Machlotes porcatus* Pascoe].

Diagnosis : Elongate, subparallel. Head with prominent eyes, 11-segmented antenna with 2-segmented club, ventrally antennal groove moderately long bordering inner margin of eye, mandible with 3 apical teeth, maxillary lacinia with an apical spine, apical segments of maxillary and labial palpi elongate and fusiform. Prothorax more or less elongate, little narrowed posterioly, pronotum with six longitudinal carinae, admedian pair of carinae interrupted near base by a deep transverse fovea, front coxae moderately widely separated, prosternal process broad, expanded apically and with transversely impressed suture between coxae, mesocoxae moderately widely separated, metasternum with indistinctly marked femoral lines; each elytron with six longitudinal carinae, intervals with large punctures, tibia of legs with a strong apical spur on inner margin and bidentate on outer margin, tarsal segments 1-3 subequal in length; intercoxal process of first abdominal ventrite broad and truncate apically, with indistindtly marked femoral lines.

3. *Machlotes elongatus* (Grouvelle)

1896. *Erotylathis elongatus* Grouvelle, *Ann. Mus. Civ. Genova* (2) **16** : 36.

1908. *Machlotes elongatus* Grouvelle, *Ann. Soc. Ent. Fr.* **77** : 445.

Diagnosis : Elongate, subcylindrical, longitudinally costate, blackish-brown, dull; head with eyes about half as long as head, anterior clypeal border little arcuate, fronto-clypeal suture concave, clypeal puncturation moderately coarse, puncturation on frons and vertex coarser than those on clypeus, antenna short, antennal segments 4-9 more or less transverse, apical segment of antennal club slightly shorter than basal one; elongate prothorax (1.5 : 1.0) convergent posteriorly, widest anteriorly, lateral border feebly arched and a tooth just below middle, pronotal carinae broad and somewhat sharp dorsally, outer carina join lateral border near anterior and posterior angles and also connected with lateral tooth; puncturation on pronotal disc coarse; elytra more than twice as long as broad (2.1: 1.00), almost parallel-sided and narrowed for apical third, carinae strongly raised but sutural ones little feebly, all carinae except second and third joined apically, punctures large and deep. Length-4.6 mm.

Material : 1 ex. India : Manipur, Chandel District, Shugnu, 3000 ft. (900.0 m.), N. Chatterjee, *ex.* under bark

Distribution : India : Manipur (New record.), Tamil Nadu.

Elsewhere : Myanmar.

SUMMARY

The paper deals with 3 species under 3 genera of 2 subfamilies of which 1 species (*Cerchanotus jelineki*) is recorded first time from India. The family is recorded first time from the State of Manipur as no taxonomic study of this group was carried out earlier from here. The species are systematically keyed and characterized.

ACKNOWLEDGEMENTS

The author is indebted to the Director, Zoological Survey of India for providing necessary facilities for the work.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 317-321, 2004

INSECTA : COLEOPTERA : DISCOLOMIDAE

T. K. PAL
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Discolomidae, otherwise referred to as Notiophygidae, are a moderately large family of Cucujoid beetles comprising about 400 species under 18 genera. The speceis of Discolomidae have been found under bark and on fungi grown upon log. Though the representatives of the family occur in tropical and subtropical parts of both the Old and New worlds but are more diversely represented in the eastern hemisphere. They are known from South America, Africa, Southeast Asia, China, Japan, and Pacific Islands to Australia, but are yet to be recorded from Europe and New Zealand. Horn (1878) established this family for *Discoloma* Erichson, Matthews (1887) proposed a family, Pseudocorylophidae for *Aphanocephalus* Wollaston to exclude it from Corylophidae. Sharp (1895) included *Holophygus* Sharp, *Notiophygus* Gory with *Discoloma* in Discolominae, thence treated under Colydiidae. Scott (1908) considered *Fallia* Erichson, *Discoloma*, *Notiophygus*, *Holophygus* and *Aphancoephalus* together in Discolomidae. John (1994) used the family–name 'Notiophygidae' instead of 'Discolomidae for the assemblage. He afterwards (1958 onwards) continued to use the name 'Discolomidae' for the family. John (1959) subdivided the family into five subfamilies. Pal (1992, 1996, 2000) described six species from Arunachal Pradesh, Sikkim and Mizoram. No species of Discolomidae is hitherto recorded from Manipur.

CHARACTERS OF FAMILY DISCOLOMIDAE

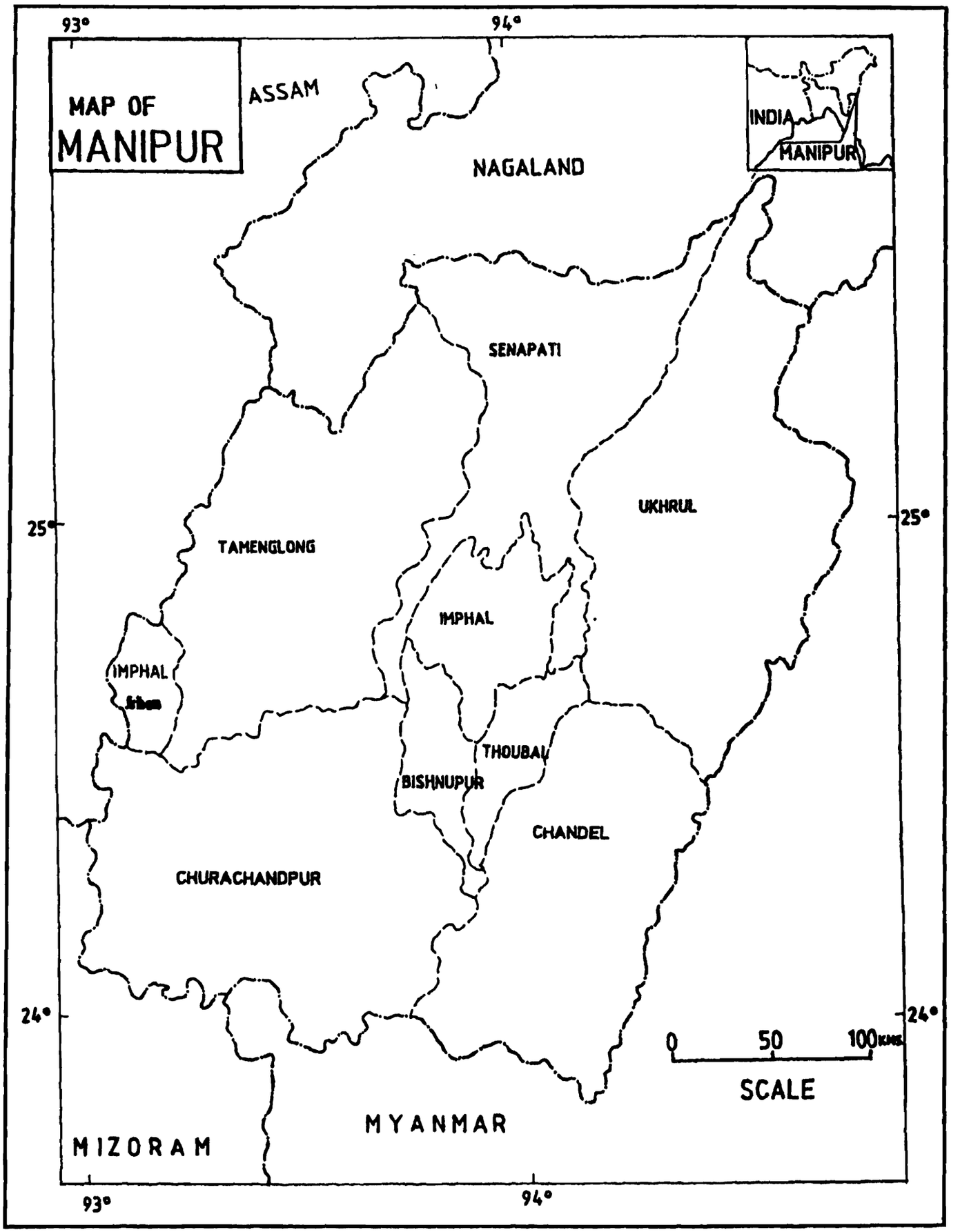
Facies broad, elongate-oblong to oval or rounded; dorsally convex, surface tuberculate or smooth.

Head small in comparison to large prothorax, often inserted under pronotum, eyes small to moderately large, usually with a fronto-clypeal suture, without transverse line on vertex behind eyes, antennal insertions dorso-lateral or dorsal but not wide anteriorly; on ventral side gular sutures widely separated, no antennal cavities; antenna 8- to 10-segmented with 1-segmented large club. Mandible with 3 apical teeth, prostheca and mola well developed; maxillary lacinia without apical spine, segment 2 of maxillary palpi elongate and narrowed towards apex; mentum of labium normal, ligula broadly triangular, segments 2 and 3 of palpi large and elongate.

Prothorax transverse, narrowed in font, sides smooth or wavy, no prebasal impression on pronotum, front coxae rounded, coxal cavities closed or narowly open.

Elytra broad, convex, punctures irregular, epipleura broad and complete. Species may be apterous or winged, no anal vein on wing, cubitus bifurcate at tip.

Mesocoxae widely separated, mesocoxal cavities closed, sternal fitting between mesocoxae not with knoblike projections, metasternum usually without median impressed line,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SCALE

metendosternite short and represented by two appophyses. Metacoxae widely separated, rounded, lateral prolongation hidden.

Legs moderately long, trochanters simple or slightly heteromeroid, tarsal formula 3-3-3 in both sexes, tarsi simple or slightly incrassate.

Abdomen short and broad, ventrites freely articulated, ventrite 1 longest and wihtout femoral lines. Aedeagus in resting condition turned on one side, no distinct parameres.

Key to the subfamilies of DISCOLOMIDAE

1. Body distinctly tuberculate, tubercles often form thick lumps on edges and giving rise to more or less waved contour; edge of pronotum and edge of elytra form an obtuse angle when viewed from side ..... NOTIOPHYGINAE*

– Body smooth or only slightly tuberculate; edge of pronotum and edge elytra form almost a straight line or slightly angulate 2

2. Body contour with almost parallel-sided elytra; hair on body partly clubbed or split-tip .... PONDONATINAE*.

– Body contour greatly arched oval with side of elytra rounded; hairs if present not like above 3

3. Body strikingly coloured with yellow and black; with two hair forms of different lengh ..... CEPHALOPHANINAE*

– Body not strikingly bicoloured; without hair forms as above 4

4. Body greatly convex with narrow ridge or crest-like edge area; surface almost shining bright, hair pits and pseudopores very minute ..... APHANOCEPHALINAE

– Body flat-convex, with wide edge area as well as a smooth contour; tubercles on body not or little raised, their gland ducts often visible .. .. DISCOLOMINAE*

*Subfamilies not recorded from Manipur

Subfamily APHANOCEPHALINAE

Genus ***Aphanocephalus*** Wollaston

1873. *Aphanocephalus* Wollaston, *Ent. Mon. Mag.* **9** : 278 (Type species : *Aphanocephalus hemisphaericus* Wollaston).

1887. *Aphanocephalus* : Matthews, *Ann. Mag. Nat. Hist.* **19** (5) : 114.

1899. *Aphanocephalus* : Ganglbauer, *Die Käfer Von Mitteleuropa* **3** : 845.

1900. *Aphanocephalus* : Dodero, *Ann. Mus. Civ. Genova* **40** : 560.

1918. *Aphanocephalus* : Grouvelle, *Trans. Ent. Soc. London* 1918 : 48.

1941. *Aphanocephalus* : John, *Zool. Med.* **42** : 11.

1992. *Aphanocephalus* : Pal, *Hexapoda* **4** (1) : 46.

Diagnosis : Body broadly ovoid, strongly convex dorsally and flattened ventrally, glabrous vestiture consisting of minute setae not generally visible at lower magnification; transverse head with small eyes, 9-segmented antenna with weakly rounded and smooth lateral sides, front coxal cavities closed behind, mesocoxal cavities closed and sternal fitting in almost straight line hind coxae widely separated; abdomen with broad intercoxal process and freely articulated ventrites.

1. ***Aphanocephalus superbus*** Pal

1997. *Aphanocephalus superbus* Pal, *Hexapoda,* **8** (1) : 15.

Diagnosis : Body oblong-ovate, finely punctate-pubescent, uniformly dark reddish-brown except antennae and legs. Exposed part of head markedly transverse, largely concealed from above by pronotum, fronto-clypeal suture situated considerably in front of antennal bases, frontal and clypeal part with pubecence denser and more distinct than on pronotum, eyes moderately large and partly visible from dorsal side, antennae little longer than pronotum, club about one-fourth as long as antenna and with single preapical annulation; prothorax 1.9x as broad as long, narrowed in front, front margin deeply emarginate, front angles broadly pointed, side margins feebly rounded and finely bordered, one pair of lateral pits visible on front angles, posterior angle acute, basal margin convex and deeply sinuate near

extremities, pronotum uniformly dark reddish-brown throughout, punctation fine and sparse; elytra about as broad as long and about 2.5 x longer than prothorax, sides evenly rounded and finely bordered, punctures simple, point-like impression on cuticle and little coarser than on pronotum. Aedeagus with distal end of median lobe recurved, proximal end recurved and pointed, distal edge of tegminal cap spatulate and beset with hairs. Length – 1.18 mm.

Material : 2 ex. Bishenpur District, K.L. Nat. Park, 930 m., 25.1. 1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New record), Sikkim.

Key to the Indian species of *Aphanocephalus* Wollaston

1. Front margin of prothorax rather deeply and widely emarginate, antero-lateral margin of pronotum not paler than remaining part, a pair of lateral marginal pits of pronotum present near humeral angles and those near basal third absent; fronto-clypeal suture situated considerably in front of antennal bases; aedeagus with proximal and distal edge of tegminal cap spatulate and beset with hairs ..... *superbus* Pal

– Front margin of prothorax either unemarginate or slightly emarginate, antero-lateral margin of pronotum paler (reddish-brown) than remaining part (blackish-brown) two paris of lateral marginal pits near humeral angles and near basal third present; fronto-clypeal suture situated just in front of antennal bases; aedeagus with proximal and distal ends of median lobe broad, distal edge of tegminal cap devoid of hairs 2

2. Antennal club segment with single preapical annulation; front margin of prothorax almost unemarginate or indistinctly emarginate 3

– Antennal club segment with two preapical annulations; front margin of prothorax narrowly and slightly emarginate 4

3. Only sides of elytra narrowly paler, remianing part uniformly dark brown; aedeagus with median lobe foot-shaped distally, little constricted above distal margin, proximal end of tegminal cap forming a finger-like projection with reduced tip ..... *convexus* Pal

– A pair of admedian hemispherical paler spots on elytra in addition to marginal pale border; aedeagus with median lobe broadened below middle, slightly rounded distally, proximal end of tegminal cap with an elongate projection and tip of which broadened ..... *maculipennis* Pal

4. Antero-lateral pale border of pronotum uninterrupted and continuous throughout its length; aedeagus with distal end of median lobe narrowed and rather broadly pointed .... *johni* Pal

– Antero-lateral border of pronotum interrupted near middle, along front margin; aedeagus with distal end of median lobe broad and blunt ..... *sikkima* Pal

SUMMARY

The paper deals with 1 species under 1 genus of the subfamily Aphanocephalinae which form the first record of Discolomidae from the State of Manipur. The species is characterised and a key to the Indian species (5 spp.) is appended.

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INSECTA : COLEOPTERA : ENDOMYCHIDAE

T. K. PAL

Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Endomychidae with about 1300 species are a rather distinct family of the section Clavicornia under the superfamily Cucujoidea. The endomychids are small to large, broadly ovoid to elongate and narrow, strongly convex to moderately flattened, seldom brightly coloured and are commonly called as 'handsome fungus beetles' The Endomychidae have a worldwide distribution but are more diverse in tropical Asia. Endomychids consume mostly softer tissues of various fungi or are sap-feeders. They are often seen beneath bark or in rotten wood, decayed fruit refuse or in leaf litter, in moist woodland areas.

Following the publication of Arrow's 'Fauna' in 1925, not many works have come out from the Indian region on this group. In recent past, Vazirani & Saha (1972) described 1 new species, and Strohecker (1974, 1975, 1982, 1983) described at least 11 new species and recorded a few more species from the Indian territory. Tomaszewska & Pal (2003) described 1 new species from Mizoram. The earlier workers recorded a few species from Manipur. The present work is based on some recent collection made by the author in Manipur plus earlier material records from this State. These represent 10 species under 8 genera.

CHARACTERS OF FAMILY ENDOMYCHIDAE

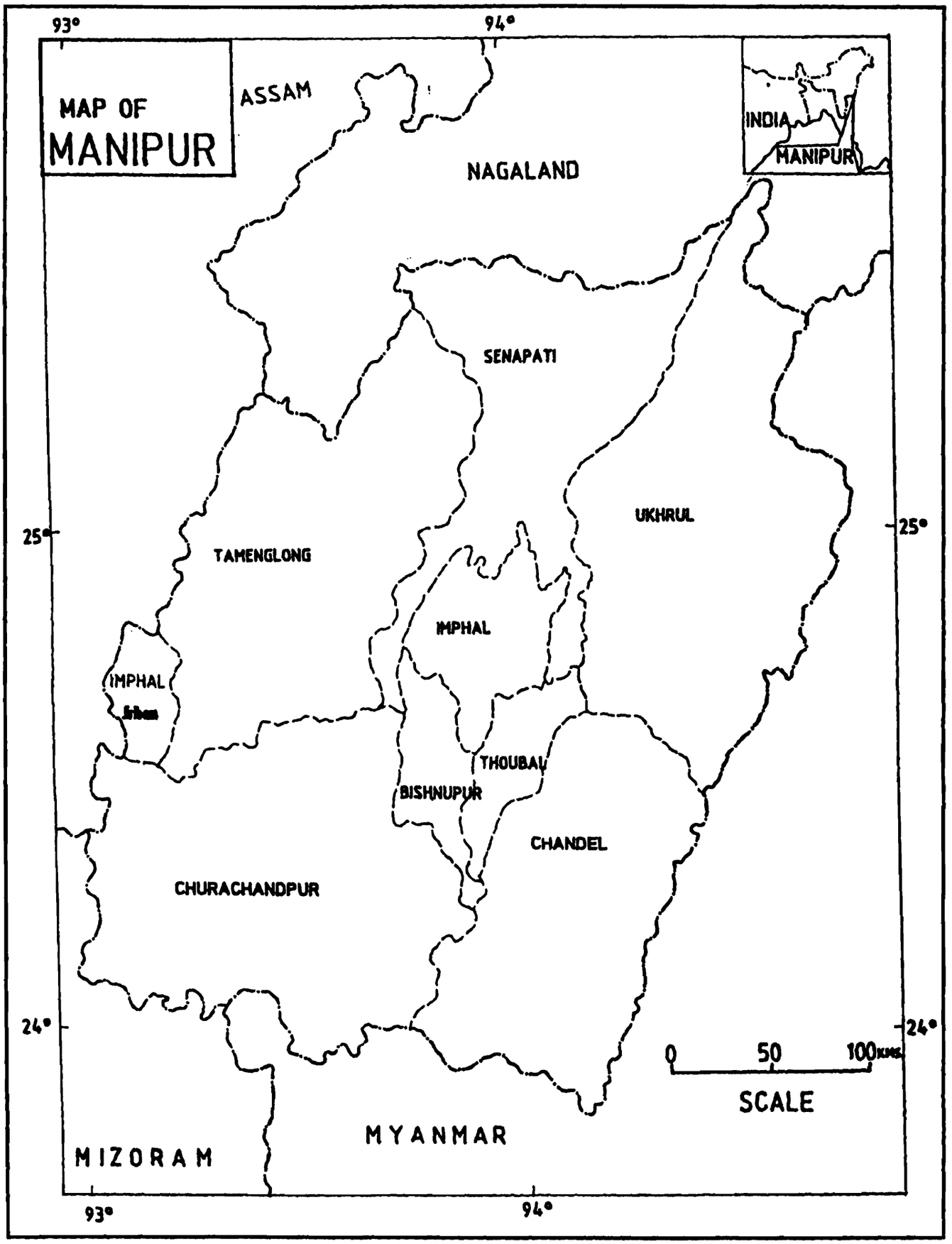
Body broadly ovate to elongate and narrow, strongly convex to moderately flattened, glabrous but occasionally clothed with hairs, and often brightly coloured.

Head with fronto-clypeal suture, eyes moderately large, vertex sometimes bear stridulatory files, antennal insertions lateral or dorso-lateral; antenna 10- or 11-segmented with 3-segmented club, club rarely 4- or 5-segmented; mandible usually well developed, apical teeth three or less in number, mola well developed; maxillary lacinia and galea well developed, lacinia with or without apical spine, apical segment elongated and more or less fusiform; labium is more subject to variation in form, mentum strongly chitinized, apical segment of labial palpi truncate apically.

Prothorax often transverse, side margins usually smooth and rarely serrulate, front edge sometimes has a stridulatory membrane, pronotal disc often with paired basal impressions, grooves or carinae, and a transverse prebasal groove, prosternum moderately long to very short, front coxae subglobular or slightly transverse with hidden trochantins.

Elytra entire, punctation usually confused, epipleura usually incomplete. Wing devoid of radial cell and usually without anal cell, with a trace of subcubital fleck.

Mesosternum sometimes reduced and concealed, anteriorly excavate or bicarinate; mesocoxae narrowly to moderately widely separated, mesocoxal cavities narrowly open outwardly; metasternum transverse, rarely with femoral lines, hind coxae widely separated,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CHANDEL
CHURACHANDPUR
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SCALE

metendosternite usually with widely separated anterior tendons.

Legs short to moderately long, trochanters simple or slightly heteromeroid, narrow tibia slightly broadened at apex and without prominent apical spurs, tarsal formula 4-4-4 or 3-3-3, tarsi either simple, or segment 3 reduced with segments 1 and 2 lobed.

Five abdominal ventrites freely articulated, ventrite 1 longer than others and sometimes with femoral lines, often with five pairs of spiracles. Aedeagus with or without articulated parameres, median lobe devoid of strut. Ovipositor with fused valvifers and coxites.

Key to the subfamilies of ENDOMYCHIDAE*

1. Size small, rarely more than 3 mm.; tarsi 3-segmented and linear, or distinctly 4-segmented 2

– Size usually larger than 3 mm.; tarsi pseudotrimerous, penultimate segment minute and almost fused with apical segment, second segment lobed 4

2. Antenna 8-11 segmented 3

- Antenna 4 or 5-segmented ..... TROCHOIDEINAE

3. Scutellum minute or invisible; metasternum extending laterally to anterior corner of elytral epipleura; first abdominal ventrite with femoral lines ..... SPHAEROSOMINAE

– Scutellum plainly visible; metasternum separated from elytral epipleura by the epimeron ..... MYCETAEINAE

4. Pronotum with a stridulatory membrane on its front margin ..... EUMORPHINAE

– Pronotum without a stridulatory membrane on its front margin 5

5. Ligula of labium quadrate or elongate ..... ENDOMYCHINAE

– Ligula produced into membranous lobes at sides, transverse. Body often pubescent; pronotum often very broadly margined, head without occipital file ..... STENOTARSINAE

LIST OF TAXA

Family ENDOMYCHIDAE

Subfamily EUMORPHINAE

1. *Eumorphus sanguinipes* (Guérin-Meneville)
2. *Engonius signifer* Gorham
3. *Indalmus kirbyanus* (Latreille)

Sabfamily ENDOMYCHINAE

4. *Eucteanus cruciger* Gorham
5. *Eucteanus eucerus* Arrow
6. *Cyclotoma indiana* (Gorham)

Subfamily STENOTARSINAE

7. *Ectomychus flavipes* Arrow
8. *Ectomychus nigripes* Arrow
9. *Stenotarsus nigripes* Arrow

Subfamily MYCETAEINAE

10. *Asymbius crinipes* Gorham

Subfamily EUMORPHINAE

Key to the genera of EUMORPHINAE

1. Prosternum not extending posteriorly beyond front coxae. Last joint of labial palpi transverse ..... *Indalmus* Gerstaecker

– Prosternum extending posteriorly beyond front coxae 2

2. Posterior marginal groove of metasternum sharply angulate. Mandible without an internal tooth ..... *Eumorphus* Weber

– Posterior marginal groove of metasternum nearly straight. Mandible with an internal tooth ..... *Engonius* Gerstaecker

Genus ***Eumorphus*** Weber

1801. *Eumorphus* Weber, *Observ. Ent.*, p. 31 [Type-species: *Erotylus quadriguttatus* Illiger]

* Subfamilial classification is after Strohecker, 1953; Shaerosominae is at present considerd as a separate family Sphaerosomatidae but not recorded from India.

Diagnosis : Facies elongate, broadly ovoid; head with transverse eyes, 11-segmented antenna with 3-segmented club, segment 3 twice as long as segment 4, mandible with a sharp apical tooth and well developed prostheca, maxillary palpi well developed and its apical segment fusiform, labial palpi short and its apical segment hemispherical; transverse prothorax more or less flattened at sides, hind angles produced, pronotal base with a marginal sulcus and lateral foveae moderately impressed, front coxae narrowly separated and prosternal process projecting little beyond coxae; with four yellow spots on elytra.

1. ***Eumorphus sanguinipes*** (Guérin-Meneville)

1858. *Haplomorphus sanguinipes* Guérin-Meneville, *Rev. Mag. Zool.* (2) **10** : 20.

1874. *Eumorphus sanguinipes*: Gorham, *Trans. Ent. Soc. Lond.* 1874: 438.

1920. *Eumorphus sanguinipes*: Arrow, *Trans. Ent. Soc. Lond.* 1920 : 16.

1925. *Eumorphus sanguinipes*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 304.

Diagnosis : Facies broadly ovoid, blackish, smooth, shining with a purplish lustre, each elytron with two bright yellow transverse spots extending near lateral margin, longitudianlly the patches separated by about three times of their breadth, distal half of femora reddish; pronotum distinctly transverse, side margins gently bisinuate, anterior and posterior angles acute, pronotum almost devoid of punctures; elytra with minute and sparse punctures, with narrow reflexed outer margins. Length – 9-11 mm.

Distribution : India : Manipur.

Elsewhere : Myanmar.

Genus ***Engonius*** Gerstaecker

1857. *Engonius* Gerstaecker, *Archiv. F. Nat.* **23**(1) : 220. (Type species: *Engonius sexguttatus* Gerstaecker.)

Diagnosis : Facies oblong, much convex, with long antennae and legs, head partially sunk into prothorax, eyes obliquely transverse, 11-segmented antenna with 3-segmented flat club, segment 3 about twice as long as segment 4, segments 4–8 subequal in length, mandible with a sharp apical tooth and short blunt tooth behind it, maxillary palpi well developed and its apical segment somewhat fusiform, front margin of ligula slightly sinuate, apical segment of labial palpi rhomboidal and transverse; prothorax transverse, front angles produced, side margins little elevated, lateral foveae on pronotum distinctly impressed, front coxae narrowly separated, prosternal process projecting little beyond coxae; femora broadened and club-shaped.

2. ***Engonius signifer*** Gorham

1875. *Engonius signifer* Gorham, *Trans. Ent. Soc. Lond.* 1875 : 311.

1925. *Engonius signifer*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*: 316.

Diagnosis : Facies elongate-ovoid, black and shining, each elytron decorated with two irregular bright-yellow patches, rather widely separated from corresponding patches of other elytron, anterior patch encloses a black spot near base which gives off two finger-like processes behind, head strongly punctured; transverse prothorax narrowed behind middle, front angles produced and blunt, base of pronotum broadly margined, lateral foveae not reaching up to middle, pronotum finely and unevenly punctate; scutellum transverse; elytra strongly and densely punctate, humeral angles not prominent, side margins nearly straight near middle and a little flattened behind. In male, front tibia bear an excision on inner margin near extremity; last abdominal ventrite bears a transverse elevation.

Distribution : India : Manipur, Meghalaya, Himachal Pradesh.

Elsewhere : Myanmar.

Genus ***Indalmus*** Gerstaecker

1858. *Indalmus* Gerstaecker, *Monogr. Endom.* : 158 [Type-species: *Eumorphus kirbyanus* Latreille].

1876. *Mycella* Chapuis, *Gen. Coleopt.* **12** : 104.

Diagnosis : Facies elongate-ovoid, moderately convex, with slender legs and antennae; head with moderately large and prominent eyes,

11- segmented antenna with 3-segmented club, segment 3 about twice as long as segment 4, segments 4-8 gradually shorter in length, mandible bifid at tip, maxillary palp with last segment subulate, ligula composed of two narrow oblique lobes, last segment of labial palp transversely triangular; prothorax slightly transverse, front angles prominent, basal sulcus and lateral foveae well marked, prosternum not produced beyond posterior border of coxae, mesosternum longer than broad and emarginate behind; elytra oblong to ovoid.

3. *Indalmus kirbyanus* (Latreille)

1807. *Eumorphus kirbyanus* Latreille, *Gen.Crust. et Insect.* **3** : 72.

1829. *Dapsa kirbyana* : *Latreille*, *Cuvier's Regne anim.* 2nd ed. **5** : 159.

1858. *Indalmus kirbyanus:* Gerstaecker, *Mongr. Endom.* : 186.

1925. *Indalmus kirbyanus:* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 324.

2001. *Ancylopus nigrothorasica* Pal, *State Fauna Ser.* 9, *Fauna of Sikkim* (Part 3) : 112. **Syn. nov.**

Diagnosis : Facies elongate-ovoid, blackish, shining, elytra marked with two pairs of irregular transverse yellowish patches, anterior pair just below humerus and reaching almost outer margin, an extension from anterior patch approaches almost basal margin, posterior pair of patches never reach either inner or outer margin of elytron; eyes coarsely facetted; both anterior and posterior angles of prothorax rather sharp, pronotum moderately strongly punctured, lateral foveae extending near middle of pronotum, side margins gently bisinuate; elytra about as wide as prothorax near base, more strongly punctate than pronotum. In male front tibia armed with a spine on inner margin beyond middle, middle tibia distinctly curved inwards near extremity, abdominal ventrite 5 broadly excised behind. Length- 5.5 – 6.5 mm.

Material : 3 ex. India : Manipur, Bishenpur District, nr. Keibul, Lamjao Nat. Park, 27.i. 1998, T.K. Pal, ex. beating bush.

Distribution : India : Manipur (New record), West Bengal (Darjeeling District), Sikkim, Assam, Meghalaya,Tamil Nadu.

Elswehere : Myanmar.

Remarks : On critical examination, it is reveald that *Ancylopus nigrothoracica* Pal, described from Sikkim, is conspecific with *Indalmus kirbyanus* (Latreille). The body colour of Sikkim material was however little lighter.

Subfamily ENDOMYCHINAE

Key to the genera of ENDOMYCHINAE

1. Prosternum narrower than mesosternum, its tip prolonged and rounded; hamispherical in shape ..... ***Cyclotoma*** Mulsant
– Prosternum about as wide as mesosternum, its apex truncate; ovoid in shape .... ***Eucteanus*** Gerstaecker

Genus *Eucteanus* Gerstaecker

1857. *Eucteanus* Gerstaecker, *Archiv. f. Nat.* **23** (1): 239. [Type-species: *Eucteanus coelestinus* Gerstaecker].

1857. *Homalosternus* Guérin, *Rev. Mag. Zool.* (2) **9** : 581.

Diagnosis : Facies elongate, moderately broad, with slender legs and antennae; head with small and moderately coarsely facetted eyes, 11-segmented antenna with 3-segmented flat pear-shaped club, segments 3-8 elongate but gradually decreasing in length, mandible stout and bifid at tip, maxillary lacinia short, labium short and elongate, labial palpi short, apical segment of palpi ovoid; pronotum rather flat, basal groove and lateral foveae less prominent, front angles produced, front margin emarginate with stridulatory membrane, front coxae broadly separated, prosternal process moderately broad and rounded apically, mesocoxae moderately widely separated; elytra convex, carinate at least at shoulders.

Key to the species of *Eucteanus* Gerstaecker

1. Facies elongate; abdomen in male hollowed out beneath and sides of cavity elevated into sharp crests. Pronotum transverse and elytra shining ..... *cruciger* Gorham

– Facies short and broad; abdomen in male not hollowed out and without elevated crests. Antennal club broad and compact, elytra widest behind middle ..... *eucerus* Arrow

4. *Eucteanus cruciger* Gorham

1897. *Eucteanus cruciger* Gorham, *Proc. Zool. Soc. Lond.* 1897 : 460.

1920. *Eucteanus cruciger*: Arrow, *Trans. Ent. Soc. Lond.* 1920 : 68.

1925. *Eucteanus cruciger*: Arrow, *Fauna Brit. India, Coleoptera*: *Clavicornia*: 353.

Diagnosis : Facies elongate, convex, smooth and shining, setose; shining dark-blue, head, pronotum, and apex and sides of elytra darker, each elytron with two large, nearly circular pale yellow spots reaching close to inner and outer margins, spots separated by half the diameter of the spots; head with moderately coarsely facetted eyes, antennal club moderately broad, apical segment about as broad as long; prothorax strongly transverse, sides little rounded and converging in front, front angles acutely and hind angles rather bluntly produced, pronotum densely and rougosely punctured, base margined;scutellum semicircular and smooth; elytra widest behind middle, shoulders broad and carinate, punctures irregular, stronger on dark areas than on paler spots. Length- 14 mm.

Distribution : India : Manipur

5. *Eucteanus eucerus* Arrow

1920. *Eucteanus eucerus* : Arrow, *Trans. Ent. Soc. Lond.* 1920 : 68.

1925. *Eucteanus eucerus* : Arrow, *Fauna Brit. India, Coleoptera*: *Clavicornia* : 355.

Diagnosis : Facies broadly elongate, convex, moderately shining, deep steel-blue, elytra brighter with two large rounded bright yellow spots on each elytron, posterior pair of spots on elytra little closely situated than the anterior ones; head with moderately coarsely facetted eyes, antennal club short, broad and gradually wider apically, apical segment strongly transverse and wider than the preceding segments; prothorax broadly transverse, sides gently bisinuate, front and hind angles acute but not prominently produced, pronotum strongly punctured except for a narrow median line; elytra widest behind middle, side margins a little flattened, apices of elytra little produced and separately rounded, punctures strong and dense, a little sparser on the paler areas than upon the dark parts. Length- 8-9mm.

Distribution : India : Manipur

Genus *Cyclotoma* Mulsant

1851. *Cyclotoma* Mulsant, *Mem. Acad. Lyon* (2) **1** : 71 [Type species : *Cyclotoma testudinaria* Mulsant].

1857. *Panomoea* Gerstaecker, *Archiv. f. Nat.* **23** (1) : 241.

1858. *Cyclotoma* : Gerstaecker, *Mon. Endom.* : 363.

1890. *Niteta* Weise, *Deutsche Ent. Zeit.* **34** : 21.

1925. *Cyclotoma*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 359.

Diagnosis : Facies hemispherical, dorsal surface smooth and glossy, head small and inserted into prothorax, with slender legs and antennae; head small and much narrower than prothorax, eyes comparatively larger, 11-segmented antenna with 3-segmented club, mandible stout and bifid at tip, maxillary lacinia narrow with an apical tooth, maxillary palpi elongate, second segment longest, apical segment bluntly pointed, ligula slightly elongate, labial palpi elongate and pointed at tip; prothorax about three times as wide as long, sides gently curved and converging anteriorly, front angles blunt, hind angles rounded, no distinct lateral foveae on pronotum; elytra much broader than prothorax at base, sides evenly rounded and with broad epipleurae beneath, front coxae broadly separated, prosternum broadly produced anteriorly, mesosternum short.

6. *Cyclotoma indiana* (Gorham)

1897. *Panomoea indiana* Gorham, *Proc. Zool. Soc. Lond.* 1897 : 462.

1925. *Cyclotoma indiana*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 360.

Diagnosis : Facies hemispherical, convex, smooth and shining; yellowish with a transverse row of four spots on pronotum, scutellum, and

seven spots on each elytron- three near inner and four near outer margin, antennal club blackish, first and second inner and third outer spots larger than the others; head densely punctate with fine pubescence, antennal segments 1-4 elongate, segments 5-8 short and compact, apical three segments form loose club; prothorax about three times as wide as long, sides distinctly curved, anterior and posterior angles blunt and rounded, pronotum finely punctate; elytra broader than prothorax at base, side margins flattened and moderately wide. Length – 6.5 – 8 mm.

Distribution : India : West Bengal (Darjeeling District), Manipur.

Elsewhere : Indonesia.

Subfamily STENOTARSINAE

Key to the genera of Stenotarsinae

1. Club of antenna asymmetrical, segments 9 and 10 transversely triangular..... .....***Ectomychus*** Gorham
- Club of antenna almost symmetrical. Mesosternum broad, excavate for reception of prosternum..... ***Stenotarsus*** Perty

Genus *Ectomychus* Gorham

1887. *Ectomychus* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 646 [Type species : *Ectomychus basalis* Gorham].

Diagnosis : Facies elongate-ovoid, body covered with soft pubescence, legs and antennae moderately long; head transverse, eyes small and widely separated, prominent; 11-segmented antenna with 3-segmented large and loosely articulated club, segments 3-8 of antenna gradually reducing in length; pronotum strongly transverse, with wide strongly elevated lateral margins, base not margined, lateral foveae sharp and well marked, prosternal process short and truncate apically, mesosternum transverse and excavated in front for receiving prosternum; elytra about as broad as prothorax at base, sides not margined.

Key to the species of *Ectomychus* Gorham

1. Legs pale in colour..... *flavipes* Arrow
- Legs blackish in colour ..... *nigripes* Arrow

7. *Ectomychus flavipes* Arrow

1925. *Ectomychus flavipes* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*: 368.

Diagnosis : Facies ovoid, moderately convex, covered with yellowish setae, reddish-brown body with last 6-7 segments of antenna blackish; transverse head finely and sparsely punctate, antennal scape and pedicel moderately long, segment 3 longer than 4, segments 5-8 gradually decreasing in length, antennal club about as long as rest of antenna; transverse prothorax divergent posteriorly, raised borders of pronotum of moderate width and slightly hollowed above, front angles blunt, hind angles nearly acute, base feebly trisinuate, lateral foveae straight and extending nearly upto middle, pronotal punctures almost similar to vertex of head, elytra strongly and evenly punctured; legs moderately long and slender, unicolourous. Length- 3 mm.

Distribution : India : Manipur.

8. *Ectomuchus nigripes* Arrow

1925. *Ectomychus nigripes* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 369.

Diagnosis : Facies ovoid, moderately convex, covered with fine setae, reddish body with femora, tibiae and antennal club black, tarsi and four to five basal segments of antenna deep reddish-brown; transverse head finely and sparsely punctate, antennal scape to segment 6 elongate, segment 3 and 4 nearly equal, club segments loosely articulated, segment 9 about as long as broad, segment 10 transverse and apical segment oval; transverse prothorax divergent posteriorly, raised borders of pronotum of moderate width, little concave, front angles blunt, hind angles nearly right angles, basal margin trisinuate, lateral foveae straight and reaching near middle of pronotum, pronotal punctures little denser than on head; elytra evenly and moderately strongly punctate. Length- 3 mm.

Distribution : India : Manipur.

Genus *Stenotarsus* Perty

1832. *Stenotarsus* Perty, *Delect. Anim. Artic.*: 112 [Type species : *Stenotarsus brevicollis* Perty].

1857. *Quirinus* Thomson, *Arch. Ent.* **1** : 157.

1900. *Stenotarsoides* Csiki, *Termesz. Füzetek* **23** : 401.

Diagnosis : Facies elongate-ovoid, compactly formed, covered with long pubesçence; head small, transverse, moderately large eyes widely separated, 11-segmented antenna with 3-segmented club; mandible short, stout and bifid at tip, maxillary galea broad and rounded apically, maxillary palpi elongate, apical segment of palpi elongate and narrowed apically, mentum transversely rectangular and somewhat narrowed anteriorly, ligula little broader in front, labial palpi elongate with apical segment narrowed anteriorly; prothorax transverse with deeply emarginate front margin, without stridulatory membrane in front, lateral borders broadly elevated and flat, lateral foveae well marked and base margined, front coxae moderately widely separated, prosternal process produced behind coxae, mesocoxae separated about as wide as front coxae; elytra closely fitted to base of prothorax, narrowly margined on sides.

9. *Stenotarsus nigripes* Arrow

1920. *Stenotarsus nigripes* Arrow, *Trans. Ent. Soc. Lond.* 1920 : 55.

1925. *Stenotarsus nigripes*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 383.

Diagnosis : Facies ovoid, convex, shining brown-red, with lower surface, antennae and legs entirely black, covered with yellowish erect setae; eyes not projecting and not coarsely facetted, antennae long and slender, scape and pedicel somewhat globular, segments 3-8 progressively increasing in length, segment 9 slightly elongate, segment 10 about as wide as apical segment and slightly elongate; prothorax about two and a half times as wide as long, with moderately wide raised borders, sides rounded in front and divergent posteriorly, front angles blunt, hind angles rectangular, pronotum finely and sparsely punctured, base bordered by a deep sulcus, lateral foveae large and well impressed; scutellum slightly transverse and obtusely angled; elytra coarsely and irregularly punctured, punctures on sides larger. Length- 4 mm.

Distribution : India : Manipur.

Subfamily MYCETAEINAE

Genus *Asymbius* Gorham

1896. *Asymbius* Gorham, *Ann. Mus. Civ. Genova* **36** : 299 [Type-species: *Asymbius crinipes* Gorham].

1925. *Asymbiuus:* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 398.

Diagnosis : Small, braodly ovoid, covered with long setae, with long antennae and legs. Head with moderately large eyes, 11-segmented antenna with 3-segmented elongate club; apical segment of maxillary palpi fusiform; apical segment of labial palpi securiform; prothorax transverse, front margin emarginate, finely margined at sides and base, elongate lateral pits on borders, no distinct stridulatory membrane, sides of pronotum foveolate; front coxae moderately widely separated, prosternal process elevated little above coxae, mesocoxae separated little wider than front coxae, hind coxae widely separated, tarsal segments elongate and simple, intercoxal process of first abdominal ventrite broad and truncate at apex; elytra subglobose, each elytron with a strongly impressed stria close to suture that touches suture near apex, stria diverging anteriorly and bend towards base in scutellar region.

10. *Asymbius crinipes* Gorham

1896. *Asymbius crinipes* Gorham, *Ann. Mus. Civ. Genova* **36** : 299.

1925. *Asymbius crinipes*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 399.

Diagnosis : Small, broadly rounded, yellowish- to reddish-brown, shiny, sparsely pubescent, and legs and antennae paler but antennal club darker than preceding segments. Head transverse, eyes moderately large, projecting, moderately coarsely facetted, separated by about 2.5 times of the diameter; antenna longer than head and prothorax together, 11-segmented, scape distinctly elongate, segments 2-8 shorter but more or less elongate and darker than preceding segment; vertex finely and sparsely punctate. Prothorax about twice as wide as long, widest little beyond middle and then narrowed posteriorly, lateral margin with an

elongate pit, hind angles sharp and base trisinuate, basal fovea on pronotal disc well marked, lateral foveae narrow and extending up to little below middle, puncturation fine and sparse; triangular scutellum impuncate. Slightly elongate elytra about as wide as prothorax near base, sides rounded, edges narrowly flanked, punctation indistinct. Length- 1.44-1.52 mm.

Material : 2 ex. India : Manipur, Bishenpur District, Numaikong, nr. Keibul, 27.i.1998, T.K. Pal, *ex.* haystack.

Distribution : India : Manipur (New record), Mizoram.

Elsewhere : Myanmar.

SUMMARY

The paper deals with 10 species, under 8 genera of 4 subfamilies, of which 2 species are recorded first time from the State of Manipur. The species are systematically keyed and characterised.

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INSECTA : COLEOPTERA : LANGURIIDAE

T. K. PAL
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Languriidae are a moderately large, well-defined family of the section Clavicornia under the superfamily Cucujoidea. The languriids are small to large, elongate-oval to narrow–elongate, slightly flattened and often glabrous. They are usually bicoloured or metallic and are commonly called 'lizard beetle' The family with about 900 species have world–wide Distribution but are found more commonly in the tropical parts of both the Old and New worlds. Larvae of many species are stem borers and their adults feed on pollen or the foliage of host plants.

Following the publication of Arrow's 'Fauna' in 1925, not many works on this family have come out from the Indian subcontinent. Only recently, Sengupta and Mukherjee (1977, 1979, and 1985) have dealt with the languriines of Himalaya and described a new genus from this part. Subsequently, Pal (1992) recorded some species from Arunachal Himalaya. The earlier workers recorded a few species from Manipur. The present work is based on some recent collection made by the author in Manipur plus earlier material records from this State.

CHARACTERS OF FAMILY LANGURIIDAE

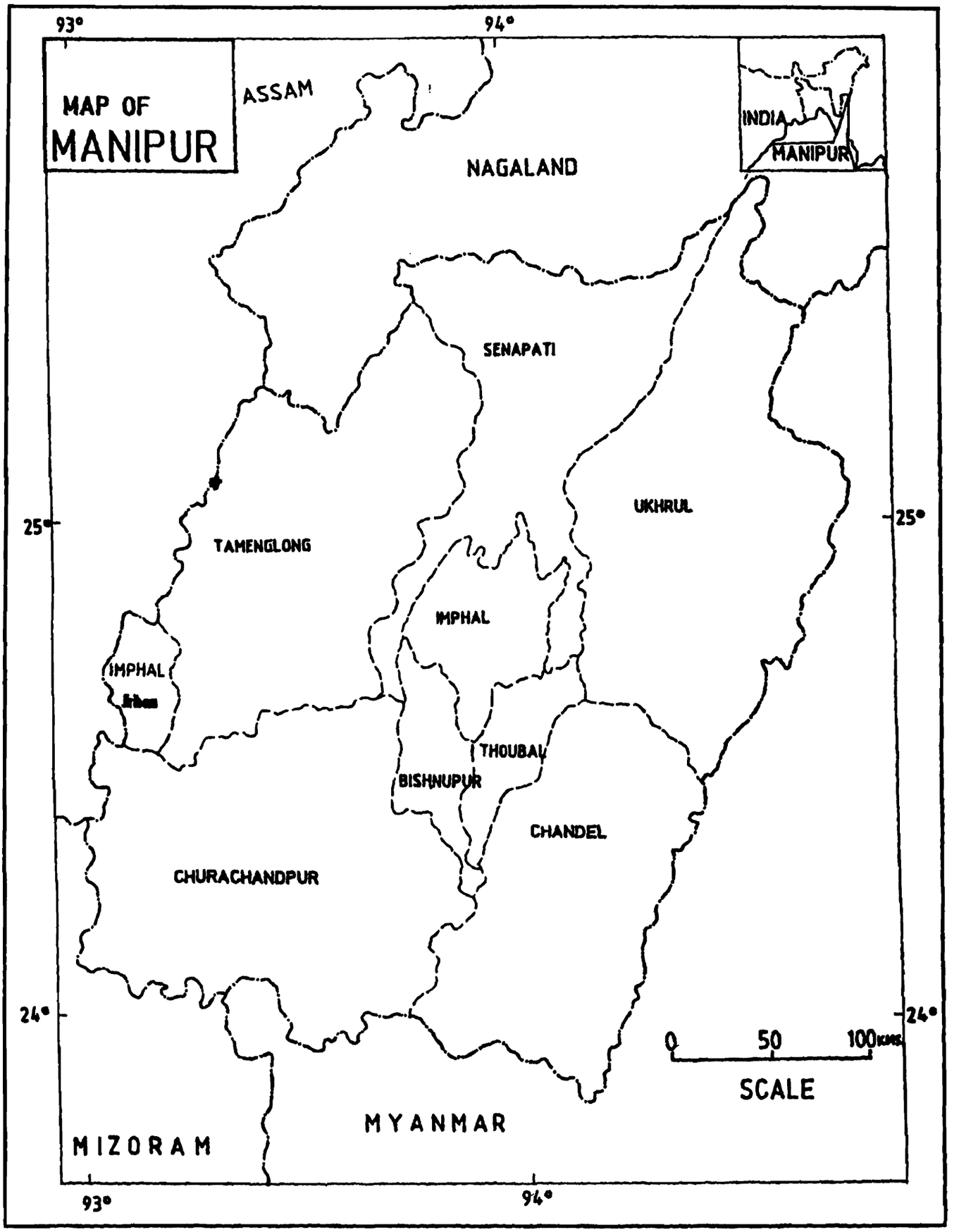
Head usually transverse, rarely with distinct tempora, vertex often with a pair of stridulatory files or occasionally single, often with transverse impressed line on vertex behind eyes, often with fronto-clypeal suture, eyes moderately large, gular sutures well separated, antenna 11-segmented with variable club, antennal insertions somewhat exposed; mandible usually with two apical teeth, mola more or less developed; maxilla with well developed lacinia, galea and palpi, lacinia often bears three apical spines, apical segment of palpi elongate and never securiform; mentum often transverse, ligula often bilobed, apical segment of labial palpi usually with truncated tip and rarely elongate-fusiform.

Prothorax a little elongate to slightly transverse, side margins often smooth, occasionally crenulate, pronotum usually bears prebasal impressions and sometimes a basal transverse groove, front coxae slightly transverse, intercoxal process moderately broad, coxal cavities usually open and occasionally closed.

Elytra striate-punctate, with or without scutellary striole, epipleura complete. Wing often with four anal veins and sometimes less in number, often with anal cell when wing possesses four anal veins, devoid of anal cell if with less number of anal veins, usually with subcubital fleck.

Mesocoxae moderately to widely separated, mesocoxal cavities closed outwardly by sterna, mesepimeral pockets usually present. Metasternum sometimes with femoral lines, metacoxae rather narrowly to moderately widely separated; metendosternite usually with moderately widely separated anterior tendons.

Legs moderately long, trochanters usually broadly elongate but never heteromeroid, tibiae often little broadened apically and with two normal


93°
94°
MAP OF
MANIPUR
ASSAM
INDIA
MANIPUR
NAGALAND
SENAPATI
UKHRUL
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TAMENGLONG
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THOUBAL
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CHANDEL
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SCALE
MYANMAR
MIZORAM
93°
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spurs, tarsal formula 5-5-5 with segment 4 often reduced.

Abdomen covered by elytra, five ventrites freely articulated and more or less equally long, ventrite 1 often with femoral lines. Aedeagus on one side when retracted, with articulated parameres, median lobe bears long struts. Ovipositor often with apically pointed coxites and with styli attached laterally.

Key to the subfamilies of LANGURIIDAE

1. Front coxal cavities externally as well as internally closed; elytra without scutellary striole; stridulatory file on head if present, single and median; first anal vein of wing may or may not run into subcubital fleck ..... CRYPTOPHILINAE

– Front coxal cavities externally open behind, if closed then internally open and elytra with scutellary striole; stridulatory file on head if present, double in number; first anal vein not running into subcubital fleck. 2

2. Trochanters narrow and distinctly elongate; sternal fitting between mesocoxae with two knobs; scutellary striole of elytra and stridulatory files on head absent; wing with less than four anal veins. .....TORAMINAE*

– Trochanters not very narrow-elongate, sternal fitting between mesocoxae with single knob, rarely in straight line; elytra with scutellary striole and stridulatory files on head present; wing usually with four anal veins. 3

3. Antennal club 2-segmented ..... SETARIOLINAE*

– Antennal club with more than two segments. 4

4. Antennal club often with more than three segments, antennal insertions dorso-lateral, head with fronto-clypeal suture; maxillary galea short and broad, mandibular mola poorly developed; front coxal cavities internally closed behind ..... LANGURIINAE

– Antennal club 3-segmented, antennal insertions lateral, fronto-clypeal suture absent; maxillary galea narrow-elongate, mandibular mola well developed and projecting; front coxal cavities internally open behind ..... LOBERINAE*

* Subfamiles not recorded from Manipur.

LIST OF TAXA

Family LANGURIIDAE

Subfamily LANGURIINAE

1. *Megalanguria melancholia* Arrow
2. *Pachylanguria cuprea* Arrow
3. *Idiolanguria opaca* Arrow
4. *Doubledaya forcipata* Arrow
5. *Anadastus karenicus* Gorham
6. *Anadastus wiedemanni* Gorham
7. *Anadastus attenuatus* Arrow

Subfamily CRYPTOPHILINAE

8. *Cryptophilus integer* (Heer)

Family LANGURIIDAE

Subfamily LANGURIINAE

Key to the genera of LANGURIINAE

1. Elytral epipleura indistinct 2

– Elytral epipleura well difined 4

2. Antennal club distinctly broad and abrupt.... ..... *Megalanguria* Arrow

– Antennal club less broad and not very abrupt 3

3. Pronotum margined at base, Elytra not acuminate at apex ..... *Pachylanguria* Crotch

– Pronotum not margined at base, Elytra acuminate at extremity, scutellum long; elytra not produced behind abdominal apex..... .....*Idiolanguria* Arrow

4. Head dilated in front of eyes, asymmetrical in female. Shoulders of elytra not tuberculate .. .. *Doubledaya* White

– Head not dilated in front of eyes and symmetrical in both sexes. Elytral apices not separately rounded ..... *Anadatus* Gorham

Genus *Megalanguria* Arrow

1925. *Megalanguria* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*: 168 [Type species: *Pachylanguria metasternalis* Crotch].

Diagnosis : Broad elongate; head large with finely facetted eyes situated wide apart, vertex with a pair of stridulatory files near middle, 11-segmented antenna with 4-segmented club, long mandible with bifid apex, apical segment of maxillary palpi fusiform, apical segment of labial palpi elongate; transverse prothorax distinctly rounded at sides, prosternal process bluntly bilobed at apex and deeply sulcate on each side; elytra broader at shoulders than prothorax, rounded at apex, epiplurae not distinct.

1. *Megalanguria melancholia* Arrow

1925. *Megalanguria melancholia* Arrow, *Fauna Brit. India, Coleoptera : Clavicornia* : 171.

Diagnosis : Facies broadly elongate; black with elytra very dark blackish-purple, pronotum decorated just beyond middle with a very irregular blood-red transverse band narrow or interrupted in the middle, metasternum also bears irregular blood-red patch on either side; head distinctly punctate and more densely on clypeus; pronotum transverse, sides rounded, front angles blunt and hind angles acute, base finely margined, lateral foveae minute but distinct, finely punctured in middle and smooth at sides; elytra with slight swellings behind middle, sides rather straight and gently converging from shoulders, shoulders prominent, minutely punctured with distinct rows of stronger punctures. Length – 5.5 – 6.5 mm.

Distribution : India : Meghalaya, Nagaland, Manipur.

Genus *Pachylanguria* Crotch

1876. *Pachylanguria* Crotch, *Cist. Ent.* **1** : 377 [Type species: *Pachylanguria paivae* Wollaston]

1876. *Tetralanguria* Crotch, *Cist. Ent.* **1** : 378.

1887. *Metabelus* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 361.

1887. *Languriomorpha* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 361.

Diagnosis : Facies elongate with short antennae, head with finely facetted eyes, vertex with or without a pair of stridulatory files, 11-segmented antenna with 4-segmented club, mandible with bifid apex, maxillary lacinia tridentate, apical segment of maxillary palpi elongate, ligula broadly bilobed and apical segment of labial palpi broad; transverse prothorax with distinctly entire basal margin, front coxae moderately widely separated, prosternal process little produced behind coxae and with a pair of lateral grooves; elytra narrower posteriorly but not acuminate at apex, epipleurae not distinct, first abdominal ventrite with femoral lines.

2. *Pachylanguria cuprea* Arrow

1925. *Pachylanguria cuprea* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*:176.

Diagnosis : Facies narrow-elongate, bright coppery in colour, shining, ventral surface and base of legs chestnut red, with a greenish metallic tinge, antennae and remainder of legs blue-black; head with antennae rather short, last four segments short and broad, vertex strongly punctate; prothorax little elongate, narrower posteriorly, little tapered in front, sides feebly rounded, front angles rather sharp and hind angles acute but slightly produced, base of pronotum narrowly margined, transversely impressed between lateral foveae, lateral foveae short but deeply impressed, puncturation slightly finer and sparser than on vertex; scutellum smooth, transverse and acutely pointed; elytral shoulders prominent, sides strongly convergent, apices rounded, sutural angles with minute spines, strong punctures on rows, interstices with minute scattered punctures. Length: 11-12 mm.

Distribution : India : Uttaranchal, Sikkim, Manipur.

Elsewhere : Myanmar.

Genus *Idiolanguria* Arrow

1925. *Idiolanguria* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*: 181 [Type species: *Tetralanguria opaca* Kraatz].

Diagnosis : Facies narrow elongated, with prominent elytral shoulders; head with finely

facetted eyes, no distinct stridulatory files, antennae short, 11-segmented with segments 3-6 elongate, club 4-segmented, mandible stout and bifid at apex, maxillary lacinia with 3 sharp apical teeth, maxillary palpi short, labial palpi short; prothorax little dilated at base, without basal margin of pronotum, prosternum produced behind coxae in a rounded lobe, mesosternum short and bilobed behind; elytra narrower posteriorly but not acuminate at apex; epipleurae not distinct, first abdominal ventrite with femoral lines.

3. *Idiolanguria opaca* (Kraatz)

1899. *Tetralanguria opaca* Kraatz, *Deutsche Ent. Zeitschr.* 1899 : 350.

1925. *Idiolanguria opaca*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 181.

Diagnosis : Facies elongated and not markedly narrowed behind; deep blue in colour with head almost black; legs and ventral surface, except posterior median part of prothorax, middle of metasternum and abdominal ventriles 1-3, bright orange-red. Head small, eyes separated by about four times of the diameter, vertex strongly punctate; pronotum about as wide as long, widest basally, little constricted near middle, front angles rounded, hind angles acute, basal foveae trensverse, lateral foveae less well marked and transversely punctiform, pronotal disc strongly punctate in middle and feebly at sides; elytral shoulders prominent, sides straight and convergent posteriorly, apex rounded, elytral surface subopaque with feeble line of punctures; pro- and metasternum impunctate, abdomen finely and closely punctate. Length- 16-20 mm.

Distribution : India : Manipur, Nagaland.

Genus ***Doubledaya*** White

1850. *Doubledaya* White, *Proc. Zool. Soc. Lond.* 1850 : 13 [Type species: *Doubledaya viator* White].

1876. *Languriosoma* Crotch, *Cist. Ent.* **1** : 379.

1896. *Coptolanguria* Gorham, *Ann. Mus. Civ. Genova* **36** : 261.

1899. *Cosmolanguria* Kraatz, *Deutsche. Ent. Zeitschr.* 1899 : 352.

1908. *Glyphilanguria* Fowler *Wytsman's Gen. Insect.* Langurinae : 14.

Diagnosis : Facies elongated; head dilated beneath laterally making eyes little bit dorsal in position, eyes finely facetted, 11-segmented antenna with 3- or 4-segmented club, mandible with bifid tip, maxillary lacinia tridantate, apical segment of maxillary palpi narrow-elongate, apical segment of labial palpi securiform; prothorax may be of different proportions, front coxae not widely separated and prosternal process produced behind coxae; elytra more or less convergent posteriorly, epipleurae distinct; first abdominal ventrite with narrow intercoxal process.

4. *Doubledaya forcipata* Arrow

1925. *Doubledaya forcipata* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia*: 201.

Diagnosis : Facies moderately elongate, with elytra tapering strong from shoulder to tip; brown with brassy green lustre; head with moderately large eyes, antenna short with 4-segmented club, club broad and compact with basal segment small and triangular; pronotum subquadrate, sides feebly rounded, lateral foveae short but well impressed, head and pronotum finely and sparsely punctate, slightly transverse and smooth; elytra with regular rows of small punctures and interstices contain finer punctures, elytral apices spinous; prosternum transversely wrinkled. Length- 12-13 mm.

Distribution : India : West Bengal (Darjeeling), Manipur.

Genus ***Anadastus*** Gorham

1887. *Anadastus* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 362 [Type species: *Languria cambodiae* Crotch].

1887. *Neolanguria* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 361.

1887. *Stenodastus* Gorham, *Proc. Zool. Soc. Lond.* 1887 : 362.

Diagnosis : Facies elongated; head not dilated beneath laterally, eyes finely facetted, 11-segmented antenna with 3- or 5-segmented club, mandible with a blunt tooth just behind sharp apical tooth, maxillary lacinia with an apical spine, apical segment of maxillary palpi fusiform, apical segment of labial palpi globular; prothorax somewhate quadrate, front coxae not widely

separated and prosternal process produced behind coxae; intercoxal process of first abdominal ventrite moderately narrow and its tip pointed, with a paired (femoral) lines; elytra somewhat parallel; epipleurae distinct.

Key to the species of *Anadastus* Gorham

1. Antennal club 5- segmented. Metasternum and abdomen black; femoral lines on abdominal ventrite 1 nearly parallel .... *karenicus* Gorham
- Antennal club 4-segmented 2
2. Femoral lines on abdominal ventrite 1 not extended beyond middle of ventrite. Prothorax dark; antennal club broad and abrupt..... .....*wiedemanni* Gorham
- Femoral lines on abdominal ventrite 1 extended beyond middle of ventrite. Head, thorax and elytra similarly coloured, brassy; elytra strongly tapering ..... *attenuatus* Arrow.

5. *Anadastus karenicus* Gorham

1896. *Anadastus karenicus* Gorham, *Ann. Mus. Civ. Genova*, **36** : 272.

1925. *Anadastus karenicus*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 215.

Diagnosis : Facies narrowly elongate with slender legs and antennae; black, smooth and shining, prothorax rather pale yellowish, elytra dark steel-blue, front and hind margin of pronotum stained more or less black in middle. Head with finely facetted eyes, antennal segments 1-6 slightly elongate, segment 7-11 form a narrow, slightly transverse loose club; prothorax clearly transverse, moderately convex, sides strongly rounded in front and contracted behind, front angles blunt and hind angles acute, base of pronotum finely margined and transversely sulcate between lateral foveae, large punctures on sulcus; scutellum smooth and transverse; head and pronotum with minute sparse punctures; elytra about twice as long as head and prothorax, sides parallel in front and convergent behind, apices minulely truncate, shoulders little prominent, punctures strong and linear. Length 4-6 mm.

Distribution : India : Meghalaya, Manipur.

Elsewhere : Myanmar.

6. *Anadastus wiedemanni* Gorham

1896. *Anadastus wiedemanni* Gorham, *Ann. Mus. Civ. Genova*, **36** : 271.

1925. *Anadastus wiedemanni*: Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 222.

Diagnosis : Facies moderately narrow, elongate, with slender legs and stout antennae; bright red with elytra dark-blue, and antenna (except base), legs (except trochanter) and ventral surface (except head and prothorax) black; head with small eyes, antennal segments 1-5 elongate, segment 6-7 little thickened, segments 8-11 form a broad and abrupt club; prothorax transverse, sides rounded and little dilated in front, contracted behind, basal foveae on pronotum deep and divergent, base depressed and strongly punctured between foveae, head and pronotum well punctured; elytral sides parallel in front and little rounded behind, extremities truncate, strong, deep punctures in rows. Length 8-9 mm.

Distribution : India : Meghalaya, Nagaland, Manipur.

Elsewhere : Myanmar.

7. *Anadastus attenuatus* Arrow

1925. *Anadastus attenuatus* Arrow, *Fauna Brit. India, Coleoptera: Clavicornia* : 228.

Diagnosis : Facies moderately elongate, with elytra rather broad at shoulders and narrowing posteriorly, slender and long legs; brown in colour with a brassy-green tinge above, ventral surface, basal half of femora and base of antennae redish-brown; head with eyes separated by less than four times of their diameter, antennal segments 1-6 elongate, segment 7 about as broad as long, segments 8-11 form a broad compact and oval club; prothorax transverse, sides strongly rounded in front and moderately contracted behind, front angles blunt, basal foveae short but well impressed, head and pronotum finely and sparsely punctate; elytra with regular rows of large punctures, punctures wide at shoulders and tapering to extremities, elytral apices obliquely truncate. Length 4.5-6 mm.

Distribution : India : Manipur, Arunachal Pradesh.

Subfamily CRYPTOPHILINAE

Genus *Cryptophilus* Reitter

1874. *Cryptophilus* Reitter, *Verh. Zool. Bot. Ges. Wien.* **14** : 381 [Type species: *Cryptophagus integer* Heer].

Diagnosis : Facies elongate, more or less ovoid, head with transverse impressed line on dorsal side behind eyes; stridulatory file single, narrow and median; antennal insertions hidden under projection of frons, 11-segmented antenna with 3-segmented club, mandible bidentate at tip, maxillary lacinia with a bifid apical spine, apical segment of maxillary palpi fusiform, apical segnent of labial palpi elongate; prothorax transverse, front coxal cavities closed, prosternal process broad at apex and apical margin little emarginate; elytral epipleurae distinct, punctures not in regular rows; intercoxal process of first abdominal ventrite broad and its apex rounded.

8. *Cryptophilus integer* (Heer)

1838. *Cryptophagus integer* Heer, *Fauna Helvetia* **1** : 426.

1874. *Cryptophagus integer*: Reitter, *Verh. Zool. Bot. Ges. Wien* **14** : 381.

1971. *Cryptophiluss integer*: Sengupta & Crowson, *Mem. Zool. Surv. India* **15**(2) : 24.

Diagnosis : Facies elongate-oval, subdepressed, punctate, pubescent, redish-brown in colour; head with coarsely facetted moderately large eyes, antennal segments 1-8 almost monliform, segments 9 and 10 weakly transverse and segment 11 about as broad as long, club segments loosely articulated; pronotum finely margined, sides gently rounded, front and hind angles not produced; transverse scutellum impunctate; elytral punctures not very coarse and diffused, elytral apex rounded. Length 2.2-2.5 mm.

Material : 8 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930 m., 3 ex., 25.i.1998, T.K. Pal, *ex.* beating bush; Numaikong, nr. Keibul, 5 ex., 27.i.1998, T.K. Pal, *ex.* haystack.

Distribution : Many parts of the World through transport of food grains (Aitken, 1975). This species was hitherto unrecorded from Manipur.

SUMMARY

The paper deals with 8 species under 6 genera of 2 subfamilies. The species are systematically keyed and characterized. *Cryptophagus integer* (Heer) is recorded first time from the State of Manipur.

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INSECTA : COLEOPTERA : LATHRIDIIDAE

T. K. PAL

Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Lathridiidae are a moderately large family of the section Clavicornia of the superfamily Cacujoidea. The lathridiids are usually small (1-3 mm.), reddish-brown, either pubescent or glabrous. They are largely associated with litter or vegetation debris, and a good number of species live in bushy vegetation. Some species live in mouldy stored foods. Hinton (1941) recorded some thirty species of Lathridiidae associated with various stroed products. The Lathridiidae seem to be more diversely represented in the tropical and subtropical climates than in the temperate zones. Champion (1922 a, b) was the first author to describe four species from Western Himalaya. Motschulsky (1866) added one more species from India. Later, Johnson (1970, 1972, 1975, 1977a, 1977b) described a good number Corticarine species from India. Sengupta (1976) dealt with the Lathridiinae of India where he included 10 species under 6 genera. Later, Sengupta (1983) revised *Stephostethus* LeConte from India. However, no species of Lathridiidae is hitherto to known from Manipur. The present work is based on the recent collection made by the author from Manipur. These represent 10 species under 6 genera of two subfamilies.

CHARACTERS OF THE FAMILY LATHRIDIIDAE

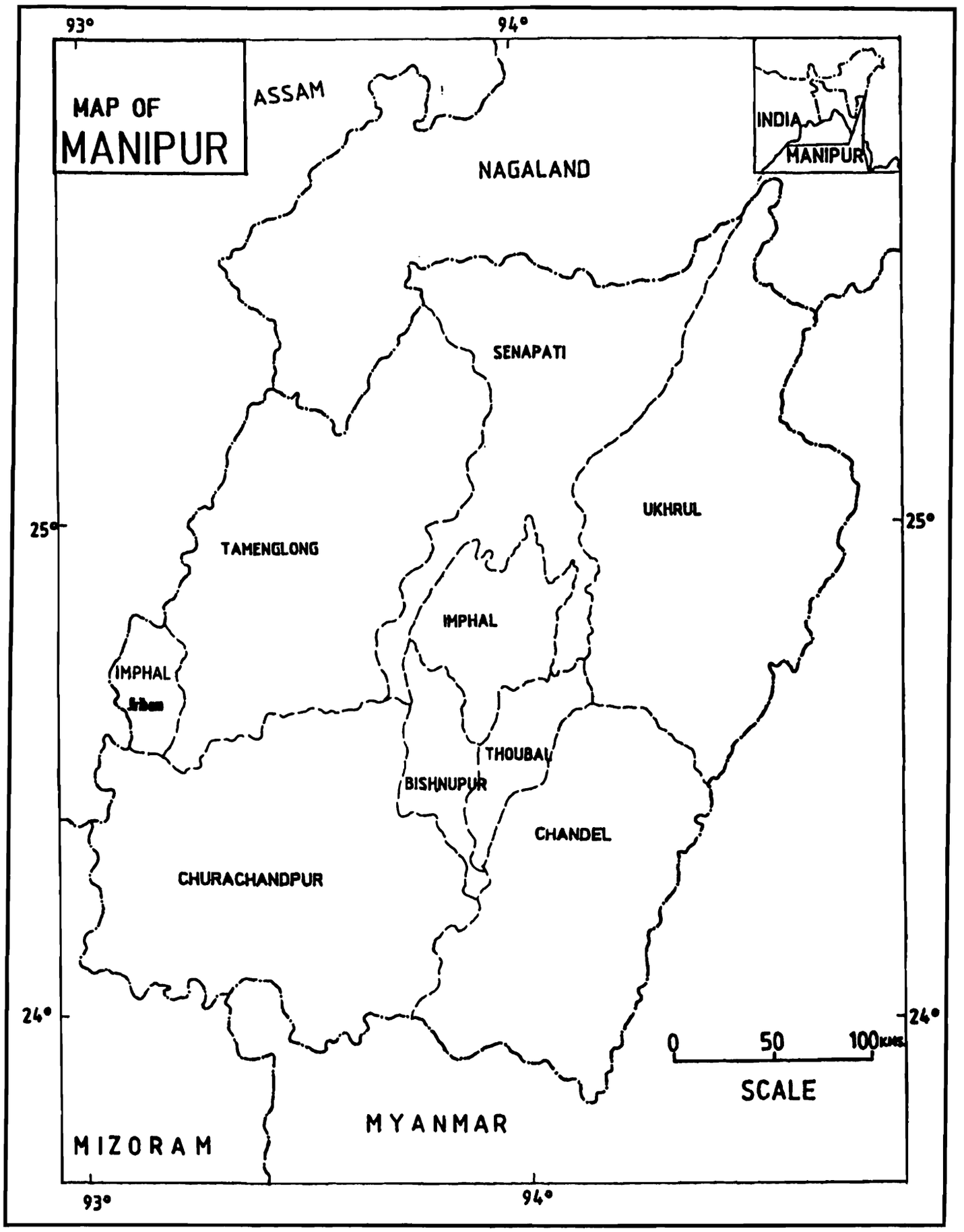
Body small (1.2-2.0 mm.), elongate-oval, somewhat depressed, yellowish to deep brown, elytral punctures in rows, dorsal surface pubescent or glabrous.

Head usually little elongate, sometimes transverse, often with prominent eyes, without stridulatory files on occipital region, transverse line on vertex behind eyes more or less prominent, with fronto-clypeal suture, antennal insertions dorso-lateral or dorsally situated, antenna 10- or 11-segmented with 2- to 3-segmented club; on ventral side gular sutures well separated, without antennal cavities. Mandible usually with well developed mola, 2 or 3 apical teeth with their inner margin often serrated; maxilla with well developed galea, its apex broad and hairy, segments 2 and 3 of palpi enlarged, apical segment usually narrow-elongate; labium with mentum transverse, segment 3 of palpi narrow apically.

Prothorax variously shaped, sides often serrate or dentate, occasionally constricted near middle, pronotum sometimes with ridges or depressions. Front coxae rounded, with hidden trochantins, either contiguous or narrowly separated, coxal cavities closed behind externally, prosternal process narrow, somtimes keeled or elevated.

Elytra with regular rows of punctures, without scutellary striole, epipleura narrow. Wing with reduced anal veins, with subcubital, fleck; without r-m cross vein, radial cell and anal cell.

Mesocoxae closely to moderately widely separated, sternal fitting between mesocoxae with a knob from metasternum or in a stright line, mesocoxal cavities outwardly closed by sterna. Metasternum transverse, metacoxae moderately widely separated; metendosternite reduced with anterior tendons widely separated.


MAP OF
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SCALE

Legs moderately long, trochanters short and simple, femora swollen towards middle, tibiae slender and slightly broadened at apex, tarsal formula 3-3-3 in both sexes.

Abdomen covered by elytra, ventrites freely articulated, ventrite 1 longest and sometimes with femoral lines, ventrites 2-5 more or less equal in length. Aedeagus reduced and simple, without articulated parameres and median strut.

Key to the subfamilies of LATHRIDIIDAE

1. Dorsal surface glabrous or almost so; fronto-clypeal suture deeply impressed with clypeus on lower plane than frons. Front coxae separated by visible prosternal process; pronotum and elytra costate or carinate..... ..... LATHRIDIINAE

– Dorsal surface with setae or pubescence; fronto-clypeal suture not deeply impressed with clypeus and frons in same plane. Front coxae contiguous and prosternal process apparently not visible; pronotum and elytra without costae or carinae .... CORTICARIINAE

LIST OF SPECIES

Subfamily LATHRIDIINAE

1. *Enicmus histrio Joy & Tomlin*
2. *Aridius latumeris Rücker*
3. *Stephostethus paradoxus Sengupta*
4. *Stephostethus tarunus Sengupta*

Subfamily CORTICARIINAE

5. *Corticarina hammondi* Johnson
6. *Corticarina* sp. A
7. *Cortinicara gibbosa* Herbst
8. *Cortinicara subgibbosa* Johnson
9. *Melanophthalma prominens* Johnson.
10. *Melanophthalma* sp. A

Subfamily LATHRIDIINAE

Key to the genera of Lathridiinae of Manipur

1. Prosternal intercoxal process parallel-sided, elevated and keeled; prothorax not constricted above base ..... *Enicmus* Thomson

– Prosternal intercoxal process pear-shaped and not keeled; prothorax usually deeply indented medially 2

2. Intercoxal process of abdominal ventrite 1 with a pair of glandular cavities or pits; sides of prothorax distinctly constricted above base; sternal fitting between mesocoxae with two knobs. Club 3-segmented, temples of head somewhat convergent and not appearing as long as eyes ..... *Aridius* Motschulsky

- Intercoxal process of abdominal ventrite 1 without cavities or pits; sides of prothorax not constricted but somewhat indented medially; sternal fitting between mesocoxae with single knob ..... *Stephostethus* Le Conte

Genus ***Enicmus*** Thomson

1859. *Enicmus* Thmson, *Skand. Coleopt.* **1** : 93 (Type-species : *Ips transversus* Oliver).

1866. *Permidius* Motschulsky, *Bull. Moscou,* **39** : 243.

1875. *Enicmus* : Reitter, *Stettin Ent. Ztg.* **36** : 299.

1897. *Enicmus* : Belon, *Revue Ent.* **16** : 114.

1952. *Enicmus* : Walkley, *Proc. ent. Soc. Wash.* **54** : 218.

Diagnosis : Head (exposed part) broader than long, clypeus broad with apical margin nearly straight, eyes moderately large, temple long; 11–segmented antenna with rather large scape, segments 2-8 narrower and more or less elongate, club 3-segmented. Prothorax transverse; sides not clearly indented near middle, margin serrated; transverse prebasal depression on pronotum; front coxae rounded and closely situated, prosternal process narrow-keeled; metasternum transverse, glandular pits with radiating lines below mesocoxae; first abdominal ventrite with radiating lines below metacoxae, no pit. Elytra ovoid, striate-punctate, interstices ribbed.

1. ***Enicmus histrio*** Joy & Tomlin

1910. *Enicmus histrio* Joy & Tomlin, *Entomologist's mon. Mag.* **46** : 250.

1967. *Enicmus histrio*: Peez, *in* Freude, Hardy & Lohse, *Käfer Mitteleurop.* **7** : 179.

Diagnosis : Moderately convex, rather shiny, yellowish- to reddish-brown, head and pronotum dull. Head broader than long, temples almost as long as moderate-sized eyes and nearly parallel-sided; antenna rather slender, scape to segment 4 more or less elongate, segments 5-8 shorter and subequal, club gradually wider anteriorly, segment 9 about as broad as long, segment 10 transverse, apical segment elongate. Prothorax transverse (1.5 : 2.0), broadest at anterior third, sides little rounded in anterior half and then narrowed posteriorly, sides somewhat flanked, a transverse broad depression from side to side above base, surface closely punctured. Elytra elongate (1.5 : 1.0), gently curved at sides, broadest near middle, interstices at least as wide as punctures and top rounded, interstice 6 more elevated than others. Length - 1.40-1.68 mm.

Material : 27 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 14 ex., 25.i.1998, T.K. Pal, *ex.* vegetation debris; Numaikong, nr. Keibul, 4 ex., 27.i.1998, T.K. Pal, *ex.* haystack; 7 ex., 26.i.1998, T.K. Pal, *ex.* vegetation debris; Ukhrul District, Somsai, 1900m. nr. Ukhrul, 1 ex., 30.i.1998, T.K.Pal, *ex.* thatch; Hundung, 1900 m., 1 ex., 31.i.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New record), Meghalaya, Mizoram, West Bengal, Bihar, Uttar Pradesh, Jammu & Kashmir.

Elsewhere : Nepal; Pakistan; Afghanistan; Azerbaidjan; Europe; Nigeria; Australia.

Genus *Aridius* Motschulsky

1866. *Aridius* Motschulsky, *Bull. Soc. Imp. Nat. Mosc.* **39** : 260 (Type-species: *Lathridius nodifer* Westwood).

1911. *Aridionomus* Reitter, *Fauna Geman.* **3** : 18, 82.

1948. *Aridius*: Walkley, *Proc. ent. Soc. Wash.* **50** : 150.

Diagnosis : Head about as braod as long or little elongate, clypeus broad with apical margin arcuate; eyes moderately large, not projecting; temple long and little convergent posteriorly; 11-segmented antenna with rather large scape, segments 2-8 shorter and narrower, club 3-segmented; transverse impressed line behind eyes not prominent. Prothorax little elongate to transverse with deep indentations on sides behind middle, sides not serrated but bordered, a pair of admedian carinae on pronotum, transverse depression on pronotum across narrowed part; front coxae rounded and closely situated, prosternal process narrow but not elevated or keeled, coxal cavities broadly closed behind; mesocoxae more widely separated than procoxae, a large pit on metasternum between coxae, a pair of pits below mesocoxae; first abdominal ventrite with broad intercoxal process, paired pits on the process; elytra ovoid, striate-punctate, interstices ribbed.

2. *Aridius latumeris* Rücker

1979. *Aridius latumeris* Rücker, *Ann. Hist. Nat. Mag. Hung.* **71** : 161.

Diagnosis : Moderately convex, rather shiny, reddish-brown, head and pronotum dull. Head about as broad as long, temple about as long as eye and somewhat converging posteriorly, narrow median sulcus on vertex; antenna slender, segments 4-7 more or less elongate, segment 8 about as broad as long, club gradually wider apically, segment 9 about as broad as long, segment 10 little transverse, segment 11 a little elongate. Prothorax a little transverse, distinctly constricted behind middle, with an elongate medial fovea, lateral foveae not well marked, surface closely punctured. Elytra elongate (1.4:1.0), gently curved at sides, broadest in anterior third, interstices narrower than rows of punctures, alternate interstices carinate and interstices 3 and 5 unite posteriorly. Length – 1.7 mm.

Material : 2 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 1 ex., 25.i.1998, T.K. Pal, *ex.* vgetation debris; Ukhrul District, Somsai, 1900m., nr. Ukhrul, 1 ex., 30.i.1998, T.K. Pal, *ex.* thatch.

Distribtuion : India : Manipur (New record), Mizoram.

Elsewhere : Vietnam.

Genus *Stephostethus* Le Conte

1874. *Stephostethus* Le Conte, *Proc. Amer. Phil. Soc.* **17** : 601 (Type speceis: *Lathridius liratus* Le Conte).

1926. *Lathridius* : Hetschko, *Coleopt. Cat.* **85** : 22.

1952. *Stephostethus* : Walkley, *Proc. Ent. Soc. Wash.* **54** : 217.

1976. *Stephostethus* : Sengupta, *Orient. Ins.* **10**(1) : 119.

Diagnosis : Head broader than long, clypeus broad with apical margin arcuate, eyes large, temple moderately long; 11-segmented antenna with rather large scape, segments 2-8 narower and more or less elongate, club 3-segmented. Prothorax about as broad as long or little transverse, sides little sinuate behind middle, margin serrated, a pair of admedian carinae on pronotum, transverse depression on pronotum often seen; front coxae rounded and closely situated, prosternal process narrow but not elevated or keeled, coxal cavities broadly closed behind; mesocoxae more widely separated than procoxae; apex of metasternum on lower plane than mesosternum, metasternum transverse, a pair of pits with radiating lines below mesocoxae; first abdominal ventrite with broad intercoxal process, no pit on intecoxal process; elytra ovoid, striate-punctate, interstieces ribbed.

Key to the species of *Stephostethus* Le conte

1. 7th elytral interstice not carinate; in male, a small spine on inner side of front tibia little before apex..... *paradoxus* Sengupta

– 7th elytral interstice carinate and which extend beyond middle of elytra; in male, a spines on inner side of hind tibia before apex..... ..... *tarunus* Sengupta

3. *Stephostethus paradoxus* Sengupta

1976. *Stephostethus paradoxus* Sengupta, *Oriental Ins.* **10** (1) : 122.

Diagnosis : Facies broadly elongate, moderately convex, little shiny and reddish-brown in colour. Head broader than long, eyes normal, temple slightly shorter than eye and little sinuate, median elongate groove on vertex; antenna slender, scape large and nearly globular, elongate pedicel broader basally, segments 3-8 elongate of which 3 longer than others, segments 9 and 11 elongate and segment 10 about as broad as long. Prothorax slightly transverse, narrower anteriorly than base, sides sinuate, broad-elongate median fovea on pronotum which bordered anteriorly, paired lateral foveae above base prominent. Elytra elongate (1.4 : 1), curved at sides, braodest little above middle, interstice carinate in anterior one-fourth only. In male, a small spinous structure on inner side of front tibia little before apex.

Material : 20 ex. India : Manipur, Ukhrul District, Somsai, 1900m. nr. Ukhrul, 18 ex., 30.i.1998, T.K. Pal, *ex.* beating bush; Hundung, 1900 m., 2 ex., 31.i.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New record), West Bengal (Darjeeling), Sikkim, Meghalaya, Assam, Jharkhand, Uttar Pradesh, Uttranchal, Himachal Pradesh.

4. *Stephostethus tarunus* Sengupta

1983. *Stephostethus tarunus* Sengupta, *Ent. Basel.* **8** : 347.

Diagnosis : Moderately convex, rather shiny, dark reddish-brown, head and pronotum comparatively dull. Head broader than long, temple slightly shorter than eye and almost vertical; antenna slender, scape large and globular, elongate pedicel broader basally, segments 3-8 elongate, subequal, segments 9 and11 elongate and segment 10 about as broad as long. Prothorax slightly transverse, sides slightly sinuate behind middle, with an elongated medial fovea which bordered anteriorly, paried lateral foveae more prominent in posterior half, surface closely punctured. Elytra elongate (1.7: 1.0), gently curved at sides, braodest little above middle, interstices wider than rows of punctures, 7th interstice carinate and extending up to posteior third. Hind tibia in male with a pair of spines little above apex. Length–1.7-1.9 mm.

Material : 39 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 20 ex., 25.i.1998, T.K. Pal, *ex.* beating bush (14 ex.), vegetation debris (6 ex.); Numaikong, nr. Keibul, 8 ex., 26.i.1998, *ex.* vegetation debris; Itahi, 930 m., nr. Keibul, 10 ex., 27.i.1998, *ex.* beating bush; Imphal district, Tulihal, 1 ex., 3.2.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New record), West Bengal (Darjeeling Dist.) Mizoram.

Subfamily CORTICARIINAE

Key to the genera of Corticariinae

1. Basal segment of tarsi (especially the hind one) strongly produced ventrally so that its apex almost reaches the apex of second segment; second segment reduced, arising dorsally from the basal segment nearly at the middle. Head generally much narrower than pronotum. Pronotum rather broad, usually strongly curved at sides, with or without a rounded post-median depression .... *Corticarina* Reitter

– Basal segment of tarsi barely produced ventrally; second segment not reduced, about three- fourths the length of basal one and arising dorsally close to its apex. Head slightly narrower than pronotum. Pronotum narrow, weakly curved at sides, with a broad transverse prebasal impression 2

2. Sides of prothorax serrulate; scutellum moderately transverse, not carinate or grooved. No femoral lines on abdominal ventrite 1 .... *Cortinicara* Johnson

– Sides of prothorax distinctly dentate; scutellum strongly transverse, grooved or carinate. Abdominal ventrite 1 with posteriorly diverging femoral lines .... *Melanophthalma* Motschulsky

Genus *Corticarina* Reitter

1880. *Corticarina* Reitter, *Verh. zool.–bot. Ges. Wien* **30** : 58 (Type-species not designated).

Diagnosis : Head broader than long, clypeus broad with its apical margin arcuate, eyes large, temple short; 11-segmented antena with moderately large scape, segments 2-8 narrower, club 3-segmented. Prothorax broader than long, considerably broader than head across eyes, sides rounded and margin finely serrated, pronotum convex and setose; front coxae rounded and closely situated, prosternal process narrow but not elevated, coxal cavities closed behind, mesocoxae more widely separated than procoxae, meso-metasernal fitting in a little concave line on metasternal apex, metasternum transverse, median impressed line prominent in posterior half, tarsal segment 1 of legs (especially hind leg) strongly lobed below and the lobe extends almost to the apex of second segment; first abdominal ventrite with braod intercoxal process, devoid of femoral lines; elytra ovoid, striate-punctate, interstices pubescent.

Key to the scpecies of *Corticarina* Reitter

1. Eyes large, frons little more than thrice as wide as ocular diameter (1.0 : 3.3), transvese impression on vertex behind eyes not very prominent; prothorax slightly transverse (1.0 : 1.25) ..... *hammondi* Johnson

– Eyes comparatively smaller, frons about four times as wide as ocular diameter (1.0: 4.1), transverse impression on vertex behind eyes rather distinct; prothorax more distinctly transverse (1.0 : 1.33) ..... sp. A

5. *Corticarina hammondi* Johnson

1972. *Corticarina hammondi* Johnson, *The Entomologist*, **105** : 102.

1978. *Corticarina hammondi*: Rücker, *Ann. Hist. Nat. Mus. Nat. Hung.* **70** : 153.

Diagnosis : Moderately convex, rather shiny, reddish-brown with antennae and legs paler, dorsum pubescent. Head broader than long, temple very short, antenna slender and slightly longer than prothorax, moderately large scape little elongate, pedicel shorter and narrower, segments 3-6 narrower and more or less elongate, club moderately broad, segments 9 and 10 about as broad as long, apical segment rather elongate. Prothorax tansverse (1.0 : 1.25), broadest near middle, sides rounded and margin serrated, a samll circular weakly impressed median depression before pronotal base, pronotal surface moderately coarsely and densely punctate, setae short. Elytra elongate (1.42: 1.00), gently curved at sides, surface shining, interstices wider than punctures and interstices wider basally and narrowed behind middle, elytral pubescence fine. Length–1.34-1.40 mm.

Material : 12 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 1 ex.,

25.i.1998, T.K. Pal, *ex.* beating bush; Itahi, 930 m., nr. Keibul, 5 ex., 27.i.1998, *ex.* beating bush; Numaikong, nr. Keibul, 1 ex., 26.i.1998, *ex.* vegetation debris; Imphal district, Tulihal,930m., 4 ex., T.K. Pal, *ex.* beating bush, Ukhrul District, Somsai, nr. Ukhrul, 1900m., 1 ex., 30.i.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New roecord), Uttranchal, West Bengal (Darjeeling Hills), Mizoram.

6. *Corticarina* sp. A

Diagnosis : Moderately convex, rather shiny, colour reddish-brown, legs and antennae paler. Head broader than long, temple short, antenna slender and slightly longer than prothorax, pedicel shorter and narrower, segments 3-7 narrower and more or less elongate, club moderately broad, segment 9 about as broad as long, segment 10 little transverse, apical segment elongate. Prothorax rather transverse (1.00 : 1.33-1.40), broadest around middle, sides strongly rounded and margin serrated, postmedian depression on pronotum weakly impressed and nearly circular, pronotal surface moderately coarsely and densely punctate, discal punctures less than a quarter of a diameter apart, hind angles weakly toothed. Elytra long oval, 1.43-1.50x as long as braod, broadest more or less around the middle where the edges are somewhat straight, sides rather weakly curved, surface shining, strial punctures moderate and close, interstices basally much wider than striae, elytral pubescence fine and decumbent. Length-1.44-1.50 mm.

Material : 25 ex. India : Manipur, Ukhrul District, Somsai, nr. Ukhrul, 1900m., 5 ex., 30.i.1998, T.K. Pal, *ex.* beating bush; Hundung, 1900 m., 10 ex., 31.i.1998, T.K. Pal, *ex.* beating bush; Imphal District, Tulihal,930m., 3 ex., 3.ii.1998, T.K. Pal, *ex.* beating bush; Bishenpur District, Keibul Lamjao Nat. Park, 930m., 2 ex., 25.i.1998, T.K. Pal, *ex.* vegetation debris; Itahi, 930 m., nr. Keibul, 3 ex., 27.i.1998, *ex.* beating bush; Numaikonge, nr. Keibul, 2 ex., 26.i.1998, *ex.* vegetation debris.

Remarks : On external characters, *i.e.*, colouration, transverse prothorax and elytral features this spceis is closely related to *C. hammondi* Johnsosn. However, the characters in the key above show this speceis as a separate one from *hammondi*, appear to be different from any described Indian *Corticarina* and may be a new species. This species however, is not named here for more examination and comparison.

Cortinicara Johnson

1975. *Cortinicara* Johnoson, *Ent. Scand.* **6** : 283 (Type-species: *Lathridius gibbosus* Herbst).

Diagnosis : Head broader than long, slightly narrower than prothorax (1.0:1.2), clypeus broad with its apical margin arcuate, eyes large, temple short, transverse impressed line on vertex behind eyes well marked; 11-segmented antenna with moderately large scape, segments 2-8 narrower, club 3-segmented. Prothorax slightly broader than long (1.0 : 1.2), broadest above middle, weakly curved at sides, margin finely serrate, pronotum with a braod transverse impression behind middle which extends across three-fourths of its width, disc setose; front coxae rounded and closely situated, prosternal process narrow but not elevated, coxal cavities closed behind, mesocoxae more widely separated than procoxae, meso-metasternal fitting in a straight line, metasternum transverse, median impresed line prominent in posterior half; tarsal segment 1 of legs not strongly lobed, second segment about three-fourths the length of segment 1; first abdominal ventrite with broad intercoxal process, devoid of femoral lines; elytra ovoid, striate-punctate, interstices with elongate punctures and pubescent.

Key to the species of *Cortinicara* Johnson

1. Anrennal club somewhat abrupt, segment broader than long, segment 11 slightly broader than long ..... *subgibbosa* (Johnson)

– Anrennal club not so abrupt, segment broader than long, segment 10 not broader than long, segment 11 longer than broad .... *gibbosa* (Herbst).

7. *Cortinicara gibbosa* (Herbst)

1793. *Lathridius gibbosus* Herbst, *Käfer*, V: 5, t.44, f.2.

1880. *Corticarina gibbosa* : Reitter, *Verh. Nat. Ver. Brunn. (Best. Tab.* 3) : 28.

1937. *Corticarina gibbosa* : Strand, *Norsk ent. Tidsskr.* **5** : 23.

1972. *Corticarina gibbosa* : Johnson, *Entomologist*, **105** : 100.

1975. *Cortinicara gibbosa* : Johnson, *Ent. Scand.* **6** : 283.

1978. *Cortinicara gibbosa* : Rücker, *Ann. Hist. Nat. Mus. Nat. Hung.* **70** : 153.

Diagnosis : Moderately convex, not very shiny, yellowish- to reddish-brown with antennae and legs paler, dorsum pubescent. Head broader than long, temple very short, antenna slender and slightly shroter than head and prothorax together, moderately large scape little elongate, pedicel shorter and narrower, segments 3-7 narrower and more or less elongate, segments 9 and 11 elongate and segment 10 about as broad as long. Prothorax transverse (1.0 : 1.2), front margin slightly rounded, broadest near anterior third, sides weakly curved, transverse depression above pronotal base rather well marked, pronotal surface moderately coarsely and densely punctate, discal punctures less than a diameter apart, hind angles rounded. Elytra long oval, about 1.5x as long as braod, broadest more or less around the middle where the edges are somewhat straight, sides rather weakly curved, surface shining, striae moderately large, interstices basally wider than striate, interstices with rows of elongate punctures, pubescence fine and decumbent. Length–1.22-1.40 mm.

Material : 45 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 37 ex., 25.i.1998, T.K. Pal, *ex.* vegetation debris; Numaikong, nr. Keibul, 1 ex., 26.i.1998, *ex.* vegetation debris; Imphal district, Tulihal,930m., 6 ex, 3.ii.1998, T.K. Pal, *ex.* beating bush; Ukhrul District, Hundung, 1900 m., 1 ex., 31.i.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Manipur (New reocrd), Kashmir, Uttaranchal, West Bengal (Darjeeling Dist.), Mizoram.

Elsewhere : Nepal; Bhutan; Sri Lanka; Pakistan; Japan; Europe across Asia to eastern Siberia; U.S.A.; Canada.

8. *Cortinicara subgibbosa* (Johnson)

1972. *Cortinicara subgibbosa* Johnson, *Entomologist* **105** : 101.

1972. *Cortinicara subgibbosa*: Johnson, *Ent. Scand.* **6** : 284.

Diagnosis : Moderately convex, little shiny, often reddish-brown with antennae and legs little paler, dorsum pubescent. Head broader than long, temple very short, antenna slender and slightly shorter than head and prothorax together, moderately large scape little elongate, pedicel shorter and narrower, segments 3-7 narrower and more or less elongate, segment 8 about as broad as long, club moderately broad and abrupt, segments 9 and 11 slightly broader than long, segment 10 clearly transverse, prothorax transverse (1.0 : 1.2), front margin rounded, broadest near anterior third, sides weakly curved, transverse depression above pronotal base rather well marked, pronotal surface moderately coarsely and densely punctate, hind angles obtuse and not sharp. Elytra long oval, about 1.5x as long as broad, broadest more or less around middle where edges are somewhat straight, sides moderately curved, striae moderately wide, interstices basally wider than striae, interstices with rows of small punctures, pubescence decumbent. Length–1.2-1.6mm.

Material : 25 ex. India : Manipur, Bishenpur District, Keibul Lamjao Nat. Park, 930m., 14 ex., 25.i.1998, T.K. Pal, *ex.* vegetation debris; Itahi, 930 m., nr. Keibul, 3 ex., 27.i.1998, *ex.* beating bush; Imphal District, Tulihal, 930m., 8 ex, 3.ii.1998, T.K. Pal, *ex.* beating bush.

Distribution : India : Uttaranchal, Manipur (New reocrd). Johnson (1975) noted this as a rare species, which has however been found in good number in Manipur Valley.

Genus *Melanophthalma* Motschulsky

1866. *Melanophthalma* Motschulsky, *Bull. Soc. Nat. Moscou* **39** : 269 (Type-species : not designated.)

Diagnosis : Head broader than long, clypeus broad with its apical margin arcuate, eyes considerably large, temple minute; 11-segmented antenna with moderately large scape, segments 2-8 narrower, 3-segmented club. Prothorax broader than long and broader than head across eyes, sides outwardly curved but not uniformly rounded, somewhat angulate at middle, sides with small but conspicuous dentitions behind angulation, pronotum convex and setose; front coxae rounded and closely situated, prosternal process narrow but not elevated, coxal cavities closed behind, mesocoxae more widely separated than front coxae, meso-metasternal fitting in a straight line, metasternum transverse, no distinct median impressed line; tarsal segment 1 of legs slightly lobed and not greatly extended below second segment; first abdominal ventrite with broad intercoxal process, with posteriorly diverging femoral lines; elytra ovoid, striate-punctate; scutellum markedly transverse, with a preapical narrow transverse groove.

Key to the species of *Melanophthalma* Motschulsky

1. Sides of prothorax more or less angulate at middle; hind margin of abdominal sternite 5 shallowly emarginate, emargination delimited on either side by a tubercle; apex of aedeagus acuminate (Fig. 3) ..... *prominens* Johnson

– Sides of prothorax not angulate at middle,somewhat parallel-sided behind anterior third; hind margin of abdominal sternite 5 truncate but not emarginate; apex of aedeagus bluntly rounded (Fig. 2) ..... sp. A

9. *Melanophthalma prominens* Johnson

1972. *Melanophthalma prominens* Johnson, *The Entomologist* **105** : 108 (Type loc. – Nilgiri Hills, Tamil Nadu).

Diagnosis : Pronotum strongly transverse, broadest across middle, with a well developed transverse depression behind middle, sides of prothorax irregularly and coarsely serrate, in the middle with a well marked angular projection, the sides narrowed basally behind this, posterior angles with strong teeth. In male anterior tibia with a tooth on the under surface a little in front of the middle; ventrite 5 with the apical margin shallowly emarginate in middle, and this emargination is delimited by a minute tubercle on either side; tip of aedeagus somewhat pointed (Fig. 3). Length–1.7 mm,

Material : 1 ex. India : Manipur, Bishenpur District, Itahi, nr.Keibul 930m., 27.i.1998, T.K.Pal, *ex.* beating bush.

Distribution : India : Manipur (New record), Tamil Nadu, Uttaranchal, Bihar.

Elsewhere : Nepal.

10. *Melanophthalma* sp. A

Diagnosis : General appearance (Fig. 1) elongate, moderately convex, somewhat shiny, colour reddish-brown, antennae and legs slightly paler. Head broader than long, temple very thin; antenna slender and slightly shorter than head and prothorax together, scape moderately large and elongate, pedicel shorter and narrower, segments 3-7 narrower and more and less elongate, segment 8 slightly wider than preceding segment, club moderately broad, segment 9 about as broad as long or feebly elongate, segment 10 little transverse and apical segment elongate, segment 10 and 11 little wider than segment 9. Prothorax transverse, (1.0: 1.3), broader in posterior half than across front margin, sides feebly arched, somewhat parallel behind anterior third, margin feebly dentate, lateral teeth about 8-9 in number and setose, transverse prebasal fovea on pronotum moderately prominent, pronotal surface moderately coarsely and densely punctate, discal punctures separated by the diameter of punctures or lesser than those, hind angles weakly toothed. Elytra long, oval, 1.5x as long as broad, about 3.5x as long as prothorax, broadest more or less around the middle, sides gently arched, striae with moderately coarse punctures, separated on row by 3.5x of their diamrter, hairs arising from interstices are long and outstanding, hairs arising out of the punctures are shorter. Male : anterior tibia not toothed, ventrites with apical margin entire and devoid any characteristic feature;

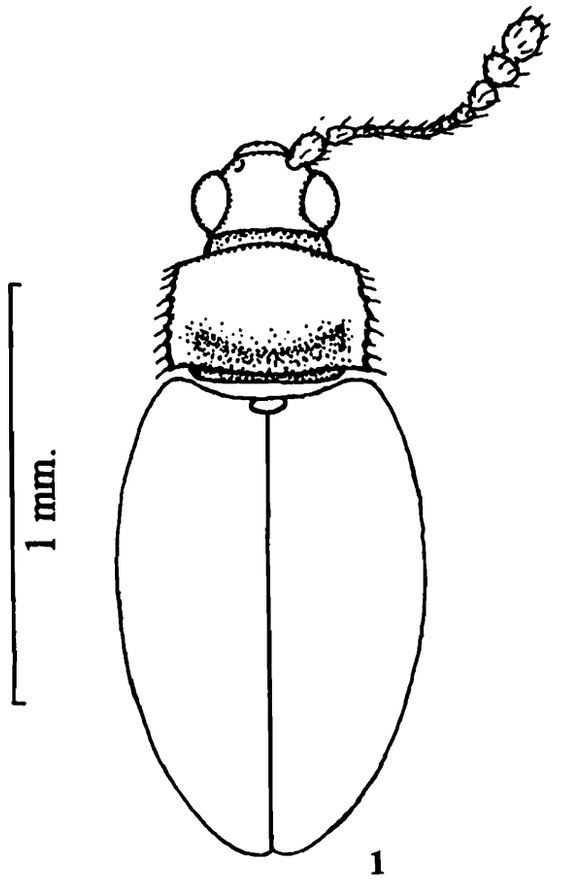

Fig. 1. *Melanophthalma* sp. A, Dorsal view.

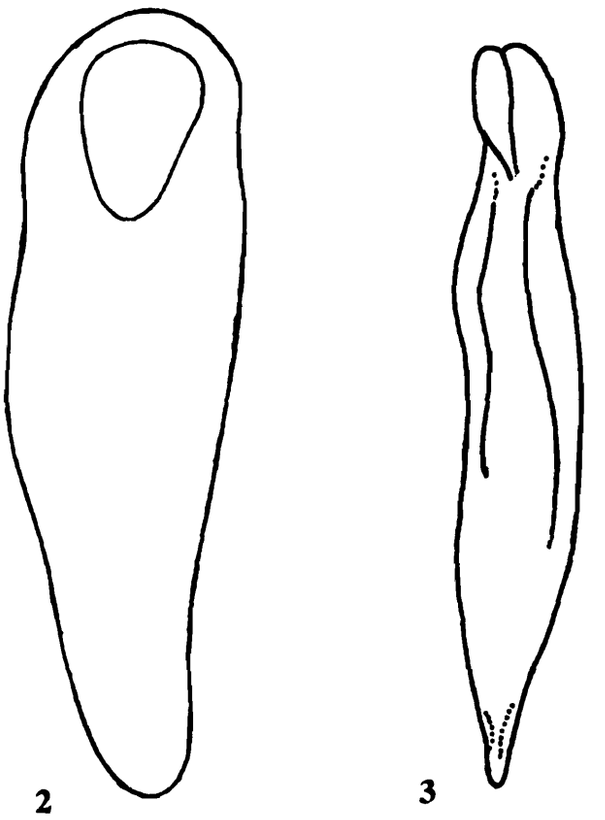

Fig. 2 & 3 : 2. Aedeagus of *Melanophthalma* sp. A, Dorsal view.; 3. Aedeagus of *Melanophthalma prominens* Johnson, Dorsal view.

aedeagus characteristic as in Fig. 2, apex slightly narrowed but not pointed. Length- 1.64 mm.

Material : 5 ex. India : Manipur, Imphal District, Imphal, Mantripukhri, 930m., 3 ex., 4.ii.1998, T.K.Pal, *ex.* beating bush; Tulihal, 930m., 2 ex., 3.iii.1998, T.K. Pal, *ex.* beating bush,

Remarks : This species comes close to *Melanophthalma franzi* Johnson but can be differentiated by its prothorax not angulate but somewhat parallel behind anterior third; transverse prebasal impression on pronotum less prominent; and structure of aedeagus different.

SUMMARY

The paper deals with 10 species under 6 genera of 2 subfamilies, of which 2 species appear to be undescribed. All these species are recorded first time from Manipur as no taxonomic study of this group was carried out earlier from this State. The species are systematically keyed and characterized.

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INSECTA : COLEOPTERA : ELATERIDAE (ELATEROIDEA)

P. MUKHOPADHYAY and *P. CHAKRABORTY
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Among the members of the superfamily Elateroidea of the Insect Order Coleoptera, Elateridae is the largest family having a very typical elongated shape. The posterior angle of their prothorax is elongated and they have a peculiar pointed process on the undersurface of their prothorax which fits into a mesosternal cavity. They are commonly called as "Click beetles" as because they make a typical "Click" sound while jumping to its anterior side and lying on its back. Size of them widely varies from few millimeters to 5-6 cms. The colour of them also have a wide range of variation. Some of them are dull in colours while some are very brightly coloured. More than 9000 species under 400 genera were recorded from the world while from India 200 species under 40 genera was recorded by Candeze, 1891. The major workers of this group are Candeze (1860 - 1898), Flautiaux (1910 - 1950), Schwarz (1906 1907), Ohira (1970 1985), Stibick (1979), Vonhayek (1973, 1979), Platia and Schimmel (1990 onwards), Casari-chen (1992 onwards) and L.K. Vats (1991 1998).

So far the fauna of Manipur is concerned not yet a single species has been recorded. So, all of the species recorded from Manipur in this paper is first time record from this State. Materials of this study are based on the collection made by various survey parties of Z.S.I. from different districts of Manipur. Distributional data of the species have been given from the published records as well as actual study of the specimens. Keys to the subfamilies, genera and species have been provided.

All together 12 species and 7 genera and 6 subfamilies have been dealt within this paper. A total of 54 examples of elaterid beetles were studied while doing this work. All these materials are kept in the Coleptera Section of Zoological Survey of India, New Alipur, Kolkata.

LIST OF SPECIES OF 'CLICK-BEETLES (ELATERIDAE)

A. Subfamily AGRYPNINAE

I. Genus ***Adelocera*** Latreille, 1829

1. *A. adspersus* (Candeze, 1857)

II. Genus ***Agrypnus*** Eschscholtz, 1829

2. *A. bipapulatus* (Candeze, 1865)
3. *A. ellipticus* (Candeze, 1857)
4. *A lapideus* (Candeze, 1851)
5. *A.serrula* (Candeze, 1857)
6. *A. sinensis* (Candeze, 1857)
7. *A. truncatus* (Herbst, 1806)

B. Subfamily MELANOTINAE

III. Genus ***Melanotus*** Eschscholtz, 1829

8. *M. fuscus* (Fabricius, 1801)

C. Subfamily CONODERINAE

IV. Genus ***Aeoloderma*** Fleutiaux, 1928

9. *A. brachmana* (Candeze, 1859)

D. Subfamily HEMIRRHIPINAE

V. Genus ***Calais*** Castelnau, 1836

10. *Calais* sp.

* 194/A, Aambagan, East Kodalia, New Barrackpore, North 24-Parganas

E. Subfamily OXYNOPTERINAE

VI. Genus ***Campsosternus*** Latreille, 1834.

11. *C. cantori* Hope, 1831.

F. Subfamily ELATERINAE

VII. Genus ***Megapenthes*** Kiesenwetter, 1863

12. *Megapenthes* sp.

Key to the subfamilies of ELATERIDAE

1. Prosternal suture opened or deeply grooved for receiving the antennae at repose, occassionally prosternopleural sutures grooved for reception of anterior tarsi ..... AGRYPNINAE.

   Prosternal suture closed or very often narrowly grooved, the latter closed or often open at front with shallow excavation at base 2

2. Frontal carina distinct or prominent, often with a hole on the top of the anterior border, tarsi may be simple or dialated 3

   Frontal carina faint or weak in the middle (between the eyes), sometimes two pieces joining at the anterior border, pronotum clearly margined laterally, prosternal sutures entire, tarsi simple ..... ELATERINAE.

3. Frontal carina equally well distinct during its extension .....4.

   Frontal carina more or less weakened at middle 5

4. Tarsi simple, claws pectinate ..... MELANOTINAE

   Tarsi with fourth article dialated or lamellated ..... CONODERINAE

5. Mesosternum and metasternum either connate (Suture indistinct or absent) or distinct (joined by a definite suture) ; claws simple, without setae, body robust, larger in size, surface smooth with metallic shining appearance ... . OXYNOPTERINAE

– Mesosternum and metasternum connate, suture absent or indistinct; claws simple, setae present at base and sometimes elsewhere on claws; body robust, larger in size, covered with plentiful pubescence of various colours ..... HEMIRRHIPINAE

A. Subfamily AGRYPNINAE

Genus I. ***Adelocera*** Latreille

1829. *Adelocera* Latreille, In Cuvier, G.L.C.F.D., *Le zegne animal.* Nouvelle ed. **4** : 451.

1973. *Adelocera,* Von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)* suppl., **20** : 13.

The genus *Adelocera* was established by Latreille and Hyslop (1921) designated *Elater ovalis* Germar as the type genus. From the State of Manipur single species under *Adelocera* has been recorded - which is recorded from this state for the first time.

1. ***Adelocera adspersus*** (Candeze)

1857. *Lacon Adspersus* Candeze, *Mem.Soc. r. Sci.Liege.*, **12** : 115.

1973. *Adelocera adspersus,* Von Hayek, *Bull. Br. Mus. Nat Hist. (Ent.)* Suppl., **20** : 22.

Material examined : 1 ex., India : Manipur : Churachandpur : Churachandpur; 3000 ft. alt., 21.ix. 1975, M.S. Shishodia coll.

Distribution : India : Manipur, Delhi, Sikkim.

Remark : The species is recorded for the first time from the State of Manipur.

Genus II. ***Agrypnus*** Eschscholtz

1829. *Agrypnus* Eschscholtz, In thon, *Entomol. Archiv.*, **2** (1) : 32

1973. *Agrypnus,* von Hayek *Bull.Br. Mus. Nat. Hist. (Ent.)* suppl., **20** : 113.

1992. *Agrypnus,* vats & Kashyap, *J. Ent. Res.*, 16 (2) : 87.

Eschscholtz (1829) first described this genus and Arnett (1952) designated *Elater murinus* Linnaeus as the type species. From India, about 86 species of this genus are recorded (Chakraborty & Chakrabarti, 2000). In this present paper, 6 species from Manipur are recorded - all of which are new record from the State.

Key To The Species of The Genus *Agrypnus*

1. Lateral margin of the pronotum entire 2
– Lateral margin of the pronotum crenulate .. .. *truncatus* (Candeze)
2. Propleural grooves either distinct or indistinct 3
– Propleural grooves absent 5
3. Apex of posterior angles of prothorax subrounded 4
– Apex of posterior angles of prothorax truncated ..... *sinensis* (Candeze)
4. Prosternum densely punctate, punctures sperated by less than their own diameter ... . *serrula* (Candeze)
– Prosternum moderately punctuate, punctures are scatterdly distributed..... *ellipticus* (Cand.)
5. Punctation on pronotum double .... *bipapulatus* (Cand.)
– Punctation on pronotum simple .... *lapideus* (Cand.)

2. ***Agrypnus bipapulatus*** (Candeze)

1865. *Lacon bipapulatus* Candeze, *Mem.Cour.Acad.r. Sci. Belg.*, (in 8°) **17**; no. I : 11.

1955. *Agrypnus bipapulatus*, Nakane & Kishi, *Bull. Osaka.Mus. Nat. Hist.*, **2** : 4.

1973. *Agrypnus bipapulatus*, von Hayek, *Bull.Br. Mus. (Nat. Hist.)* suppl., **20** : 132.

Material examined : 2 exs., 1 ex. India : Manipur : around Moreh : Burma border; 21.i.1976, A.K. Ghosh coll.; 1 ex., Manipur : Gularthol Forest : Jiribam; 8.v.1993; S.K. Chakraborty coll.

Distribution : India : Manipur, Sikkim.

Elsewhere : China and Japan.

Remark : This species is recorded for the first time from the State of Manipur.

3. ***Agrypnus ellipticus*** (Candeze)

1857. *Lacon ellipticus Candeze, Mem.Soc. r. Sci. Liege,* **12** : 135.

1926. *Adelocera ellipticus*, Fleutiaux, *Annls. Soc.ent. Fr.*, **95** : 96.

1973. *Agrypnus ellipticus*, Von Hayek, *Bull. Br. Mus. (Hist)* suppl. **20** : 151.

Material examined : 5 exs., 1 ex. India : Manipur : Gularthol : Jiribam, 9.v.1993, B. Mitra coll.; 3 exs., Manipur : Ukhrul, 6200 m.alt., 29.ix. 2.x.75, M.S. Shishodia coll.; 1 ex., Manipur : Compel, 6200 m.alt., 1.x.1975, M.S. Shishodia coll.

Distribution : India : Manipur, Himalaya, Punjab.

Remark : This species is first time recorded from Manipur.

4. ***Agrypnus lapideus*** (Candeze)

1857. *Lacon lapideus* Candeze, *Mem. Soc. r. Sci.Liege.*, **12** : 141.

1973. *Agrypnus lapideus*, von Hayek, *Bull. Br. Mus. (Nat. Hist.)* suppl., **20** : 174.

Material examined : 2 exs., India : Manipur : Chandel dist., 10.vi.1992, R. Mathew coll.

Distribution : India : Manipur, Kashmir, Sikkim.

Elsewhere : Nepal, Laos and Tonkin.

Remark : This species is first time recorded from the State of Manipur.

5. ***Agrypnus serrula*** (Candeze)

1857. *Lacon serrula* Candeze, *Mem.Soc. r. Sci. Liege,* **12** : 122.

1973. *Agrypnus serrula*, von Hayek, *Bull.Br. Mus. Nat. Hist. (Ent.)* suppl. **20** : 210.

Material examined : 6 exs., 3 exs., India : Manipur : Moreh : Khuig : airock riverbed, 100 ft. alt., 18.i.1976, Dr. A.K. Ghosh coll.; 2exs., Manipur : Moreh (1.5 km away) nr. Burma border, 18.i. 1976, Dr. A.K. Ghosh coll.; 1 ex., Manipur : Churachandpur, 5.vi.1992, R. Mathew coll.

Distribution : India : Manipur, Sikkim.

Elsewhere : Yunnen.

Remark : This species is recorded from the state of Manipur for the first time.

6. ***Agrypnus sinensis*** (Candeze)

1857. *Lacon sinensis* Candeze, *Mem. Soc. r. Sci.Liege,* **12** : 139.

1973. *Agrypnus sinensis,* von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)* suppl. **20** : 212.

Material examined: 13 exs.; 8 exs., India : Manipur : Sankai, 25.i.1977, S.G. Patil coll., 3 exs., Churachandpur, 19.v.1993, S.K. Chatterjee coll., ex. - at light ; 1 ex., North Churachandpur, 21.ix.1975, M.S. Shishodia coll.

Distribution : India : Manipur.

Elsewhere : China, Laos.

Remark : This species is recorded from India as well as from Manipur for the first time.

7. *Agrypnus truncatus* (Herbst)

1806. *Elater truncatus* Herbst, *Kafer,* **10** : 95, pl. 166, fig. 2.

1973. *Agrypnus truncatus* von Hayek, *Bull. Br. Mus. Nat. Hist.* suppl., **20** : 23.

Material examined: 5 exs.; 1 ex., India : Manipur : Churachandpur, 19.v.1993, S.K. Chatterjee coll.; 3 exs., Domba, 28.i.1977, S.G. Patil coll.; 1 ex., Imphal, 9.iv.1998, P.H. Roy & Party coll.

Distribution : India : Manipur, Sikkim, N. India.

Remark : This species is first time recorded from Manipur.

B. Subfamily MELANOTINAE

Genus III. *Melanotus* Eschscholtz

1829. *Melanotus* Eschscholtz, In *Thon.Archiv.* **2** : 32.

1921. *Melanotus,* Hyslop, *Proc.U.S. Natn. Mus.,* **58** : 656.

Subfamily Melanotinae has the type genus *Melanotus* and the species *Elater fuscipes* Gyllenhal. Candeze (1891) recorded 139 species of this genus from the world, of which 10 were from India. In the present paper only one species of this genus has been recorded from Manipur.

8. *Melantous fuscus* (Fabricius)

1801. *Elater fuscus* Fabricius, *Syst. Eleuth,* **2** : 228.

1970. *Melanotus fuscus,* Ohira, *Ann. Hist. Nathn. Mus. Hung.,* **62** : 220.

Material examined: 2 exs., 1 ex., India : Manipur : Mamenvill, 24.v.1981, C. Radhakrishan, Coll. ; 1 ex., Gularthol Forest Tribam, 8.v.1993, S.K. Chakraborty coll.

Distribution : India : Manipur, Sikkim, Tripura, West Bengal.

Elsewhere : Ambonia, Indo China, Mayanmar, Sri Lanka, Yunnan.

Remark : This species is recorded from Manipur for the first time.

C. Subfamily CONODERINAE

Genus IV. *Aeoloderma Fleutiaux*

1829. *Aeolus* Eschscholtz, In *Thon, Archiv.,*Vol. **2** : 33, pt. 1.

1928. *Aeoloderma* Fleutiaux, *Encyclopedie Entomologique* ser. B, pt. 1, vol. **3** : 135.

1973. *Aeoloderma,* Ohira, *Folia Entomol. Hung.,* suppl. **26** : 320

The genus was established by Fleutiaux, 1928 and *Elater crucifer* Rossi, 1790 (*Fauna Etrusca,* Vol. 1 : 183 original designation) was described as the type species (Hyslop, 1921). Here single species has been recorded under this genus.

9. *Aeoloderma brachmana* (Candeze)

1859. *Aeolus brachmana* Candeze, *Mon. Elat.* **2** : 283, 345.

1929. *Aeoloderma* brachmana, Fleutiaus, *Ency. Ent.,* Coleoptera : 34.

1973. *Aeoloderma brachmana,* Ohira, *Folia Entomol. Hung.,* suppl. **31** : 320.

Material examined: 9 exs., 8 exs., India : Manipur : Churachandpur : Thanion, 23.ii.1993, S.K. Chakraborty coll.

Distribution : India : Manipur.

Elsewhere : Annam, Burma, Java, Formosa, Vietnam, Philippines, Sumatra.

Remark : This species is recorded from the State of Manipur for the first time.

D. Subfamily HEMIRRHIPINAE

Genus V. *Calais Castelnau*

1829. *Alaus* (pars.) Eschscholtz, In *Thon Ent, Archiv.,* **2** : 33.

1869. *Calais* Castelnau, *Revue Ent.*, **4** : 9.

1994. *Calais* Casari-Chen. A. Sonia, *Revta bras. Ent.*, **38** (1) : 206 219.

Hyslop designated *Elater excavatus* as the type species of the genus *Calais*. Casari-chen (1994) fixed the priority of the generic name *Calais* Castelnau (1869) for the species which were described under *Alaus* Eschscholtz till then. In the present paper only one species is recorded under this genus.

10. *Calais sp.*

Material examined : 1 ex., India : Manipur : Harinagar : Jiriban, 10.v.1993, S.K. Chakraborty coll.

Remarks : Due to nonavailability of more materials the species determination of this material was not possible here. It will be studied and done later on seperately.

E. Subfamily OXYNOPTERINAE

Genus VI. *Campsosternus* Latreille

1834. *Campsosternus* Latreille, *Annls. Soc. Ent. Fr.*, Vol. **3** : 141.

1921. *Campsosternus* Hyslop, *Proc. Soc. U.S. Natn. Mus.*, **58** : 632.

This genus was established by Latreille, 1834 and the type genus was designated as *Elater fulgens* Fabricius, 1775, *Ent. Syst.*, vol. 2 : 20 (Monobasic). Here single species has been recorded from Manipur.

11. *Campsosternus cantori* Hope

1831. *Campsosternus cantori* Hope, *Zool. Miscell.*, : 25.

1906. *Campsosternus cantori*, Schwarz, In Wytsmann Genera Insect. **46** A : 50.

Material examined : 5 exs., 4 exs., India : Manipur : Churachandpur ; 8.v. 18.v.1993, S.K. Chakraborty, x. atlight; 1 ex. Churachandpur, 5.vi.1992, R. Mathew coll.

Distribution : This species is first time recorded from the state of Manipur.

F. Subfamily ELATERINAE

Genus VII. *Megapenthes* Kiesenwetter

1863. *Megapenthes* Kiesenwetter, *Naturg. Ins. Deut. Schl.*, vol. **5** : 353.

1921. *Megapenthes*, Hyslop, *Proc. U.S. Natn.* Mus., **58** : 655.

The genus *Megapenthes* has the type species *Elater lugens* Redtenbacher, 1842 *Dissert. inang. vint* : 11 (as designated by Hyslop, 1921). From India 9 species of this genus were recorded. In the present paper single species has been recorded from Manipur.

12. *Megapenthes* sp.

Material examined : 3 exs.; 1 ex., India. Manipur, Churachandpur, 19.v.1993. S.K. Chakraborty coll., 1 ex., Sielmat Reserve Forest, 14.v.1993. B. Mitra coll., 1 ex., Mamen vill., 24.v.1981, C. Radhakrishnan coll.

Remarks : Three examples of this species were studied. But due to absence of the specific literatures its specific determination has not been attempted here. It will be done separately later on.

SUMMARY

The present paper deals with 12 species belonging to 7 genera under 6 subfamilies. All these are new record from Manipur and the species viz. *Agrypnus sinensis* (Candeze) is recorded as new from India. First reference and recent valid names of the genera and species have also been given. Keys to the subfamilies, genera and species have been provided. Informations on their distribution has been provided, whereever possible.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 359-370, 2004

INSECTA : COLEOPTERA : ADEPHAGA (FAM. HALIPLIDAE, FAM. GYRINIDAE AND FAM. DYISCIDAE)

P. MUKHOPADHYAY and S. K. GHOSH
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Of the 14 families of aquatic coleoptera known from India, 5-families belongs to the suborder Adephaga : Coleoptera. Of which present paper deals with the families like Haliplidae, Gyrinidae and Dytiscidae.

More than 8,000 species of aquatic beetles are known from the world. Of which, about 588 species are represented from India.

The members of the family Haliplidae are commonly known as 'crawling water beetles' They are poor swimmers and rather crawl instead of swimming. Adult and larvae of the species of this family are omnivorous i.e. feed upon both plant and animal materials and usually live at the edge of small ponds, quiet streams, lakes etc. Thomson (1860), Regimbart (1892-99) Guignot (1936), Vazirani (1966-84) etc. are the major workers on the group.

The members of the family Gyrinidae are commonly known as 'whirligig beetles' and are aquatic both in adult and larval stages. They feed on the surface of the water but can swim equally beneath water. Fabricius (1781), Walker (1858-59), Motschulsky (1861), Regimbart (1882-83), Ochs (1924-66), Vazirani (1980-84) are the major workers of the group.

The members of the family Dytiscidae are commonly known as 'predacious diving beetles' and form the main constituent of insect fauna of aquatic biota and found both in stagnant and running waters. The major workers on the group are Balfour Browne (1946), Guignot (1954-58), Brancucci (1983), Zimmerman (1920), Vazirani (1953-84) etc.

As regards to Indian fauna of these three families, Ochs (1924-66) published a series of papers on the family Gyrinidae, Vazirani published a series of papers during 1953-80 and in 1984 published Fauna of India on the family Haliplidae and Gyrinidae. Later Biswas, Mukhopadhyay & Saha (1995) has published fauna of West Bengal; Mukhopadhyay, Ghosh Saha and Biswas (2000) fauna of Meghalaya, Ghosh Mukhopadhyay & Biswas (2000) fauna of Tripura on the families like Haliplidae, Gyninidae and Dytiscidae.

Prior to this study, one species of the family Haliplidae and six species under four genera belonging to the family Dytiscidae were known from Manipur. Of the three families, Erichson (1834) described the first species viz. *Cybister* (Melanonectes) *sugillatus* belonging to the family Dytiscidae from Manipur. The present study is based on the collections brought from different districts of Manipur by different survey parties of Zoological Survey of India and other collections present in the National Zoological Collection and includes also the published records to prepare a consolidated account on the families like Haliplidae, Gyrinidae and Dytiscidae from Manipur. Key to the subfamilies, tribes and genera has already been dealt within Fauna of West Bengal (1995). Synonymies and distributional data of each species of the three families from Manipur have also been provided here.

SYSTEMATIC TAXA

List of species

Family HALIPLIDAE

Genus 1. ***Haliplus*** Latreille, 1802

1. *Haliplus* (Liaphlus) *manipurensis* Vazirani

Family II. GYRINIDAE

Subfamily (A) ENHYDRINAE

Genus 2. ***Dineutus*** MacLeay, 1825

*2. *Dineutus* (Spinosodineutus) *spinosus* (F.)

Subfamily (B) ORECTOCHILINAE

Genus 3. ***Orectochilus*** **Eschscholtz,** 1883

3. *Orectochilus* sp.

Family III. DYTISCIDAE

Subfamily (A) NOTERINAE

Tribe HYDROCANTHINI

Genus 4. ***Canthydrus*** Sharp, 1882.

*4. *Canthydrus flavus* (Mots.)

Subfamily (B) LACCOPHILINAE

Genus 5. ***Laccophilus*** Leach, 1817

5. *Laccophilus anticatus* Sharp

*6. *Laccophilus chinensis inefficiens* Walker

**7. *Laccophilus clarki* Sharp

*8. *Laccophilus flexuosus* Aube

*9. *Laccophilus indicus* Gschwendtner

*10. *Laccophilus medialis* Sharp

*11. *Laccophilus parvulus obtusus* Sharp

*12. *Laccophilus ritsemae* Regimbart

*13. *Laccophilus sharpi* Regimbart

*14. *Laccophilus uniformis* Motschulsky

Subfamily (C) HYDROPORINAE

Tribe (a) HYPHYDRINI

Genus 6. ***Hyphydrus*** Illiger, 1807

**15. *Hyphydrus* (Apriophorus) *birmanicus* Regimbart

Tribe (b) HYDROVATINI

Genus 7. ***Hydrovatus*** Motschulsky, 1855

*16. *Hydrovatus confertus* Sharp

Tribe (c) BIDESSINI

Genus 8. *Clypeodytes* Regimbart, 1894

17. *Clypeodytes* sp.

Genus 9. ***Guignotus*** Houlbert, 1934

*18. *Guignotus flammulatus* (Sharp)

*19. *Guignotus inconstans* (Regimbart)

20. *Guignotus* sp.

Tribe (d) HYDROPORINI

Genus 10. ***Hyphoporus*** Sharp, 1882

21. *Hyphoporus* sp.

Subfamily (D) COLYMBETINAE

Tribe (a) COPELATINI

Genus 11. ***Copelatus*** Erichson, 1832

*22. *Copelatus indicus* Sharp

Tribe (b) AGABATINI

Genus 12. ***Lacconectus*** Motschulsky, 1855

23. *Lacconectus* (S. Str.) *fulvescens* Motschulsky

24. *Lacconectus* (S. Str.) *ritsemai* Regimbart

Tribe (c) COLYMBETINI

Genus 13. ***Rhantus*** Stephens, 1835

*25. *Rhantus* (S. Str.) *taprobanicus* Sharp

Subfamily (E) DYTISCINAE

Tribe (a) HYDATICINI

Genus 14. ***Hydaticus Leach***, 1817

*26. *Hydaticus* (Guignotites) *fabricii* MacLeay

*27. *Hydaticus* (Guignotites) *leechi* Sato

*28. *Hydaticus* (Guignotites) *vittatus* (F.)

Tribe (b) THERMONECTINI

Genus 15. ***Rhantaticus*** Sharp, 1882

*29. *Rhantaticus congestus* (Klug)

Genus 16. ***Sandracottus*** Sharp, 1882

30. *Sandracottus manipurensis* Vazirani

Tribe (c) CYBISTERINI

Genus 16. ***Cybister Curtis***, 1827

*31. *Cybister (Meganectes) limbatus* (F.)

32. *Cybister (Melanectes)* posticus Aube

33. *Cybister (Melanectes)* sugillatus Erichson

*34. *Cybister (Meganectes) tripunctatus asiaticus Sharp*

(** First time from India

* First time from Manipur State)

SYSTEMATIC ACCOUNT

Family I. HALIPLIDAE

Genus 1. ***Haliplus*** Latreille, 1802

1802. *Haliplus* Latreille, *Hist.Nat.Crust.Ins.*, **3** : 77.

1. ***Haliplus (Liaphlus) manipurensis*** Vazirani

1966. *Haliplus (Liaphlus) manipurensis* Vazirani *Proc. Zool. Soc. Calcutta*, **19** : 132.

1984. *Haliplus (Liaphlus) manipurensis* Vazirani, *Fauna of India*, Coleoptera : Fam. Gyrinidae and Fam. Haliplidae, pp. 124-125.

Material examined : 33 ex., India : Manipur : Imphal, 1.iii.1993, S.K. Saha & Party.

Distribution : India : Manipur.

Family II. GYRINIDAE

Subfamily (A) ENHYDRINAE

Genus 2. ***Dineutus*** MacLeay, 1825

1825. *Dineutus* Macleay, *Annulosa javanica*, ed. **1** : 30

1835. *Dyneutes* : Laporte, *Etud. Ent.*, p. 109.

1835. *Dineutes* : Brulle, *Hist.nat.Ins.*, (5) **2** : 234, 240.

2. ***Dineutus* (Spinosodineutus) *spinosus*** (F.)

1781. *Gyrinus spinosus* Fabricius, *Species Insectorun*, p. 298.

1838. *Dineutus spinosus*, Aube, *Species Coleopteres*, **6** : 789.

1930. *Dineutus* (Spinosodineutus) *spinosus* : Ochs, *Cat.Indian Ins.*, pt. **19**, Gyrinoidea, p.10.

1984. *Dineutus* (Spinosodineutus) *spinosus* (F.) : Vazirani, *Fauna of India*, Coleoptera, Fam. Gyrinidae and Fam. Haliplidae, pp. 17-20.

Material examined : 2 ex., India : Manipur : Bishnupur, 13.ii.1993, A. Bhattacharjee; 19 ex., Langgunpal, 12.ii.1992, A. Bhattacharjee.

Distribution : India : Manipur, Bihar, Assam, Meghalaya, Orissa, Uttar Pradesh, Tamil Nadu, West Bengal.

Elsewhere : Bangladesh; Burma; Thailand; Malaysia; Laos; Vietnam.

Remarks : This species is recorded here for the first time from Manipur.

Subfamily (B) ORECTOCHILINAE

Genus 3. ***Orectochilus*** Eschscholtz, 1833

1833. *Orectochilus* Eschscholtz, in Dejeans *Catalogue Coleopteres*, ed. II : 59.

3. ***Orectochilus*** sp.

Material examined : 7 ex., India : Manipur : Churachandpur, 6.vi.1992, Coll. R. Mathew; 45 ex., Manipur : Kangvai 22.iii.1975, M. Dutta & Party.

Remarks : Further detailed study of the material will be dealt elsewhere.

Family III DYTISCIDAE

Subfamily (A) NOTERINAE

Tribe HYDROCANTHINI

Genus 4. ***Canthydrus*** Sharp, 1882

1882. *Canthydrus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 269, 838.

1977. *Canthydrus* Sharp, Vazirani, *Rec. Zool. Surv. India*, Misc. Publ., *Occ. Paper* No. **6** : 5-8.

4. ***Canthydrus flavus*** (Motschulsky)

1855. *Hydrpcanthys flavus* Motschulsky, *Etudes Entomologiques*, **4** : 83.

1882. *Canthydrus flavus*, Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 279.

1977. *Canthydrus flavus*, Vazirani, *Cat. Orient. Dytiscidae*, p. 5-6.

Material examined : 22 ex., India : Manipur : Senapati dist., 1.iii. 1993, S.K. Saha & Party; 10 ex., Bishnupur dist., Sendra : Loktak Lake, 10.iv.1992, S.K. Saha & Party; 1ex., Imphal, 6.viii.1960, F. Schmid; 31 ex., Imphal dist., Robei, 28.ii.1993, S.K. Saha & Party; 23 ex., Bishnupur dist., Phubal, Loktak Lake, 18.ii.1993, S.K. Saha; 10 ex., Churachandpur dist., Churachandpur, 24.ii.1993, S.K. Saha; 23 ex., Churachandpur dist., Thinghat, 22.ii.1993, S.K. Saha & Party; 41 ex., Imphal dist., Singda, 25.ii.1993, S.K. Saha & party; 33 ex., Bishnupur dist., Kaibal Lamjo National Park, 21.ii.1993, S.k. Saha & party; 16 ex., Imphal, 27.ii.1993, S.K. Saha & Party; 4 ex., Imphal dist., Sangoimang, 27.ii.1993, S.K. Saha

& Party, 15 ex., Senapati dist., Sapermaina, 2.iii.1993, S.K. Saha & Party; 18 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party; 9 ex., Bishnupur dist., Thanga, Loktak Lake, 20.ii.1993, S.K. Saha & Party; 10 ex., Bishnupur dist., Sendra, Loktak Lake, 10.iii.1992, S.K. Saha & Party; 1 ex., Churachandpur dist., Boumba, 11.iv.1992, S.K. Saha & Party.

Distribution : India : Manipur, Assam.

Elsewhere : Thailand; Vietnam; Indonesia; China; Formosa.

Remarks : Though this species is well represented throughout this state, but it is recorded here for the first time from Manipur.

Subfamily (B) LACCOPHILINAE

Genus 5. Laccophilus Leach, 1817

1817. *Laccophilus Leach, Zool. Misc.*, **3** : 69.

1977. *Laccophilus*, Vazirani, *Rec. zool. Surv. India* : 9-17.

5. *Laccophilus anticatus* Sharp

1890. *Laccophilus anticatus*, Sharp, *Trans. Ent. Soc. London*, : 341.

1977. *Laccophilus anticatus*, Vazirani, *Rec. zool. Surv. India*, p. 9.

Material examined : 8 ex., India : Manipur : Imphal, 27.ii.1993, S.K. Saha & Party; 2 ex., Imphal, Robei, 28.ii.1993, S.K. Saha & Party; 1 ex., Imphal dist., Singda, 25.ii.1993, S.K. Saha & Party; 6 ex., Bishnupur dist., Keibal Comjo National Park, 21.ii.1993, S.K. Saha & Party; 6 ex., Churachandpur dist., Behiang, 24.ii.1993, S.K. Saha & Party; 13 ex., Senapati dist. Sapermaina, 2.iii.1993, S.K. Saha and Party; 1 ex., Bishnupur dist., Phubal, Loktak Lake, 18.ii.1993, S.K. Saha.

Distribution : India : Manipur, Tripura, Assam, Bihar, Orissa, West Bengal, Uttar Pradesh, Maharashtra.

Elsewhere : Bangladesh; Sri Lanka; Indonesia.

6. *Laccophilus chinensis inefficiens* Walker

1858. *Laccophilus chinensis*, Boheman, *K. Sv. Fregatten Eugenies Resa Zoolgi.*, 1. Insect., **2** : 21.

1859. *Laccophilus inefficiens* Walker, *Ann. Mag. nat. Hist.*, (3) **3** : 51.

1954. *Laccophilus chinensis inefficiens*, Guignot, *Ark. Zool.*, (N.S.) **6** : 565.

1977. *Laccophilus chinensis inefficiens* Walker, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper* No. **6** : 10-11.

Material examined : 1 ex., India : Imphal, 27.ii.1993, S.K. Saha & Party; 1 ex., Bishnupur dist., Moirang, 7.iv.1992, S.K. Saha & Party; 4 ex., Imphal dist., Sangoimang, 27.ii.1993; 1.ex., Bishnupur dist., Loktak Lake, 7.ii.1992, S.K. Saha & Party; 10 ex., Churachandpur dist., Behiang, 24.ii.1993, S.K. Saha & Party; 4 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Orissa, Assam, Tripura, Sikkim, Punjab, Uttar Pradesh, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, West Bengal.

Elsewhere : Nepal; Bhutan; Bangladesh; China; Hongkong; Japan; Taiwan; Sri Lanka; Vietnam; Laos, Thailand.

Remarks : This species is recorded here for the first time from Manipur.

7. *Laccophilus clarki* Sharp

1880-82. *Laccophilus clarki* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 313.

1983. *Laccophilus clarki*, Brancucci, *Ent. Arb. Mus. Frey*, **31** : 364

Material examined : 1 ex., India : Manipur : Bishnupur, 8.iv.1992, S.K. Saha & Party; 7 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party; 4 ex., Churachandpur dist., Thanion, 23.ii.1993, S.K. Saha & Party; 8 ex., Senapati dist., Pangmol, 1.iii.1993, S.K. Saha & Party.

Distribution : India : Manipur.

Remarks : This species is recorded here for the first time from India (Manipur).

8. *Laccophilus flexuosus* Aube

1838. *Laccophilus flexuosus* Aube, *In Dejean's Species Coleopteres*, **6** : 430.

1977. *Laccophilus flexuosus*, Vazirani, *Rec. zool. Surv. India*, p. 11-12.

Material examined : 4 ex., India : Manipur : Imphal dist., Robei, 28.ii.1993, S.K. Saha & Party; 4 ex., Churachandpur dist., Behiang, 24.ii.1993, S.K. Saha & Party; 5 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party; 8 ex., Imphal dist., Sangoimang, 27.ii.1993, S.K. Saha & Party; 6 ex., Imphal, 27.ii.1993, S.K. Saha & Party; 10 ex., Senapati dist., Pangmol, 1.iii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Orissa, Sikkim, Tripura, Uttar Pradesh, Himachal Pradesh, Madhya Pradesh, Gujrat, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal.

Elsewhere : Iran; Iraq; Japan; Burma; Sri Lanka; Pakistan; Nepal; Indonesia; Hongkong.

Remarks : This species is recorded for the first time from Manipur.

9. ***Laccophilus indicus*** **Gschwendtner**

1959. *Laccophilus flexuosus* Aube, Guignot, *Bull.Mens. Soc.Linn.Lyon,* **28** : 11.

1968. *Laccophilus sindensis,* Vazirani, *Ori. Ins.,* **2** : 247.

1983. Laccophilus indicus Gschwendtner, Brancucci, *Ent. Arb. Mus. Frey,* **31/32**, p. 322.

Material examined : 4 ex., India : Manipur; Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim, Tripura, Punjab, West Bengal.

Elsewhere : Bangladesh.

Remarks : This species is recorded for the first time from Manipur.

10. ***Laccophilus medialis*** Sharp

1880-82. *Laccophilus medialis* Sharp, *Sci. Trans. R. Dubmlin Soc.,* **2** : 309.

1889. *Laccophilus medialis,* Regimbart, *Ann. Soc. ent. Fr.,* **68** : 265.

1977. *Laccophilus medialis, Vazirani, Rec. zool. Surv. India, Occ. Paper* **6** : 12.

Material examined : 2 ex., India : Manipur : Imphal dist., Sangoimang, 27.ii.1993, S.K. Saha & Party; 1 ex., Bishnupur dist., Moirang,7.iv.1992, S.K. Saha & Party; 1 ex., Senapati dist., Pangmol, 1.iii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim, West Bengal.

Elsewhere : Bhutan; Burma; Laos; Thailand; Vietnam; Indonesia.

Remarks : This species is recorded for the first time from Manipur.

11. ***Laccophilus parvulus obtusus*** Sharp

1880-82. *Laccophilus obtusus* Sharp, *Sci. Trans. R. Dublin Soc.,* **2** : 311.

1889. *Laccophilus parvulus* Aube, *Regimbart, Ann. Soc. ent. Fr.,* **68** : 257.

1983. *Laccophilus parvulus obtusus* Sharp, Brancucci, *Ent. Arb. Mus. Frey,* **31/32** : 360-364.

Material examined : 2 ex., India : Manipur : Imphal dist., Singda, 25.ii.1993, S.K. Saha & Party; 11 ex., Imphal dist., Sangoimang, 27.ii.1993, S.K. Saha & Party; 8 ex., Imphal, 27.ii.1993, S.K. Saha & Party; 4 ex., Imphal : Ropei, 28.ii.1993, S.K. Saha & Party; 1 ex., Churachandpur dist., Behiang, 24.ii.1993, S.K. Saha & Party; 2 ex., Churachandpur dist., Thinghat, 22.ii.1993, S.K. Saha & Party; 7 ex., Senapati dist., Pangmol, 1.iii.1993, S.K. Saha & Party; 1 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur; Kerala, Pondicherry, Goa, West Bengal.

Elsewhere : China; Vietnam; Laos; Thailand; Indonesia; Nepal; Bangladesh.

Remarks : This species is recorded here for the first time from Manipur.

12. ***Laccophilus ritsemae*** Regimbart

1880. *Laccophilus ritsemae* Regimbart, *Notes Leyden Mus., 2 : 209.*

Material examined : 1 ex., India : Manipur : Bishnupur dist., Loktak Lake, 7.iv.1992, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim, Andaman and Nicobar Is.

Elsewhere : Indonesia ; Philippines.

Remarks : This species is recorded for the first time from Manipur.

13. ***Laccophilus sharpi*** Regimbart

1889. *Laccophilus sharpi* Regimbart, *Ann. Soc. ent. Fr.*, **6** (9) : 151.

1977. *Laccophilus Sharpi* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 15-16.

Material examined : 1 ex., India : Manipur : Moirang in Bishnupur dist., 7.iv.1992, S.K. Saha & Party; 4 ex., Thoubal dist. : Thoubal, 25.ii.1993, S.K. Saha & Party; 2 ex., Imphal dist. : Robei, 28.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Orissa, Sikkim, Tripura, Madhya Pradesh, Maharashtra, Rajasthan, Gujarat, Uttar Pradesh, Tamil Nadu, Andaman Island.

Elsewhere : Burma; Nepal; Pakistan; Sri Lanka; Japan; China; Iraq.

Remarks : This species is recorded for the first time from Manipur.

14. ***Laccophilus uniformis*** Motschulsky

1859. *Laccophilus uniformis* Motschulsky, *Etud.Ent.*, **8** : 46.

1920. *Laccophilus uniformis*, Zimmermann, *Coleopt.Cat.*, **4** (71) : 27.

1977. *Laccophilus uniformis*, Vazirani, *Rec. zool. Surv. India, Occ. Paper No.* **6** : 17.

Material examined : 13 ex., India : Manipur : Imphal dist., Robei, 28.ii.1993, S.K. Saha & Party; 3 ex., Senapati dist., Pangmol, 1.iii.1993, S.K. Saha & Party, 1 ex., Thoubal dist., Thoubal, 25.ii.1993, S.K. Saha & Party; 3 ex., Churachandpur dist., Thinghat, 22.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim.

Elsewhere : Burma; Indonesia; China; Vietnam; Laos; Cambodia; Thailand.

Remarks : This species is recorded here for the first time from Manipur.

Subfamily (C) HYDROPORINAE

Tribe (a) **Hyphydrini**

Genus 6. ***Hyphydrus*** Illiger, 1807.

1807. *Hyphydrus* Illiger, *Mag. Ins.*, **6** : 349

15. ***Hyphydrus (Apriophorus) birmanicus*** Regimbart

1888. *Hyphydrus birmanicus* Regimbart, *Annali Mus. Stor. nat. Genova*, (2) **6** : 614.

1920. *Hyphydrus birmanicus*, Zimmermann, *Coleopt. Cat.*, **4** : 39.

1977. *Hyphydrus birmanicus, Vazirani, Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 20-21.

Material examined : 1 ex., India : Manipur : Robei in Imphal dist., 28.ii.1993, S.K. Saha & Party; 1 ex., Moirang in Bishnupur dist., 7.iv.1992, S.K. Saha & Party.

Distribution : India : Manipur.

Elsewhere : Burma.

Remarks : This species was earlier recorded from Burma. In the present study it is being recorded for the first time from India (Manipur).

Tribe (b) **Hydrovatini**

Genus7. ***Hydrovatus*** Motschulsky, 1855.

1855. *Hydrovatus* Motschulsky, *Etudes Entomologiques* **5** : 82.

1899. *Oxynoptilus* Schaum, in Erichson, *Nat.Ins.Deutsche.*, *1* (2) : 28.

1833. *Hydatonychus* Kolbe, *Arch. Naturgesch.*, **49** : 402.

1977. Hydrovatus Motschulsky, Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 25-31.

16. ***Hydrovatus confertus*** Sharp

1882. *Hydrovatus confertus* Sharp, *Sci.Trans.R.Dublin Soc.*, *2* : 329.

1954. *Hydrovatus confertus*, Guignot, *Ark. zool.*, (N.S.), *6* : 565.

1977. *Hydrovatus confertus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : p.27.

Material examined : 3 ex., India : Sangoimang, 27.ii.1993, S.K. Saha & Party; 3 ex., Imphal, 27.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Tripura, Punjab, Uttar Pradesh, Rajasthan, Kerala, Tamil Nadu, West Bengal.

Elsewhere : Burma; Indonesia; Sri Lanka; China; Vietnam; Thailand.

Remarks : This species is first time recorded from Manipur.

Tribe (C) **Bidessini**

Genus 8. *Clypeodytes* Regimbart, 1894

1894. *Clypeodytes* Regimbart, *Ann. Soc. ent. Fr.*, **63** : 230.

1977. *Clypeodytes* Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 37-41.

17. ***Clypeodytes*** sp.

Material examined: 1 ex., India : Manipur : Behiang in Churachandpur dist., 24.ii.1993, S.K. Saha & Party; 11 ex., Sangoimang in Imphal dist., 27.ii.1993, S.K. Saha & Party; 16 ex., Imphal, 29.ii.1993, S.K. Saha & Party; 7 ex., Robei in Imphal dist., 28.ii.1993, S.K. Saha & Party; 23 ex., Pangmol in Senapati dist., 1.iii.1993, S.K. Saha & Party; 1 ex., Keibul Camjo National Park in Bishnupur dist., 21.ii.1993, S.K. Saha & Party.

Remarks : Further detailed study of the material will be dealt elsewhere.

Genus 9. ***Guignotus*** Houlbert, 1934

1934. *Bidessus* (Guignotus) Houlbert, *Fauna Ent. Arm.*, Hydrocanthares, p. 54.

1945. *Guignotus*, Guignot, *Mem. Mus. natn. Hist. nat.*, **19** : 226.

1977. *Guignotus*, Vazirani, *Rec. zool. Surv. India. Misc. Publ. Occ. Paper No.* **6** : 31-37.

18. ***Guignotus flammulatus*** (Sharp)

1882. *Bidesus flammulatus* Sharp, *Sci, Trans. Dublin Soc.*, **2** : 359.

1954. *Guignotus flammulatus*, Guignot, *Opusc. ent. Orient.*, Lund., **19** : 221.

1977. *Guignotus flammulatus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. paper No.* **6** : 32.

Material examined : 2 ex., India : Manipur : Robei in Imphal dist., 20.11.1993, S.K. Saha & Party; 3 ex., Sangoimang in Imphal dist., 27.ii.1993, S.K. Saha & Party; 5 ex., Moirang in Bishnupur dist., 7.iv.1992, S.K. Saha & Party; 1 ex., Thanga : Loktak Lake in Bishnupur dist., 20.ii.1993, S.K. Saha & Party; 7 ex., Thanion in Churachandpur dist., 23.ii.1993, S.K. Saha & Party;1 ex., Sapermaina in Senapati dist., 2.iii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Orissa, Tripura, Sikkim, Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, Tamil Nadu, West Bengal.

Remarks : This species is first time recorded from Manipur.

19. ***Guignotus inconstans*** (Regimbart)

1892. *Bidessus inconstans* Regimbart, *Ann. Soc. ent. Fr.*, **36** : 119.

1963. *Guignotus inconstans*, Fernando, *Bull. Fish. Res. Stn., Ceylon*, **16** (1) : 26.

1977. *Guignotus inconstans*, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper* No. **6** : 33-34.

Material examined : 1 ex., India : Manipur : Robei in Imphal dist., 28.ii.1993, S.K. Saha & Party; 6ex., Sangoimang in Imphal dist., 27.ii.1993, S.K. Saha & Party; 1 ex., Thanga : Loktak Lake in Bishnupur dist., 20.ii.1993, S.K. Saha & Party; 1 ex., Behiang in Churachandpur dist., 24.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Orissa, Tripura, Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, Tamil Nadu, Goa, West Bengal.

Remarks : This species is recorded here for the first time from Manipur.

20. ***Guignotus*** sp.

Material examined : 1 ex., India : Manipur : Moirang in Bishnupur dist., 7.iv.1992, S.K. Saha & Party, 1 ex., Robei in Imphal dist., 28.ii.1993, S.K. Saha & Party.

Remarks : Further detailed study of the material will be dealt elsewhere.

Tribe (d) **Hydroporini**

Genus 10. ***Hyphoporus*** Sharp, 1882

1882. *Hyphoporus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 390, 859.

1977. *Hyphoporus*, Vazirani, *Rec. zool. Surv. India, Misc. publ., Occ. Paper No.* **6** : 44-47.

21. ***Hyphoporus*** sp.

Material examined : 20 ex., India : Manipur : Thanion in Churachandpur dist., 23.ii.1993, S.K. Saha & Party; 7 ex. Churachandpur, 7.vi.1992, R. Mathew; 7 ex., Boumba in Churachandpur dist., 11.iv.1992, S.K. Saha & party; 21 ex., Thinghat in Churachandpur dist., 22.ii.1993, S.K. Saha & Party; 4 ex., Thanga : Loktak Lake in Bishnupur dist., 20.ii.1993, S.K. Saha & Party; 4 ex., Sendra : Loktak Lake in Bishnupur dist., 10.iv.1992, S.K. Saha & Party; 1 ex., Bishnupur, 9.iv.1992, S.K. Saha & Party.

Remarks : Further detailed study of the materials will be delt elsewhere.

Subfamily (D) COLYMBETINAE

Tribe (a) **Copelatini**

Genus 11. ***Copelatus*** Erichson, 1832

1832. *Copelatus* Erichson, *Genera Dytiscidae, pp.***18** : 38.

1977. *Copelatus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 52-58.

22. ***Copelatus indicus*** Sharp

1882, *Copelatus indicus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 582.

1977. *Copelatus indicus* Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 54-55.

Material examined : 3 ex., India : Manipur : Imphal, 27.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Assam, Tripura, Bihar, Uttar Pradesh.

Remarks : This species is recorded here for the first time from Manipur.

Tribe (b) **Agabatini**

Genus 12. ***Lacconectus*** Motschulsky, 1855

1855. *Lacconectus* Motschulsky, *Etudes Entomologiques*, **4** : 83.

1977. *Lacconectus* Vazirani, *Rec. zool. Surv. India.*, Misc. Publ., *Occ. Paper* No. **6** : 58-60.

23. ***Lacconectus*** (S.Str.) ***fulvescens*** Motschulsky

1855. *Lacconectus* fulvescens, Mots, *Etudes Ertomologiques*, **4** : 83.

1970. *Lacconectus* (S.str.) *fulvescens*, Vazirani, *Ori. Ins.*, **4** : 325.

Material examined : Not seen.

Distribution : India : Manipur, Sikkim, West Bengal.

24. ***Lacconectus*** (S.Str.) ***ritsemai*** Regimbart

1833. *Lacconectus ritsemai* Regimbart, *Notes Leyden Mus.*, **5** : 299.

1970. *Lacconectus* (S.Str.) *ritsemai*, Vazirani, *Ori. Ins.*, **4** : 322.

Material examined : Not seen.

Distribution : India : Manipur, West Bengal.

Tribe (c) **Colymbetini**

Genus 13. ***Rhantus*** Stephens, 1835.

1835. *Rhantus* Stephens, *Illustrated Brit. Ent. Mand.*, 5a, pp. : 395.

1977. *Rhantus* Vazirani, *Rec. zool. Surv. India, Misc, Publ., Occ. Paper* No. **6** : 70-73.

25. ***Rhantus*** (S.Str.) ***taprobanicus*** Sharp

1890. *Rhantus taprobanicus* Sharp, *Trans.ent. Soc. Lond.*, **1** : 346.

1919. *Rhantus taprobanicus* Zimmermann, *Arch. Naturgesch.*, **83A** (12) : 218.

1977. *Rhantus* (S.Str.) *taprobanicus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : pp. 73.

Material examined : 2 ex., India : Manipur : Robei in Imphal dist., 28.ii.1993, S.K. Saha & Party; 9 ex., Imphal, 27.ii.1993, S.K. Saha & Party; 1 ex., Manipur, Stn. No.5,20.i.1977, S.G. Patil; 4 ex., Lunggunpal, 12.ii.1993, A. Bhattacharjee; 1 ex., Boumba in Churachandpur dist., 11.iv.1992, S.K. Saha & Party.

Distribution : India : Manipur, Bihar, Meghalaya, Delhi, Uttar Pradesh, Rajasthan, Maharashtra, Karnataka, Pondicherry, Tamil Nadu, West Bengal.

Remarks : This species is recorded here for the first time from Manipur.

Subfamily(E) DYTISCINAE

Tribe (a) **Hydaticini**

Genus 14. ***Hydaticus*** Leach, 1817

1817. *Hydaticus* Leach, *Zool. Miscell.* **3** : 69, 72

1997. *Hydaticus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 75-82.

26. ***Hydaticus*** (Guignotites) ***fabricii*** MacLeay

1833. *Hydaticus fabricii* Macleay, *Annulosa Javanica,* p. 134.

1838. *Hydaticus rufulus* Aube, in Dejeans, *Species Coleopteres,* **6** : 199.

1858. *Hydaticus confusus* Boheman, *Eugen. Ressiesa. Col.,* p. 21.

1977. *Hydaticus (Guignotites)* fabricii, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : pp. 76-77.

Material examined : 1 ex., India : Manipur : Bishnupur, 7.vi.1992, R. Mathew; 6 ex., Launggumpol, 12.ii.1993, A. Bhattacharjee; 1 ex., Thanga : Loktak Lake in Bishnupur dist., 20.ii.1993, S.K. Saha & Party; 3 ex., Singda in Imphal dist., 25.ii.1993, S. K. Saha & Party; 4 ex., Imphal, 27.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim, Rajasthan, Tamil Nadu, Goa, Andaman Island.

Elsewhere : Indonesia; Vietnam; Philippines.

Remarks : This species is recorded here for the first time from Manipur.

27. ***Hydaticus (Guignotites) leechi*** Sato

1961. *Hydaticus leachi* Sato, *Trans. Shikoku. ent. Soc.,* **7** : 61.

1977. *Hydaticus (Guignotites) leechi* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 78.

Material examined : 1 ex., India : Manipur : Langgunpal, 12.ii.1993, A. Bhattacharjee; 2 ex., Bishnupur, 7. vi. 1992, R. Mathew.

Distribution : India : Manipur, Sikkim, Andaman Island.

Elsewhere : Indonesia ; Vietnam.

Remarks : This is recorded here for the first time from Manipur.

28. ***Hydaticus (Guignotites) vittatus*** (F.)

1775. *Dytiscus vittatus* Fabricius, *Syst. ent. App.* : 825.

1883. *Hydaticus vitatus,* Aube, in Dejean's *Species Coleopteres,* **6** : 208.

1977. *Hydaticus (Guignotites) vittatus,* Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 81.

Material examined : 5 ex., India : Manipur, Langgunpal, 12.ii.1993, A. Bhattacharjee; 6 ex., Bishnupur, 7.vi.1992, R.Mathew; 1 ex., Moirang in Bishnupur dist., 7.iv. 1992, S.K. Saha & Party.

Distribution : India : Manipur, Sikkim, Tripura, Gujarat, Uttar Pradesh, Tamil Nadu, West Bengal.

Elsewhere : Indonesia.

Remarks : This species is recorded for the first time from India.

Tribe (b) **Thermonectini**

Genus 15. ***Rhantaticus*** Sharp, 1882

1882. *Rhantaticus* Sharp, *Sci. Trans. R. Dublin Soc.,* **2** : 691, 911.

1977. *Rhantaticus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 82-83.

29. ***Rhantaticus congestus*** (Klug)

1832. *Hydaticus congestus* Klug, *Symb. Physical, Insects,* Madagascar, **3** : 136.

1920. *Rhantaticus congestus* var. *rochazi,* Zimmermann, *Coleopt. Cat.*, **4** : 333.

1977. *Rhantaticus congestus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Paper No.* **6** : 83.

Material examined : 2 ex., India : Manipur : Langgunpal, 12.ii.1993, A. Bhattacharjee, 1 ex., Bishnupur, 7.vi.1992, R. Mathew.

Distribution : India : Manipur, Bihar, Orissa, Delhi, Rajasthan, Maharashtra.

Elsewhere : Nepal.

Ramarks : This species is recorded for the first time from Manipur.

Genus 16. ***Sandracottus*** Sharp, 1882

1882. *Sandracottus* Sharp, *Sci.Trans.R.Dublin Soc.*, **2** : 685, 910.

1977. *Sandracottus* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 83-86.

30. ***Sandracottus manipurensis*** Vazirani

1969. *Sandracottus manipurensis* Vazirani, *Orient. Ins.*, **2** : 277.

1977. *Sandracottus manipurensis* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : pp. 85.

Material examined : 1 ex., India : Manipur : Bishnupur, 7.vi.1992, R. Mathew; 1 ex., Bishnupur, 8.iv.1992, S.K. Saha & Party; 6 ex., Behiang in Churachandpur dist., 24.ii.1993, S.K. Saha & Party.

Distribution : India : Manipur.

Tribe (c) **Cybisterini**

Genus 16. ***Cybister*** Curtis, 1827

1827. *Cybister* Curtis, *Brit.Ent.*, **4** : 151.

1977. *Cybister* Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 86-93.

31. ***Cybister (Meganectes) limbatus*** **(F.)**

1775. *Dytiscus limbatus* Fabricius, Systema Ent., : 230.

1838. *Cybister limbatus*, Aube, in Dejean's *Species Coleopteres*, **6** : 55.

1977. *Cybister (Meganectes) limbatus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 91.

Material examined : 1 ex., India : Manipur : Imphal, 18.iii.1993, A.K. Karmakar; 1 ex., Bishnupur, 30.v.1992, A. Mathew; 1 ex., Jiribam, Khutikhong Fish Farm, 18.iii.1993, A.K. Karmakar.

Distribution : India : Manipur, Bihar, Orissa, Tripura, Arunachal Pradesh, Maharashtra, Goa, Kerala, West Bengal.

Elsewhere : Formosa; Vietnam; Philippines.

Remarks : This species is recorded here for the first time from Manipur.

32. ***Cybister (Melanectes) posticus*** Aube

1838. *Cybister posticus* Aube, in Dejean's *Species Coleopteres.* **6** : 87.

1977. *Cybister (Melanectes) posticus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 89.

Material examined : 1 ex., India : Manipur : Churachandpur in Churachandpur dist., 27.iii.1974, K.R. Rao.

Distribution : India : Manipur, Assam, Orissa, Uttar Pradesh, Delhi, Maharashtra, West Bengal.

Elsewhere : Bangladesh.

33. ***Cybister (Melanectes) sugillatus*** Er.

1934. *Cybister sugillatus* Erichson, *Nova Acta Leop. Carol.*, **16** : 227.

1899. *Cybister (Melanectes) sugillatus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No.* **6** : 89.

Material examined : 1 ex., India : Manipur : Churachandpur in Churachandpur dist., 27.iii.1974, K.R. Rao; 1 ex., Boumba in Churachandpur dist., 11.iv.1992, S.K. Saha & Party.

Distribution : India : Manipur, Assam, Tripura, Sikkim, Orissa, Madhya Pradesh, Uttar Pradesh, Maharashtra, Tamil Nadu, West Bengal.

Elsewhere : Japan, Indonesia, Philippines.

34. ***Cybister (Meganectes) tripunctatus asiaticus*** Sharp

1832. *Cybister asiaticus* Sharp, *Sci. Trans. R. Dublin Soc.*, **2** : 731.

1899. *Cybister tripunctatus asia*ticus, Regimbart, *Ann. Soc. ent. Fr.*, **68** : 352.

1977. *Cybister (Meganectes) tripunctatus asiaticus*, Vazirani, *Rec. zool. Surv. India, Misc. Publ., Occ. Paper No.* **6** : 92.

Material examined : 1 ex., India : Manipur : Churachandpur in Churachandpur dist., 19.iii.1993, K. R. Rao; 1 ex., Imphal, 18.iii.1993, A.K. Karmakar; 1 ex., Bishnupur, 7.vi.1992, R. Mathew; 1 ex., Loktak Lake, Sendra in Bishnupur

dist., 19.ii.1993, S.K. Saha & Party; 1 ex., Imphal, 27.ii.1993, S.K. Saha & Party.

Distribution : India : Tripura, Manipur, Sikkim, Rajasthan, Gujarat, Tamil Nadu, Andaman Island.

Elsewhere : Pakistan; Sri Lanka; Burma; Nepal; Bangladesh; Afganisthan.

Remarks : This species is recorded for the first time from Manipur.

SUMMARY

A comprehensive taxonomic account of the family Haliplidae, Gyrinidae and Dytiscidae with reference to the species known from Manipur is presented. It includes a total of 34 species under 16 genera belonging to these three families. Of which 2 species under 2 genera are recorded for the first time from India (Manipur) and 20 species under 10 genera belonging to families like Gyrinidae and Dytiscidae are recorded for the first time from Manipur. This paper also includes important synonymies and distribution of the species

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INSECTA : COLEOPTERA : SCARABAEIDAE
(Cetoniinae, Dynastinae, Rutelinae & Euchirinae)

S. K. CHATTERJEE

Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Scarabaeidae is one of the largest families of Order Coleoptera, belonging to the superfamily Scaraboidea, commonly known as Dung beetles. In India so far 1610 species under 203 genera are described.

The group is economically important for serious pest, larvea generally live in rotten tree trunks, heaps of debris or underground. A large number of this family are nocturnal in habit and hide during day time and few are diurnal. Majority of the species feed in dead vegetable animal matter, juices of plants, flowers, etc.

The valuable contribution of Indian Scarabaeidae is based on the Faunal work of G. J. Arrow (1910, 1917). R. Miksic (1976, 1977), I. C. Mittal (1976) and recently the regional faunal work has been done by S. K. Chatterjee and S. Biswas (1990, 1995, 2000) on the subfamily Cetoniinae, Dynastinae and Rutelinae.

Present study is based on the materials collected by the different survey parties of Z.S.I. and also the materials present in the National Zoological Collections, beside these the species added in this paper which earlier recorded from Manipur but not avilable for study to make a comprehensive work on the group from the state of Manipur.

In the present paper altogether 49 species under 22 genera belonging to 4 subfamilies have been delt with, of these 11 species are new record from the State of Manipur and 4 species are added to Indian Fauna. Moreover, Key to the subfamily, genera, species and necessary synonymies of the species have also been provided.

Distributional data of the species has been listed from published records and also from actual study of the specimens. In the list of taxa species recorded for the first time from Manipur marked with single asterisks and from India with double asterisks.

LIST OF TAXA

Family SCARABAEIDAE

Subfamily I. CETONIINAE

Genus 1. ***Macronota*** Hoffmansegg

1. *M. indica* (Janson)
2. *M. quadrilineata* Hope
3. *M. virgata* (Janson)

Genus 2. ***Jumnos*** Saunders

4. *J. ruckeri* Saunders

Genus 3. ***Rhomborrhina*** Hope

5. *R. mellyi* (Gory & Percheron)
6. *R. subopaca* (Arrow)

Genus 4. ***Heterorrhina*** Westwood

7. *H. punctatissima* Westwood

Genus 5. ***Trigonophorus*** Hope

8. *T. nepalensis* Hope
9. *T. gracilipes* Westwood

Genus 6. ***Glycyphana*** Burmeister

10. *G. horsfieldi* (Hope)
11. *G. nepalensis* Kraatz

Genus 7. ***Cetonia*** Fabricius

12. *C. laeviventris* Arrow

Genus 8. ***Oxycetonia*** Arrow

13. *O. jucunda* (Faldermann)

Genus 9. ***Callinomes*** Westwood

14. *C. bicolor* (Nonfried)

Genus 10. ***Macroma*** Gory &Percheron

15. *M. melanopus* Schaum
16. *M. xanthorrhina* (Hope)

Genus 11. ***Trichus*** Fabricius

17. *T. costipennis* (Janson)
18. *T. dombrowskii* Nonfried

Subfamily II. DYNASTINAE

Genus 12. ***Xylotrupes*** Hope

*19. *X. gideon* (Linnaeus)

Genus 13. ***Eupatorus*** Burmeister

*20. *E. hardwickei* (Hope)

Genus 14. ***Trichogomphus*** Burmeister

**21. *T. martabani* (Guerine)

Genus 15. ***Eophileurus*** Arrow

22. *E. planatus* (Wiedemann)

Subfamily III. RUTELINAE

Genus 16. ***Adoretus*** Castelnau

**23. *A. tener* Arrow
**24. *A. pallens* Blanchard
**25. *A. plebejus* Arrow

Genus 17. ***Peltonotus*** Burmeister

26. *P. morio* Burmeister

Genus 18. ***Parastasia*** Westwood

27. *P. rufopicta* Westwood

Genus 19. ***Popillia*** Serville

28. *P. nitida* Hope
29. *P. amabilis* Arrow

Genus 20. ***Mimela*** Kirby

30. *M. schneideri* Ohaus
31. *M. soror* Arrow
*32. *M. heterochropus* Blanchard

Genus 21. ***Anomala*** Samouelle

*33. *A. dorsalis* (Fabricius)
34. *A. bilunata* Fairmaire
*35. *A. clerica* Arrow
*36. *A. varicolor* Gyllenthal
37. *A. variivestis* Arrow
*38. *A. siliguria* Arrow
39. *A. signaticollis* Nonfried
*40. *A. bella* Arrow
*41. *A. lineatopennis* Blanchard
42. *A. dimidiata* (Hope)
*43. *A. grandis* (Hope)
44. *A. rufiventris* Redtenbacher
45. *A. auronitens* (Hope)
*46. *A. erythoptera* (Kraatz)
47. *A. pusilla* Arrow
48. *A. dohertyi* Arrow

Subfamily IV. EUCHIRINAE

Genus 22. ***Propomacrus*** Newmann

49. *P. henrici* (Pouill.)

Key to the Subfamilies of SCARABAEIDAE

1. Labrum membranous, not visible externally 2
– Labrum well-developed 3
2(1). Mandibles not visible externally, front coxae vertical ..... CETONIINAE
– Mandibles visible externally, front coxae transverse ..... DYNASTINAE
3(1). Claws unequal, separately movable, the shorter one always undivided ..... RUTELINAE
– Claws equal and not separately movable. ..... EUCHIRINAE

Subfamily I. CETONIINAE

Key to the genera of Cetoniinae

1. Mesosternal epimera dialted above and usually reaching the dorsal surface, base of the pronotum not meeting ridges upon scutellum and elytra 2
– Mesosternal epimera neither dilated nor reaching the dorsal surface, base of the pronotum meeting ridges upon scutellum and elytra 11
2. Mandibles thin and not sharp-pointed nor adapted for biting, furnished with a free membranous inner lobe 3
– Mandibles strong and sharp, without a free membranous inner lobe 10
3. Base of the pronotum lobed in the middle ..... ***Macronota*** Haffmansegg
– Base of the pronotum not lobed in the middle 4
4. Base of the pronotum transverse 5
– Base of the pronotum not transverse 8
5. Front margin of the clypeus simple 6
– Front margin of the clypeus not simple .. 7
6. Hind angles of the prothorax sharply rectangular, front tibia of the male toothed ..... ***Jumnos*** Saunders
– Hind angles of the prothorax rounded, front tibia of the male unarmed .... ***Rhomborrhina*** Hope
7. Front margin of the clypeus notched ..... ***Heterorrhina*** Westwood
– Front margin of the clypeus bearing a horn dilated at the end ..... ***Trigonophorus*** Hope
8. Pronotum not abruptly emarginate behind ..... ***Glycyphana*** Burmeister
– Pronotum abruptly emarginate behind 9
9. Sternal process laterally compressed ..... ***Cetonia*** Fabricius
– Sternal process broad and flat or absent ..... ***Oxycetonia*** Arrow
10. Body not very compact, prothorax not very broad at base ..... ***Callinomes*** Westwood
– Body very compact, prothorax very broad at base ..... ***Macroma*** Gory & Percheron
11. Body less compact, softer integuments, legs generally long and slender .... ***Trichus*** Fabricius

Genus 1. ***Macronota*** Hoffmansegg 1817

1817. *Macronota* Hoffmansegg, *Zool. Mag.* I, **1** : 15.

1910. *Macronota* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 41-42.

Key to the species of the Genus *Macronota*

1. Pronotum sharply angulated at the sides, clypeus bilobed .....*indica* (Janson)
– Pronotum not sharply angulated at the side, clypeus feebly notched 2
2. Elytra feebly serrated at the apex, antennal club of the ♂ long ..... *quadrilineata* Hope
– Elytra strongly serrated at the apex, antennal club of the ♂ short ..... *virgata* (Janson)

1. ***Macronota indica*** (Janson)

1909. *Taeniodera indica* Janson, *The Entomologist* **42** : 226.

1910. *Macronota indica*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 59-60.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya.

2. ***Macronota quadrilineata*** Hope

1831. *Macronota quadrilineata* Hope, *Gray's Zool. Miscellany*, p. 24.

1910. *Macronota quadrilineata*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 61.

1995. *Macronota quadrilineata*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland, West Bengal.

Elsewhere : Nepal.

3. *Macronota virgata* (Janson)

1892. *Taeniodera virgata* Janson, Notes *Leyd. Mus.* **14** : 59.

1910. *Macronota virgata,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 62.

1995. *Macronota virgata,* Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, West Bengal.

Elsewhere : Bangladesh and Mayanmar.

Genus 2. *Jumnos* Saunders 1839

1839. *Jumnos* Saunders, *Trans. Ent. Soc. London,* **2** : 176, Pl. xvi, fig. 1.

4. *Jumnos ruckeri* Saunders

1839. *Jumnos ruckeri* Saunders, *Trans. Ent. Soc. London,* **2** : 176, Pl. xvi, fig. 1.

1910. *Jumnos ruckeri,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 79.

1995. *Jumnos ruckeri,* Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, West Bengal and Sikkim.

Elsewhere : Mayanmar.

Genus 3. *Rhomborrhina* Hope 1837

1837. *Rhomborrhina* Hope, *Coleop, Man.,* **1** : 120

1910. *Rhomborrhina,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 84.

Key to the species of the Genus *Rhomborrhina*

1. Mesosternal process broad, curved but not tapering ..... *mellyi* (Gory & Percheron)

– Mesosternal process narrow and tapering ..... *subopaca* Arrow

5. *Rhomborrhina mellyi* (Gory & Percheron)

1833. *Goliathus mellyi* Gory & Percheron, *Monogr. Cet.,* P. 156, Pl. 26, fig. 4.

1910. *Rhomborrhina mellyi,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 86.

1995. *Rhomborrhina mellyi,* Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Assam, Meghalaya and West Bengal.

Elsewhere : Mayanmar.

6. *Rhomborrhina subopaca* Arrow

1907. *Anomalocera subopaca* Arrow, *Ann. Mag. Nat. Hist.* **19** (7) : 348.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Genus 4. *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.

7. *Heterorrhina punctatissima* Westwood

1842. *Heterorrhina punctatissima* Westwood, *Arcana Ent.,* **1** : 135, pl. 34, fig. 5.

1910. *Heterorrhina punctatissima,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 99.

Material examined : Material is not available for study.

Distribution : India ; Manipur, Assam, West Bengal, Meghalaya and Sikkim.

Elsewhere : Bangladesh.

Genus 5. *Trigonophorus* Hope 1831

1831. *Trigonophorus* Hope, *Gray's Zool. Miscell.,* p. 24.

1910. *Trigonophorus,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 102.

Key to the species of the Genus *Trigonophorus*

1. Femora not green, tibiae bright orange .... *nepalensis* Hope

– Femora green, tibiae reddish .... *gracilipes* Westwood

8. *Trigonophorus nepalensis* Hope

1831. *Trigonophorus nepalensis* Hope, *Gray's Zool. Mis. Cell.*, p. 24.

1910. *Trigonophorus nepalensis*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 103.

1995. *Trigonophorus nepalensis*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland, West Bengal, Meghalaya and Assam.

Elsewhere : Bangladesh, Bhutan.

9. *Trigonophorus gracilipes* Westwood

1845. *Trigonophorus gracilipes* Westwood, *Trans. Ent. Soc. London.*, **4** : 88, Pl. 4, fig. 5.

1995. *Trigonophorus gracilipes*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, West Bengal and Sikkim.

Elsewhere : Bhutan.

Genus 6. *Glycyphana* Burmeister 1842

1842. *Glycyphana* Burmeister, *Handb. Ent.*, **3** : 345.

1856. *Euryomia* Lacordaire, *Gen. Col.*, **3** : 525.

1910. *Glycyphana*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 120.

Key to the species of the Genus *Glycyphana*

1. Black species, usually with red, orange or golden sports on each elytron .... *horsfieldi* (Hope)

– Olive green species with pale yellow spots on each elytron ..... *nepalensis* Kraatz

10. *Glycyphana horsfieldi* (Hope)

1831. *Centonia horsfieldi* Hope, *Gray's Zool. MisCell.*, p. 25.

1910. *Glycyphana horsfieldi*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 121.

1995. *Glycyphana horsfieldi*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser., 3* (6A) : 363-447.

Material examined : 1 ex. Manipur, Lahrio, Churachandpur, 18.v.1993. S. K. Chakreborty Coll.

Distribution : India : Manipur, Assam, Bihar, West Bengal and Sikkim.

Elsewhere : Nepal, Bhutan, Sri Lanka, Bangladesh and Mayanmar.

11. *Glycyphana nepalensis* Kraatz

1894. *Glycyphana nepalensis* Kraatz, *Deutsche Ent. Zeitschr.*, P. 294.

1891. *Glycyphana aspera* Gestro, *Ann. Mus. Genova*, (2) **10** : 847.

1910. *Glycyphana nepalensis*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 125-126.

Material examined : Material is not available for study.

Distribution : India : Manipur, West Bengal.

Elsewhere : Bhutan, Mayanmar.

Genus 7. *Cetonia* Fabricius 1775

1775. *Cetonia* Fabricius, *Syst. Ent.*, **1** : 52.

1910. *Cetonia*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 132.

12. *Cetonia laeviventris* Arrow

1910. *Cetonia laeviventris*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 134.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland.

Genus 8. *Oxycetonia* Arrow, 1910

1842. *Gametis* Burmeister, *Handb. Ent.*, **3** : 163-164.

1910. *Oxycetonia,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 163-164.

13. *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 : Material is not available for study.

Distribution : India : Manipur, Meghalaya and West Bengal.

Elsewhere : China, Japan, Nepal and Siberia.

Genus 9. *Callinomes* Westwood 1874

1874. *Callinomes* Westwood, *Thes. Ent. Oxon.*, P. 26.

1910. *Callinomes,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 215.

14. *Callinomes bicolor* Nonfried

1893. *Callinomes bicolor,* Nonfried, *Berlin. Ent. Zeitschr.* **68** : 336.

1910. *Callinomes bicolor,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 215-216.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Genus 10. *Macroma* Gory & Percheron 1833

1833. *Macroma* Gory & Percheron, *Manogr. Cat.*, P. 35.

1910. *Macroma,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 217.

Key to the species of the Genus *Macroma*

1. Elytra black, pronotum sparingly and finely punctured ..... *melanopus* Schaum

– Elytra yellow or blackish, pronotum irregularly punctured .... *xanthorrhina* (Hope)

15. *Macroma melanopus* Schaum

1848. *Macroma melanopus* Schaum, *Verz. Lamell. Melit.*, P. 60.

1910. *Macroma melanopus,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 219.

Material examined : Material is not available for study.

Distribution : India : Manipur and Meghalaya.

Elsewhere : Mayanmar and Thailand.

16. *Macroma xanthorrhina* (Hope)

1831. *Campsiura xanthorrhina* Hope, *Gray's Zool. Misc.* P. 25.

1910. *Macroma xanthorrhina,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 219-220.

Material examined : Material is not available for study.

Distribution : India : Manipur and West Bengal.

Elsewhere : Mayanmar, Nepal.

Genus 11. *Trichius* Fabricius 1792

1792. *Trichius* Fabricius, *Ent. Syst.*, **1** (2) : 118.

1910. *Trichius,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 249.

Key to the species of the Genus *Trichius*

1. Elytra deep metallic green, deeply sulcate and sulci being rugose .... *costipennis* Janson

– Elytra dully green, with white spot, slight curved punctures .... *dombrowskii* Nonfried

17. *Trichius costipennis* Janson

1890. *Gnorimus costipennis* Janson, *Notes Leyden Mus.*, **12** : 128.

1894. *Gnorimus viridis* Jordan, *Novit. Zoology.* P. 486, 692, Pl. 13, fig. 3.

1910. *Trichius costipennis,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 254.

Material examined : Material is not available for study.

Distribution : India : Manipur.

18. ***Trichius dombrowskii*** Nonfried

1906. *Trichius dombrowskii* Nonfried, *Stettin Ent. Zeit.*, **67** : 224.

1910. *Trichius dombrowskii*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 254-255.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Subfamily II. DYNASTINAE

Key to the genera of Dynastinae

1. Basal joint of hind tarsus not tringular, similar to those succeeding 2
– Basal joint of hind tarsus more or less triangular 3

2(1). Elytra coriaceous in both sexes, male bearing a single horn ..... ***Xylotrupes*** Hope
– Elytra of male very shining, of female rugose, male bearing paired thoracic horns ..... ***Eupatorus*** Burmeister

3(1). Clypeus truncate or bi-angulate, tarsi rather short ..... ***Trichogomphus*** Burmeister
– Clypeus acuminate, tarsi slender..... ..... ***Eophileurus*** Arrow

Genus 12. ***Xylotrupes*** Hope 1837

1837. *Xylotrupes* Hope, *Coleopterist's Manual* **1** : 19.

19. ***Xylotrupes gideon*** (Linnaeus)

1767. *Scarabaeus gideon* Linnaeus, *Syst. Nat.* 12th ed., **1** (2) : 541.

1910. *Xylotrupes gideon*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 262-265.

1995. *Xylotrupes gideon*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-347.

Material examined : 2 exs., 1 ex. Manipur, Bungmual, 19.ix.1975, 1 ex. Moreh, near Burma border, 24.ix.1975, M. S. Shishodia coll. (both).

Distribution : India : Manipur, Assam, Meghalaya, West Bengal, Kerala and Maharashtra.

Elsewhere : Sri Lanka.

Remarks : The species is recorded for the first time from Manipur.

Genus 13. ***Eupatorus*** Burmeister 1847

1847. *Eupatorus* Burmeister, *Handb. Ent.*, *5* : 268.

20. ***Eupatorus hardwickei*** (Hope)

1831. Dynastes hardwickei Hope, *Gray's Zool. Misc.*, P. 22.

1910. *Eupatorus* hardwickei, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 268-269.

Material examined : 1 ex. Manipur, Mao, Songsony area, 13.ix.1975, M. S. Shishodia coll.

Distribution : India : Manipur, West Bengal.

Remarks : The species is recorded for the first time from Manipur.

Genus 14. ***Trichogomphus*** Burmeister 1847

1847. *Trichogomphus* Burmeister, *Handb. Ent.*, **5** : 219.

1856. *Trichogomphus* Lacord, Gen. Coleopt., **3** : 432.

1910. *Trichogomphus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 281.

21. ***Trichogomphus martabani*** Guerin

1834. *Scarabaeus martabani* Guerin, *Voy. Belang. Ind.*, P. 484, Pl. 1, fig 3.

1908. *Scarabaeus martabani* Arrow, *Trans. ent. Soc.* London, P. 347.

Material examined : 1 ex. Manipur, Churachandpur, Suelmat Reserve forest, 17.vi.1993, B. Mitra coll.

Distribution : India : Manipur.

Elsewhere : Bangladesh, Mayanmar.

Remarks : The species is recorded for the first time from India.

Genus 15. ***Eophileurus*** Arrow 1908

1908. *Eophileurus* Arrow, *Trans. ent. Soc.* London, P. 332.

22. ***Eophileurus planatus*** (Wiedemann)

1823. *Geotrupes planatus* Weidemann, *Zool. Mag.* **2** (1) : 5.

1910. *Eophileurus planatus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **1** : 288-289.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland, Uttaranchal, Sikkim and Andaman

Elsewhere : Bangladesh, Mayanmar.

Subfamily III. RUTELINAE

Key to the genera of Rutelinae

1. Labrum horizontal, not produced downwards, without median process 2
– Labrum produced downwards and with a median process ..... ***Adoretus*** Castelnau
2(1) Labrum visible from above .... ***Peltonotus*** Burmeister
– Labrum not visible from above 3
3(2) Mandibles produced beyond the clypeus, antennae 10-jointed .... ***Parastasia*** Westwood
– Mandibles entirely covered by the clypeus, antennae 9-jointed 4
4(3). Pronotum excised before the scutellum .... ***Popillia*** Serville
– Pronotum not excised before the scutellum 5
5(4). Prosternum strongly elevated and bent abruptly forward ..... ***Mimela*** Kirby
– Prosternum rarely elevated and never bent abruptly forward ..... ***Anomala*** Samouelle

Genus 16. *Adoretus* Castelnau 1840

1840. *Adoretus* Castelnau, *Hist. Nat. Ins.*, **2** : 142.

1917. *Adoretus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 295.

1995. *Adoretus*, Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.*, **3** (6A) : 427.

Key to the species of the Genus *Adoretus*

1. Longer claw of the front feet thin and equally divided 2
– Longer claw of the front feet stout and not equally divided 3
2. Ventral segments not tuberculate, setae of pronotum longer ..... *tener* Arrow
3. Species large and narrow, upper surface shining, thinly clothed with minute setae, pronotum coarsely punctured .... *pallens* Blanchard
– Species rather short and stout, upper surface closely clothed with setae, pronotum densely punctured ..... *plebejus* Arrow

23. *Adoretus tener* Arrow

1914. *Adoretus tener*, Arrow, *Ann. Mag. Nat. Hist.* (8) **13** : 600.

Material examined : 1 ex., Manipur, Chandel, 1.vi.1992, P. Mathew coll.

Distribution : India : Manipur.

Elsewhere : Mayanmar.

Remarks : First time recorded from India.

24. *Adoretus pallens* Blanchard

1851. *Adoretus pallens* Blanchard, *Cat. Coll. Ent. Mus. Paris*, P. 233.

1878. *Adoretus nudiusculus* sharp, *Journ. Roy. Asiat. Soc. Bengal*, **47** (2) : 173.

1917. *Adoretus pallens*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 334.

Material examined : 2 exs., 1 ex. Manipur, Churachandpur, 03.vi.1992, 1 ex., Chandal, 10.vi.1992, both collections made by R. Mathew.

Distribution : India : Manipur.

Elsewhere : Mayanmar.

Remarks : The species is recorded for the first time from India.

25. *Adoretus plebejus* Arrow

1917. *Adoretus plebejus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 342-343.

Material examined : 1 ex., Manipur, Nongthoupong, 16.III.1976, Dr. A. K. Ghosh coll.

Distribution : India : Manipur.

Elsewhere : Mayanmar.

Remarks : The species is recorded for the first time from India.

Genus 17. ***Peltonotus*** Burmeister 1847

1847. *Peltonotus* Burmeister, *Handb. Ent.*, **5** : 75.

1917. *Peltonotus,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 27.

26. ***Pletonotus morio*** Burmeister

1847. *Peltonotus morio* Burmeister, *Handb. Ent., 5* : 75.

1917. *Peltonotus morio,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), *2* : 28.

Material examined : Material is not available for study.

Distribution : India : Manipur, Sikkim

Elsewhere : Nepal, Bhutan and Mayanmar.

Genus 18. ***Parastasia*** Westwood, 1841

1841. *Parastasia* Westwood, *Ann. Mag. Nat. Hist.*, P. 204.

1874. *Rutelarcha* Waterhouse, *Ent. Mon. Mag.*, P. 52.

1875. *Lutera* Westwood, *Trans. Ent. Soc.* London, P. 236.

1875. *Cyphelytra* Waterhouse, *Cist. Ent.*, **1** : 367.

1917. *Parastasia,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 35-36.

27. ***Parastasia rufopicta*** Westwood

1841. *Parastasia rufopicta* Westwood, *Proc. Ent. Soc.* London,

1917. *Parastasia rufopicta,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 37-38

1995. *Parastasia rufopicta,* Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland, West Bengal.

Elsewhere : Bangladesh.

Genus 19. ***Popillia*** Serville 1825

1825. *Popillia* Serville, *Eneyel. Meth.*, **10** : 367.

1917. *Popillia,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 58-59.

Key to the species of the Genus *Popillia*

1. Elytra without abrupt lateral flange, sternal process broad, 5th elytral interval not broad ..... *nitida* Hope

– Elytra with abrupt lateral flange, sternal process narrow, 5th elytral interval broad... ..... *amabilis* Arrow

28. ***Popillia nitida*** Hope

1831. *Popillia nitida* Hope, *Gray's Zool. Miscell.*, P. 23.

1917. *Popillia nitida,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 70.

1995. *Popillia nitida,* Chatterjee & Biswas, *Fauna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Assam and West Bengal.

Elsewhere : Nepal.

29. ***Popillia amabilis*** Arrow

1913. *Popillia amabilis* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 77-78.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland and Meghalaya.

Elsewhere : Mayanmar.

Genus 20. ***Mimela*** Kirby 1825

1825. *Mimela* Kirby, *Trans. Linn. Soc.*, **14** : 101.

1839. *Paracrusis,* Newman, *Mag. Nat. Hist.*, **3** : 366.

1917. *Mimela,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 102-103.

Key to the species of the Genus *Mimela*

1. Body not very convex, elytra broad with minute sculpture ..... *schneideri* Ohaus

– Body very convex, elytra not decorated with minute sculpture 2

2. Upper surface strongly punctured, legs dark metallic green ..... *soror* Arrow

– Upper surface strongly punctured, legs non metallic, femora and tibae reddish .... *heterochropus* Blanchard

30. *Mimela schneideri* Ohaus

1905 *Mimela schneideri* Ohaus, *Deutsche Ent. Zeits.*, P. 89.

1917. *Mimela schneideri*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 108-109.

Material examined : Material is not available for study.

Distribution : India : Manipur, Nagaland.

Elsewhere : Mayanmar.

31. *Mimela soror* Arrow

1908. *Mimela soror* Arrow, *Ann. Mag. Nat. Hist.*, (8) : **1** : 245.

Material examined : Material is not available for study.

Distribution : India : Manipur.

32. *Mimela heterochropus* Blanchard

1851. *Mimela heterochropus* Blanchard, *Cat. Coll. Ent. Mus. Paris*, P. 196.

1855. *Mimela hopei* Burmeister, *Handb. Ent.*, **4** (2) : 507.

1917. *Mimela heterochropus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 117-118.

Material examined : 1 ex., Manipur, Chandel, 9.vi.1992, R. Mathew coll.

Distribution : India : Manipur, Nagaland, Sikkim, West Bengal.

Elsewhere : Bhutan, Mayanmar.

Remarks : The species is recorded for the first time from Manipur.

Genus 21. *Anomala* Samouelle, 1819

1819. *Anomala* Samouelle, The *Entomologist's* useful *Companion*, P. 191.

1863. *Phylloperthina* Motschulsky, *Bull. Soc. Ent. Mosc.*, **2** : 468.

1917. *Anomala*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 126-127.

Key to the species of the Genus *Anomala*

1. Mesosternum without an intercoxal process 2

– Mesosternum produced between the middle coxae 13

2. Clypeus of the male with sharp front angles, elytra of the female angularly dilated .... *dorsalis* (Fabricius)

– Clypeus of the male with rounded or obtuse front angles; elytra of the female not angularly dilated 3

3. Base of the pronotum completely margined 4

– Base of the pronotum not completely margined 9

4. Longer claw cleft on the middle feet 5

– Longer claw of the front feet only cleft .. 8

5. Species smaller, narrow and elongate 6

– species shorter and compact 7

6. Front tibia tridentate, elytra with opaque lateral areas ..... *bilunata* Fairmaire

– Front tibia bidentate, elytra without opaque lateral areas ..... *clerica* Arrow

7. Larger dark patches upon the pronotum coalescing, front tibia tridentate .... *varicolor* Gyllenthal

– Dark patches upon the pronotum not coalescing, front tibia bidentate .... *variivestis* Arrow

8. Hind tibia stout, not long .... *siliguria* Arrow

– Hind tibia thin and long..... ..... *signaticollis* Nonfried

9. Elytra showing strongly-marked striae or lines of punctures 10

– Elytra without strongly-marked striae, grooves or lines of punctures 11

10. Upper surface not so shining, very finely and closely punctured and lower surface pale .... *bella* Arrow

– Upper surface shining not very finely and closely punctured and lower surface not pale ..... *lineatopennis* Blanchard

11. Pygidium less finely rugulose .... *dimidiata* (Hope)

– Pygidium very finely rugulose 12

12. Bright green above and legs golden .... *grandis* (Hope)

– Deep rosy green above and legs blue .... *rufiventris* Redtenbacher

13. Mesosternal process elongate and pointed .... *auronitens* (Hope)

– Mesosternal process very short, blunt and rounded 14

14. Pronotum and elytra dissimilarly coloured, pronotum scarcely punctured .... *erythroptera* (Kraatz)

– Pronotum strongly punctured at the sides 15

15. Lower surface pale, pygidium shining .... *pusilla* Arrow

– Lower surface dark, pygidium dull .... *dohertyi* Arrow

33. ***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 : 1 ex., Manipur, Churachandpur, 13.v.1993, S. K.Chakraborty coll.

Distribution : India : Manipur, Sikkim, Assam, West Bengal, Bihar, Uttaranchal, Punjab, Maharashtra, Karnataka, Kerala and Andaman.

Remarks : Frist time recorded from Manipur.

34. ***Anomala bilunata*** Fairmaire

1888. *Anomala bilunata* Fairmaire, *Ann. Soc. ent. France,* **8** (6) : 341.

1917. *Anomala bilunata,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 147-148.

Material examined : Material is not available for study.

Distribution : India : Manipur, West Bengal.

Elsewhere : Bhutan, Mayanmar, South China.

35. ***Anomala clerica*** Arrow

1917. *Anomala clerica,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 2 : 150.

Material examined : 1 ex., Manipur, Ukhrul, 21.ix.1998, P. H. Roy & Party coll.

Distribution : India : Manipur, Sikkim, West Bengal.

Remarks : Frist time recorded from Manipur.

36. ***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 : 2 exs., Manipur, Ukhrul, 21.ix.1998, P. H. Roy & Party coll.

Distribution : India : Manipur, Sikkim, Uttar Pradesh, Karnataka, Mysore, Bihar.

Elsewhere : Sri Lanka, South China.

Remarks : Frist time recorded from Manipur.

37. ***Anomala variivestis*** Arrow

1917. *Anomala variivestis,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 156.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Elsewhere : Mayanmar.

38. ***Anomala siliguria*** Arrow

1917. *Anomala siliguria* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 188-189.

Material examined : 1 ex., Manipur, Chandel, 11.vi.1992, R. Mathew coll.

Distribution : India : Manipur, West Bengal and Uttaranchal.

Remarks : Frist time recorded from Manipur.

39. ***Anomala signaticollis*** Nonfried

1893. Anomala signaticollis Nonfried. *Berl. Ent. Zeitschr.*, P. 334.

1995. *Anomala signaticollis*, Chatterjee & Biswas, *Faunna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya & West Bengal.

40. ***Anomala bella*** Arrow

1917. *Anomala bella* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 208-209.

Material examined : 1 ex., Manipur, Bishenpur, 29.x.1992, R. Mathew coll.

Distribution : India : Manipur, Meghalaya, West Bengal.

Elsewhere : Bangladesh and Mayanmar.

Remarks : Frist time recorded from Manipur.

41. ***Anomala lineatopennis*** Blanchard

1951. *Anomala lineatopennis* Blanchard, *Cat. Coll. Ent. Mus. Paris.* P. 191.

1917. *Anomala lineatopennis*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 212-213.

Material examined : 1 ex., Manipur, Ukhrul, 21.ix.1998, P. H. Roy & Party coll.

Distribution : India : Manipur, Uttarnchal, Himachal Pradesh, West Bengal.

Elsewhere : Nepal and Bhutan.

Remarks : Frist time recorded from Manipur.

42. ***Anomala dimidiata*** (Hope)

1831. *Euchlora dimidiata* Hope, *Gry's zool. Misc.* P. 23.

1840. *Euchlora sulcatta* Hope, *Mag. Nat. Hist.* (2) **4** : 349.

1917. *Anomala dimidiata*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 232-233.

1995. *Anomala dimidiata*, Chatterjee & Biswas, *Faunna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya, West Bengal, Uttaranchal, Himachal Pradesh and Kashmir.

Elsewhere : Nepal.

43. ***Anomala grandis*** (Hope)

1840. *Euchlora grandis* Hope, *Mag. Nat. Hist.* **4** (2) : 284.

1917. *Anomala grandis*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 234-235.

Material examined : 1 ex., Manipur, Churachandpur, 02.vi.1992, R. Mathew coll.

Distribution : India : Manipur, Assam, Bihar.

Elsewhere : Bangladesh, Mayanmar.

Remarks : Frist time recorded from Manipur.

44. ***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.

1995. *Anomala rufiventris*, Chatterjee & Biswas, *Faunna of West Bengal, State Fauna Ser.*, **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya, Sikkim, West Bengal and Uttaranchal.

Elsewhere : Bhutan.

45. ***Anomala auronitens*** (Hope)

1835. *Mimela auronitens* Hope, *Trans. Ent. Soc. Lond.*, **1** : 114.

1855. *Anomala (Spilota) auronitens* Burmeister, *Handb. Ent.*, **4**(2) : 504.

1917. *Anomala auronitens*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 242-243.

1995. *Anomala auronitens,* Chatterjee & Biswas, *Faunna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya, West Bengal.

Elsewhere : Mayanmar.

46. ***Anomala erythroptera*** (Kraatz)

1892. *Ischnopopillia erythroptera* Kraatz, *Deutsche Ent. Zeits.,* P. 295.

1917. *Anomala erythroptera,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 262-263.

Material examined : 1 ex., Manipur, Sherni, 12.vi.1992, R. S. Burman coll.

Distribution : India : Manipur, Meghalaya and West Bengal.

Remarks : Frist time recorded from Manipur.

47. ***Anomala pusilla*** Arrow

1912. *Anomala pusilla* Arrow, *Ann. Mag. Nat. Hist.* **9** (8) : 82.

1995. *Anomala pusilla,* Chatterjee & Biswas, *Faunna of West Bengal, State Fauna Ser.,* **3** (6A) : 363-447.

Material examined : Material is not available for study.

Distribution : India : Manipur, Meghalaya and West Bengal.

Elsewhere : Nepal.

48. ***Anomala dohertyi*** Arrow

1917. *Anomala dohertyi,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 264-265.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Subfamily IV. EUCHIRINAE

Genus 22. ***Propomacrus*** Newman 1837

1837. *Propomacrus* Newman, *Entom. Mag.,* **4** : 255.

1917. *Propomacrus,* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), **2** : 367-368

49. ***Propomacrus henrici*** Pouill

1913. *Propomacrus henrici* Pouill, *Insecta,* P. 472, figs. 5c, 6c.

Material examined : Material is not available for study.

Distribution : India : Manipur.

Elsewhere : Mayanmar, Tibet.

SUMMARY

The present paper deals with 49 species under 22 genera belonging to 4 subfamilies namely Cetoniinae, Dynastinae, Rutelinae and Euchirinae of Lamellicorn beetles from Manipur.

Out of 49 species, 11 species have been recorded for the first time from Manipur and 4 species have been added to Indian fauna. The systematic account, keys to the subfamilies, genera and species have also been provided.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 385-399, 2004

INSECTA : COLEOPTERA : STAPHYLINIDAE

D. N. BISWAS and P. MUKHOPADHYAY
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Staphylinidae is one of the largest family of the superfamily Staphylinoidea, distributed throughout the World. About 30,000 species are known from the world and more than 2,000 species have been recorded so far from India. Motschulsky (1858), Kraatz (1859), Fauvel (1895) and Bernhauer (1915) are the pioneer workers of the family Staphylinidae. Prior to Cameron's work on fauna of British India series (1930, 1931, 1932, 1939) major works have been done by authors mentioned above. Since the work of Cameron (1930, 1931, 1932, 1939) no comprehensive work on Indian fauna of Staphylinidae have been done by any authors.

Cameron in his fauna of British India series recorded 24 species from Manipur. In this present work 37 species are newly recorded from Manipur, of which 2 species are first time recorded from India. Thus the total number of species known from Manipur comes to 61.

The present work on the family Staphylinidae is based on the collection brought from different districts of Manipur by various survey parties from Zoological Survey of India and other old collections present in the National Zoological Collections. Materials of some species recorded from Manipur were not available for study, however for the sake of completeness these species are also included in this work. This study based on 153 examples comprising 61 species under 36 genera and 6 subfamilies. Key to the subfamilies, tribes and genera are dealt with in State Fauna Series 3 : Fauna of West Bengal, part 6 (A) : 201-361, 1995. Key to species and distributional data of each species of the family Staphylinidae from Manipur have been provided. Under systematic account arrangement of the taxa has been done after Cameron.

The specimens dealt with in this paper are deposited in the collection of Zoological Survey of India, Kolkata.

SYSTEMATIC LIST

(* denotes new records from Manipur and ** new records from India).

Subfamily (I) OXYTELINAE

Tribe I. **Piestini**

Genus 1. *Apatetica* Westwood

1. *javanica* (Sharp)
2. *lebioides* Fauvel
3. *viridipennis* Fauvel
4. *caeruleipennis* Cameron

Tribe II. **Eleusiini**

Genus 2. *Eleusis* Castelnau

5. **humilis* Erichson

Tribe III. **Omaliini**

Genus 3. *Phloeonomus* Heer

6. *(Phloeostiba) temporalis* Cameron

Tribe IV. **Oxytelini**

Genus 4. *Oxytelopsis* Fauvel

7. **pseudopsina* Fauvel

* 30, Ramkrishna Samadhi Road, F.B. 18, Kolkata-700 054.

Genus 5. *Oxytelus* Gravenhorst

8. *(Tanycraerus) dohertyi* Cameron

Genus 6. *Anotylus* Thomson

9. **micans* (Kraatz)
10. *birmanus* Cameron

Subfamily (II) STENINAE

Genus 7. *Stenus* Latreille

11. *(Hypostenus) nitidulus* Cameron
12. ***(H.) birmanus* Fauvel
13. **(H.) pictus* Motschulsky
14. **(Mesostenus) stigmaticus* Fauvel
15. *(S. Str.) *diffidens* Cameron

Genus 8. *Dianous* Samouelle

16. *cameroni* Champion
17. *subvorticosus* Champion
18. *punctiventris* Champion

Subfamily (III) PAEDERINAE

Tribe V. **Pinophilini**

Genus 9. *Pinophilus* Gravenhorst

19. **bomfordi* Eppelsheim

Tribe VI. **Paederini**

10. *Paederus* Fabricius
20. *aliiceps* Cameron
21. **himalayicus* Bernhauer
22. **sondaicus* Fauvel
23. **fuscipes* Curtis

Genus 11. *Dibelonetes* Sahlberg

24. **bengalensis* Biswas & Sengupta
25. **bhaumiki* Biswas & Sengupta

Genus 12. *Cryptobium* Mannerheim

26. **bernhaueri* Cameron
27. **abdominale* var. *rufipenne* Mots.

Genus 13. *Lathrobium* Gravenhorst

28. **guttula* Fauvel
29. **semicaeruleum* Cameron
30. **unicolor* Kraatz

Genus 14. *Stiliderus* Motschulsky

31. **loebli* Rougemont

Genus 15. *Astenus* Stephens

32. **flavipennis* Cameron
33. **gracilentus* Fauvel
34. **melanurus* (Kust.)

Genus 16. *Acanthoglossa* Kraatz

35. **testaceipennis* Kraatz

Genus 17. *Stilicopsis* Sachse

36. **indica* Cameron

Genus 18. *Lobochilus* Bernhauer

37. **assamensis* Cameron

Subfamily (IV) STAPHYLININAE

Tribe VII. **Xantholinini**

Genus 19. *Leptacinus* Erichson

38. **beesoni* Cameron

Genus 20. *Xantholinus* Serv.

39. **punctulatus* Payk.

Tribe (VIII) **Staphylinini**

Genus 21. *Philonthus* Curtis

40. *assamensis* Cameron
41. **paederoides* Motschulsky
42. ***pulchellus* Kraatz
43. **aliquatenus* Schub.
44. **castaneus* Motschulsky
45. **aeger* Eppelsheim

Genus 22. *Tolmerinus* Bernhauer

46. *obscurus* Cameron

Genus 23. *Staphylinus* Linnaeus

47. (S. Str.) *maculicollis* Fauvel
48. *(Tasgius) antennalis* Cameron

Genus 24. *Pammegus* Fauvel

49. *flavipes* Fauvel

Subfamily (V). TACHYPORINAE

Tribe IX. **Tachyporini**

Genus 25. *Tachyporus* Gravenhorst

50. **himalayicus* Bernhauer

Tribe X. **Symmixini**

Genus 26. *Symmixus Bernhauer*

51. *sikkimensis* Bernhauer

Subfamily (VI) ALEOCHARINAE

Tribe XI. **Bolitocharini**

Genus 27. *Gyrophaena* Mannerheim

52. (S. Str.) *difficilis* Cameron

Genus 28. *Lampromalota* Cameron

53. *brunneicollis* Cameron

Tribe (XII) **Myrmedoniini**

Genus 29. *Cordalia* Jacobs

54. **vestita* Boh.

Genus 30. *Falagria* Mannerheim

55. **(Anaulacaspis) latesulcata* Cameron

Genus 31. *Amaurodera* Fauvel

56. **veluticollis* (Motschulsky)

Genus 32. *Mimacrotona* Cameron

57. *uniformis* Cameron

Genus 33. *Orphnebius* Motschulsky

58. *(Mesocephalobius) indicus* Cameron

Tribe XIII. **Phloeoporini**

Genus 34. *Oxypoda* Mannerheim

59. *(Podoxya) dohertyi* Cameron

Tribe XIV. **Aleocharini**

Genus 35. *Aleochara* Gravenhorst

60. *(Polychara) dohertyi* Cameron

Genus 36. *Pseudoplandria* Fenyes.

61. *dohertyi* Cameron

SYSTEMATIC ACCOUNT

Genus *Apatetica* Westwood

1848. *Apatetica* Westwood, *Cab. Or. Ent.*, : 86.

Key to the species of *Apatetica* Westwood

1. Species entirely or in greater part black; striae of the elytra finely punctured .... *javanica* Sharp

— Species in part metallic; striae of the elytra moderately, coarsely punctured 2

2(1). Thorax unicolorous black 3

— Thorax with the explanate margins distinctly rufo-testaceous; elytra metallic, coppery, blue or green. Antennae reddish-testaceous ..... *lebioides* Westwood

3(2). Thorax with irregular impunctate spaces. Tarsi reddish yellow ... *viridipennis* Fauvel

— Thorax uniformly closely and coarsely punctured (except the explanate margins). Antennae with the first 4 segments black (rest wanting). Tarsi pitchy .... *caeruleipennis* Cameron

1. *Apatetica javanica* (Sharp)

1802. *Trygaeus javanica* Sharp, *Not. Leyd. Mus.*, **14** : 61.

1930. *Apatetica javanica* : Cameron; *Fauna British India*, **1** : 29-30.

Material examined : Not studied.

Distribution : India : Manipur, West Bengal.

Elsewhere : Indonesia.

2. *Apatetica lebioides* Westwood

1818. *Apatetica lebioides* Westwood, *Cab. Oc. Ent.*, **86**, pl. 41, fig. 6.

1930. *Apatetica lebioides* : Cameron, *Fauna British India*, **1** : 31.

Material examined : Not studied.

Distribution : India : Manipur.

Other Indian State : Nil.

Elsewhere : Nil.

3. *Apatetica viridipennis* Fauvel

1895. *Apatetica Viridipennis* Fauvel, *Rev. d' Ent.*, **14** : 192.

1930. *Apatetica viridipennis* : Cameron, *Fauna British India*, **1** : 31-32.

Material examined : Not studied.

Distribution : India : Manipur, West .Bengal, Assam.

Elsewhere : Burma.

4. *Apatetica caeruleipennis* Cameron

1930. *Apatetica caeruleipennis* : Cameron, *Fauna British India*, **1** : 32.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Eleusis*** Castelnau

1835. *Eleusis* Castelnau, *Etud. Ent.*, **1** : 131.

5. ***Eleusis humilis*** Erichson

1840. *Eleusis humilis* Erichson, *Gen. Spec. staph.*,: 830.

1859. *Eleusis indica* Kraatz, *Arch. Naturgesch.*, **25** (1) : 183.

1889. *Eleusis subtilis* Sharp, *Ann. Mag. Nat. Hist.*, **3** (6) : 467.

1865. *Eleusis tennis* Fauvel, *Bull. Soc. Linn. Norm.*, **9** : 41.

1930. *Eleusis humilis* : Cameron, *Fauna British India*, **1** : 83-84.

Material examined : 9 ex., India : Manipur, Nighthoukhong, Bishnupur, 9 ex., 9.IV.1992, D. N. Biswas coll.

Distribution : India : Manipur, Andamans, Tamil Nadu, Uttarakhand.

Elsewhere : Sri Lanka, Burma, Japan and generally distributed throughout the tropics.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Phloeonomus*** Heer

1838-1842. *Phloeonomus* Heer, *Faun. Helv.*, **1** : 184.

6. ***Phloeonomus (Phloeostiba) temporalis*** Cameron

1930. *Phloeonomus (Phloeostiba) temporalis* Cameron, *Fauna British India*, **1** : 148.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Oxytelopsis*** Fauvel

1895. *Oxytelopsis* Fauvel, *Rev. d'Ent.*, **14** : 199.

7. ***Oxytelopsis pseudopsina*** Fauvel

1895. *Oxytelopsis pseudopsina* Fauvel, *Rev. d' Ent.*, **14** : 201.

1930. *Oxytelopsis pseudopsina* : Cameron, *Fauna British India*, **1** : 205-207.

1980. *Oxytelopsis pseudopsina* : Biswas & Sengupta, *Oriental Insects*, **14** (3) : 391-395.

Material examined : 2 exs., India : Manipur, Kangpokpi, Senapati dist., 2 ex., 14.IV.1992, D. N. Biswas coll.

Distribution : India : Manipur, West Bengal, Meghalaya, Uttar Pradesh.

Elsewhere : Burma, Peninsula, Sri Lanka, Indonesia, Celebes, Nepal, Thailand, Philippines and Prinsen Is.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Oxytelus*** Gravenhorst

1802. *Oxytelus* Gravenhorst, *Col. Micr. Brunsv.*, 101.

8. ***Oxytelus (Tanycraerus) dohertyi*** Cameron

1930. *Oxytelus (Tanycraerus) dohertyi* Cameron, *Fauna British India*, **1** : 223-224.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Anotylus*** Thomson

1861. *Anotylus* Thomson, *Skand. Col.*, **3** : 130.

Key to the species of *Anotylus* Thomson

1. Thorax scarcely impressed at the sides, posterior angles rounded ..... *micans* (Kraatz)

— Thorax distinctly bisinuate at the sides, posterior angles obtuse ... *birmanus* Cameron

9. ***Anotylus birmanus*** Cameron

1930. *Anotylus birmanus* Cameron, *Fauna British India*, **1** : 240.

Material examined : Not studied.

Distribution : India : Manipur.

Elsewhere : Burma.

10. ***Anotylus micans*** (Kraatz)

1859. *Oxytelus micans* Kraatz, *Arch. Naturgesch.*, **25** (1) : 175.

1930. *Oxytelus (Tanycraerus) foetidus* Cameron, *Fauna British India,* **1** : 228-230.

1973-75. *Anotylus micans* : Hammond, *Ent. Scand. Suppl.* **4** : 164.

Material examined : 6 ex., India : Manipur, Thanion, Chura chandpur dist., 1 ex., 23.v.1993, S. K. Saha & Party coll., Keibul Conja. Nat. Park, Bishnupur dist., 5 ex., 21.ii.1993, S. K. Saha & Party coll.

Distribution : India : Manipur, Uttar Pradesh, Maharashtra, Sikkim.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Manipur.

Genus ***Stenus*** Latreille

1796. *Stenus* Latreille, *Prec. Car. Gen. Ins.*, 77.

Key to the sub genera and species of *Stenus* Latreille

1. Fourth tarsal segment at most slightly emarginate ..... Stenus (S. Str.) (*diffidens* Cameron)

— Fourth tarsal segment distinctly bilobed .2

2(1). Abdomen not, or very indistinctly margined on 1st, 5th and 6th segments only ..... *Hypostenus* Rey

— Abdomen completely and distinctly margined ..... *Mesostenus* Rey *(stigmaticus* Fauvel)

3(2). Abdomen bicolorous ... *pictus* Motschulsky

— Abdomen unicolorous 4

4(3). Antennae short, the penultimate segments not or but little longer than broad ..... *birmanus* Fauvel

— Antennae long and slender, the penultimate segments much longer than broad ..... *nitidulus* Cameron

11. ***Stenus (Hypostenus) nitidulus*** Cameron

1914. *Stenus (Hypostenus) nitidulus* Cameron, *Trans. Ent. Soc. Lond.*, : 531.

1930. *Stenus (Hypostenus) nitidulus* Cameron, *Fauna British India,* **1** : 373.

Material examined : Not studied.

Distribution : India : Manipur.

12. ***Stenus (Hypostenus) birmanus*** Fauvel

1895. *Stenus birmanus* Fauvel, *Rev. d' Ent.*, **14** : 213.

1930. *Stenus (Hypostenus) birmanus* : Cameron, *Fauna British India,* **1** : 363-364.

Material examined : 2 ex., India : Manipur, Matbuk, Senapati dist., 1 ex., 16.IV.1992, D. N. Biswas Coll., Chandel, 1 ex., 9.VI.1992, R. Mathew Coll.

Distribution : India : Manipur.

Elsewhere : Burma.

Remark : In the present study this species is recorded for the first time from India (Manipur).

13. ***Stenus (Hypostenus) pictus*** Motschulsky

1857. *Stenus pictus* Motschulsky, *Bull. Mosc.*, **30** (4) : 515.

1924. *Hypostenus pictus* Champion, *Entomologist's Monthly Mag.*, **60** : 160.

1930. *Stenus (Hypostenus) pictus* : Cameron, *Fauna British India,* **1** : 351-352.

Material examined : 1 ex., India : Manipur, Matbuk, Senapati dist., 1 ex., 16.IV.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal, Tamil Nadu.

Remark : In the present study this species is recorded for the first time from Manipur.

14. ***Stenus (Mesostenus) stigmaticus*** Fauvel

1895. *Stenus stigmaticus* Fauvel, *Rev. d'Ent.*, **14** : 210.

1930. *Stenus (Mesostenus) stigmaticus* : Cameron, *Fauna British India,* **1** : 389-390.

Material examined : 1 ex., India : Manipur, Taphou, 1 ex., 1.IV.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal, Nagaland.

Elsewhere : Myanmar, Tonkin and Hong-Kong.

Remark : In the present study this species is recorded for the first time from Manipur.

15. *Stenus* (S. Str.) *diffidens* Cameron

1924. *Stenus diffidens* Cameron, *Trans. Ent. Soc. Lond.*, : 330.

1930. *Stenus* (S. Str.) *diffidens* Cameron, *Fauna British India*, **1** : 329-330.

Material examined : 3 ex., INDIA : Manipur, Tuilaphai, Churachandpur, 3 ex., 5.IV.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Assam, Nagaland.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Dianous*** Samouelle

1819. *Dianous* Samouelle, *Ent. Camp.*, : 173.

Key to the species of *Dianous* Samouelle

1. Elytra without rosette of radiating or vorticose rugae about the middle .... *punctiventris* Champion

— Elytra with a rosette of radiating or vorticose rugae 2

2(1). Fourth tarsal segment bilobed..... ..... *Cameroni* Champion

— Fourth tarsal segment at most little emarginate ..... *subvorticosus* Champion

16. *Dianous Cameroni* Champion

1919. *Dianous cameroni* Champion, *Entomologist Monthly Magazine*, **55** : 50.

1930. *Dianous cameroni* : Cameron, *Fauna British India*, **1** : 432-433.

Material examined : Not studied.

Distribution : India : Manipur, West Bengal.

17. ***Dianous subvorticosus*** Champion

1919. *Dianous subvorticosus* Champion, *Entomologist's Monthly Magazine*, **55** : 52, 54, fig. 9.

1930. *Dianous subvorticosus* : Cameron, *Fauna British India*, **1** : 440-441.

Material examined : Not studied.

Distribution : India : Manipur, Uttaranchal.

18. ***Dianous punctiventris*** Champion

1919. *Dianous punctiventris* Champion, *Entomologist's Monthly Magazine*, **55** : 48.

1930. *Dianous punctiventris* : Cameron, *Fauna British India*, **1** : 420.

Material examined : Not studied.

Distribution : India : Manipur, Uttaranchal.

Genus ***Pinophilus*** Gravenhorst

1802. *Pinophilus* Gravenhorst, *Col. Micr. Brunsv.* : 201.

19. ***Pinophilus bomfordi*** Eppelsheim

1890. *Pinophilus bomfordi* Eppelsheim, W.E.Z., **9** : 279.

1931. *Pinophilus bomfordi* : Cameron, *Fauna British India*, **2** : 17-18.

Material examined : 1 ex., India : Manipur, F.R. House Compound, Imphal, 1 ex., 2.x.1975, M.S. Shishodia Coll.

Distribution : India : Manipur, Maharashtra, Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Paederus*** Fabricius

1775. *Paederus* Fabricius, *Syst. Ent.*, : 268.

Key to the species of *Paederus* Fabricius

1. Apterous; elytra shorter than the thorax and dilated behind ..... *alliceps* Cameron

— Winged; elytra at least as long as the thorax and parallel 2

2(1). Anterior femora entirely testaceous 3

— Anterior femora dark at apex .... *himalayicus* Bernhauer

3(2). Larger (9 mm.). Last segment of antennae testaceous ..... *sondaicus* Fauvel

— Smaller (6.5 mm.). Last segment of antennae concolorous ..... *fuscipes* Curtis

20. *Paederus alliceps* Cameron

1914. *Paederus alliceps* Cameron, *Trans. Ent. Soc. Lond.*, : 538.

1931. *Paederus alliceps* Cameron, *Fauna British India*, **2** : 61.

Material examined : Not studied.

Distribution : India : Manipur.

21. *Paederus himalayicus* Bernhauer

1914. *Paederus himalayicus* Bernhauer, *W.Z.B.*, **64** : 98.

1911. *Paederus indicus* Bernhauer, *Ent. Blatt.* **7** : 61.

1931. *Paederus himalayicus* : Cameron, *Fauna British India*, **2** : 39-40.

Material examined : 21 exs., India : Manipur, Thainga, Loktak Lake, Bishnupur, 8 ex., 20.11.1993, S. K. Saha & Party Coll., Sendra Loktak Lake, 11 ex., 19.ii.1993, S. K. Saha & Party Coll., Napan, Senapati dist., 2 ex., 15.iv.1992, D. N. Biswas Coll., Chandel, 1 ex., 9.vi.1922, R. Mathew Coll.

Distribution : India : Manipur, West Bengal, Himachal Pradesh and Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

22. *Paederus sondaicus* Fauvel

1895. *Paederus sondaicus* Fauvel, *Rev. d'Ent.*, **14** : 232.

1931. *Paederus sondaicus* : Cameron, *Fauna British India*, **2** : 37-38.

Material examined : 1 ex., India : Manipur, New Churachandpur, 1 ex., 10.ix.1975, M.S. Shishodia Coll.

Distribution : India : Manipur, Tamil Nadu, Maharashtra and Meghalaya.

Elsewhere : Sri Lanka, Burma, Indonesia and Tonkin.

Remark : In the present study this species is recorded for the first time from Manipur.

23. *Paederus fuscipes* Curtis

1823-40. *Paederus fuscipes* Curtis, *Ent. Brit.*, **3** : 108.

1839-40. *Paederus aestuans* Erichson, *Gen. Spec. Staph.* : 655.

1843. *Paederus angolensis* Erichson, *Arch. Naturgesch.*, **9** (1) : 222.

1861. *Paederus corsicus* Gant., *Ann. Soc. Ent. Fr.*, **4** (1) : 393.

1867. *Paederus erichsoni* Woll., *Col. Hesperid.* : 247.

1931. *Paederus fuscipes* : Cameron, *Fauna British India*, **2** : 40-41.

Material examined : 11 exs., India : Manipur, Thainga, Loktak Lake, 3 ex., 20.ii.1993, S. K. Saha & Party Coll., Sendra, Loktak Lake, 4 ex., 19.ii.1993, S. K. Saha & Party Coll.; Keibul Lamjo National Park, Bishnupur, 1 ex., S. K. Saha & Party Coll.; Loktak Lake, 3 ex., 20.ix.1975, M.S. Shishodia Coll.

Distribution : India : Manipur, West Bengal, Bihar, Karnataka and Madhya Pradesh.

Elsewhere : Sri Lanka. Also in the rest of the world except America.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Dibelonetes* Sahlberg

1844. *Dibelonetes* Sahlberg, *Act. Soc. Fenn.*, **2** : 791.

Key to the species of *Dibelonetes* Sahlberg

1. Elytra bicolour .... *bengalensis* Biswas & Sengupta

— Elytra unicolour .... *bhaumiki* Biswas & Sengupta

24. *Dibelonetes bengalensis* Biswas & Sengupta

1980. *Dibelonetes bengalensis* Biswas & Sengupta, *Oriental Insects*, **14** (2) : 253-262.

Material examined : 4 exs., India : Manipur, Napan, Senapati dist., 4 ex., 15.iv.1992, D.N. Biswas Coll.

Distribution : India : Manipur, West Bengal, Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Cryptobium*** Mannerheim

1830. *Cryptobium* Mannerheim, *Brach.*, : 38.

Key to the species of *Cryptobium* Mannerheim

1. Elytra unicolorous .... *abdominale* var *rufipenne* Motschulsky

— Elytra bicolorous ..... *bernhaueri* Cameron

26. ***Cryptobium bernhaueri*** Cameron

1924. *Cryptobium bernhaueri* Cameron, *Trans. Ent. Soc. Lond.*, : 196.

1924. *Cryptobium bernhaueri* var. *distinctum* Cameron, *Trans. Ent. Soc. Lond.*, : 197.

1931. *Cryptobium bernhaueri* : Cameron, *Fauna British India*, **2** : 239-240.

Material examined : 2 ex., India : Manipur, Napan, Senapati dist., 2 ex., 15.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

27. ***Cryptobium abdominale*** **var. *rufipenne*** Motschulsky

1858. *Cryptobium abdominale* Motschulsky, *Bull. Mosc.*, **31** (2) : 651.

1858. *Cryptobium abdominale* var. *rufipenne* Motschulsky, *Bull. Mosc.*, **31** (2) : 651.

1931. *Cryptobium abdominale* var. *rufipenne* : Cameron, *Fauna British India*, **2** : 243-244.

Material examined : 1 ex., India : Manipur, Night-houkhong, Bishnupur, 1 ex., 9.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur.

Elsewhere : Sri Lanka.

Remark : In the fauna (1931) mentioned only India, and the Indian Archipelago. It may be first time recorded from Manipur.

Genus ***Lathrobium*** Gravenhorst

1802. *Lathrobium* Gravenhorst, *Col. Micr. Brunsv.*, : 51.

Key to the species of *Lathrobium* Gravenhorst

1. Elytra with yellow or reddish apical marking ..... *guttula* Fauvel

— Elytra uniformly coloured 2

2(1). Elytra entirely blue .... *semicaeruleum* Cameron

— Elytra reddish testaceous .. *unicolor* Kraatz

28. ***Lathrobium guttula*** Fauvel

1895. *Lathrobium guttula* Fauvel, *Rev.d'Ent.*, **14** : 234.

1931. *Lathrobium guttula* : Cameron, *Fauna British India*, **2** : 201-202.

Material examined : 3 exs., India : Manipur, Napan, Senapati dist., 1 ex., 15.iv.1992, D. N. Biswas Coll. Nighthhoukhong, Bishnupur, 2 ex., 9.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal and Uttar Pradesh.

Elsewhere : Myanmar.

Remark : In the present study this species is recorded for the first time from Manipur.

29. ***Lathrobium semicaeruleum*** Cameron

1921. *Lathrobium semicaeruleum* Cameron, *Entomologist's Monthly Magazine*, **57** : 271.

1922. *Lathrobium semicaeruleum* var. *ochreonotatum* Champion, *Entomologist's Monthly Magazine*, **58** : 34.

1931. *Lathrobium semicaeruleum* : Cameron, *Fauna British India*, **2** : 204-205.

Material examined : 3 exs., INDIA : Manipur, Taphou, 1 ex., 1.iv.1992, D. N. Biswas Coll. Bishnupur, 2 ex., 8.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Sikkim, Uttar Pradesh and Himachal Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

30. *Lathrobium unicolor* Kraatz

1858. *Lathrobium unicolor* Kraatz, *Arch. Naturgesch.*, **25** (1) : 117.

1931. *Lathrobium unicolor* : Cameron, *Fauna British India*, **2** : 210.

Material examined : 1 ex., India : Manipur, Thainga, Loktake, Bishnupur dist., 1 ex., 20.ii.1993, S. K. Saha & Party coll.

Distribution : India : Manipur, Northern India.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Stiliderus* Motschulsky

1858. *Stiliderus* Motschulsky, *Bull. Mosc.*, **31** (2) : 639.

31. *Stiliderus loebli* Rougemont

1985. *Stiliderus loebli* Rougemont, *Revue suisse Zool.*, **92** (1) : 217-228.

Material examined : 2 ex., India : Manipur, Tuilaphai, Churachandpur, 2 ex., 5.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Assam.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Astenus* Stephens

1832. *Astenus* Stephens, Ill. *Brit. Ent. Mand.*, **5** : 275.

Key to the species of *Astenus* Stephens

1. Abdomen entirely reddish testaceous ....*flavipennis* Cameron

— Abdomen reddish - testaceous, the 7th and 8th segments more or less black or pitchy 2

2(1). Sides of the elytra with black setae either outstanding or decumbent .... *gracilentus* Fauvel

— Sides of the elytra without black setae..... ..... *melanurus* (Kust)

32. *Astenus flavipennis* Cameron

1931. *Astenus flavipennis* : Cameron, *Fauna British India*, **2** : 80.

Material examined : 1 ex., India : Manipur, Thailaphai, Churachandpur dist., 1 ex., 5.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal and Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

33. *Astenus gracilentus* Fauvel

1859. *Sunius gracilis* Kraatz, *Arch. Naturgesch.* **25** (1) : 147.

1879. *Astenus gracilentus* Fauvel, *Ann. Mus. Civ. Gen.*, **15** : 83.

1931. *Astenus gracilentus* : Cameron, *Fauna British India*, **2** : 84-85.

Material examined : 1 ex., India : Manipur, Thoubal, Thoubal dist., 1 ex., 25.ii.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur; West Bengal, Tamil Nadu and Uttar Pradesh.

Elsewhere : Bangladesh and Singapore.

Remark : In the present study this species is recorded for the first time from Manipur.

34. *Astenus melanurus* (Küst)

1853. *Sunidus melanurus* Küst, *Kaf. Eur.*, **26** : 76.

1858. *Sunius melanurus* Kraatz, *Berl. Ent. Zeitg.*, **2** : 67.

1872. *Sunius melanurus* Fauvel, *Fauna Gallo-Rhen.*, **3** : 296.

1860. *Sunius apicalis* Motschulsky, *Bull. Mosc.*, **33** (2) : 560.

Material examined : 1ex., India : Manipur, Thanior, Churachandpur dist, 1 ex., 23.ii. 1993, S.K. Saha and Party coll.

Distribution : India : Manipur, West Bengal, Maharashtra and Uttar Pradesh.

Elsewhere : Mediterranean, Canary Islands, South Africa and Java.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Acanthoglossa* Kraatz

1859. *Acanthoglossa* Kraatz, *Arch. Naturgesch.*, **25** (1) : 144.

35. *Acanthoglossa testaceipennis* Kraatz

1859. *Acanthoglossa testaceipennis* Kraatz, *Arch. Naturgesch.*, **25** (1) : 145.

1931. *Acanthoglossa testaceipennis* : Cameron, *Fauna British India*, **2** : 121-122.

Material examined : 36 exs., India : Manipur, Kangpokoi, Senapati dist., 35 ex., 14.iv.1992, D. N. Biswas Coll., Napan, Senapati dist., 1 ex., 15.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal, Tamil Nadu and Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Lobochilus* Bernhauer

1918. *Lobochilus* Bernhauer, *Arch. Naturgesch.*, : **84 (A)** : 179.

1984. *Neosclerus* Cameron, *Trans. ent. Soc. Lond.*, : 188.

37. *Lobochilus assamensis* Cameron

1931. *Lobochilus assamensis* : Cameron, *Fauna British India*, **2** : 126.

Material examined : 1 ex., India : Manipur, Thuilaphai, Churachandpur dist., 1 ex., 5.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Nagaland.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Leptacinus* Erichson

1839. *Leptacinus* Erichson, *Kaf. Mark Brand*, 429.

38. *Leptacinus beesoni* Cameron

1932. *Leptacinus beesoni* Cameron, *Fauna British India*, **3** : 12.

Material examined : 1 ex., India : Manipur, Kangpoxpi, 1 ex., 14.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus *Xantholinus* Serville

1825. *Xantholinus* Serville, *Encyc. Meth.*, **10** : 475.

39. *Xantholinus punctulatus* (Payk.)

1789. *Staphylinus punctulatus* Payk., *Mon. Staph.*, : 30.

1873. *Xantholinus haroldi* Reitt. in Harold., *Col. Hefte*, **11** : 146.

1871. *Xantholinus melanarius* Fauvel, *Abeille*, **8** : 304.

1832. *Xantholinus obscurus* Stephens, III. *Brit. Ent.*, **5** : 256.

1932. *Xantholinus punctulatus* : Cameron, *Fauna British India*, **3** : 24.

Material examined : 1 ex., INDIA : Manipur, Matbuk, Senapati dist., 16.iv.1992, S. K. Saha Coll.

Distribution : India : Manipur.

Elsewhere : Palaearetic and Nearctic regions.

Remark : In the fauna (1932) mentioned only India. It may be first time recorded from Manipur.

Genus *Philonthus* Curtis

1825. *Philonthus* Curtis, *Brit. Ent.*, **8** : 610.

Key to the species of *Philonthus* Curtis

1. Thorax with dorsal row of 4 punctures ..2

— Thorax with dorsal row of more than 4 punctures 4

2(1). Thorax red or reddish brown 3

— Thorax black or metallic .... *aeger* Eppelsheim

3(2). Thorax red; abdomen entirely black, very closely and finely punctured and pubescent throughout ..... *assamensis* Cameron

— Thorax reddish-brown; abdomen black, with the posterior margin of the segments rufescent, finely punctured at the base of the segments..... *castaneus* Motschulsky

4(1). Thorax bright red 5

— Thorax black or brown, sometimes with slight metallic reflex... *aliquatenus* Schub.

5(4). Abdomen black, at most with the posterior margin of the segments reddish..... ..... *pulchellus* Kraatz

— Abdomen in great part red .... *paederoides* Motschulsky

40. ***Philonthus assamensis*** Cameron

1932. *Philonthus assamensis* : Cameron, *Fauna British India,* **3** : 100.

Material examined : 15 ex., INDIA : Manipur, Kangpokpi, Senapati dist., 15 ex., 14.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur.

41. ***Philonthus paederoides*** Motschulsky

1858. *Philonthus paederoides* Motschulsky, *Bull. Mosc.,* **31** (2) : 662.

1859. *Philonthus bellus* Kraatz, *Arch. Naturgesch.,* **25** (1) : 83.

1932. *Philonthus paederoides* : Cameron, *Fauna British India,* **3** : 114.

Material examined : 1 ex., India : Manipur, Napan, Senapati dist., 1 ex., 15.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, West Bengal and Tamil Nadu.

Elsewhere : Sri Lanka, China, Philippines and Indonesia.

Remark : In the present study this species is recorded for the first time from Manipur.

42. ***Philonthus pulchellus*** Kraatz

1859. *Philonthus pulchellus* Kraatz, *Arch. Naturgesch.,* **25** (1) : 92.

1932. *Philonthus pulchellus* : Cameron, *Fauna British India,* **3** : 136.

Material examined : 2 ex., India : Manipur, F.R. House Compound, Imphal, 2 ex., 2.x.1975, M.S. Shishodia Coll.

Distribution : India : Manipur.

Elsewhere : Sri Lanka, Singapur, Penang and Indonesia.

Remark : In the present study this species is recorded for the first time from India (Manipur).

43. ***Philonthus aliquatenus*** Schub.

1908. *Philonthus aliquatenus* Schub., *D. E. Z.,* : 618.

1932. *Philonthus aliquatenus* : Cameron, *Fauna British India,* **3** : 107-108.

Material examined : 1 ex., India : Manipur, F.R. House, Imphal, 1 ex., 2.x.1975, M.S. Shishodia Coll.

Distribution : India : Manipur, Himachal Pradesh and Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

44. ***Philonthus castaneus*** Gemm. et. Har.

1886. *Philonthus castaneus* Gemm. et Har., *Cat. Col.,* **2** : 586.

1858. *Philonthus badius* Motschulsky, *Bull. Mosc.,* **31** (1) : 661.

1932. *Philonthus castaneus* : Cameron, *Fauna British India,* **3** : 99-100.

Material examined : 5 ex., India : Manipur, Thainga, Bishnupur dist., 5 ex., 20.ii.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur.

Remark : In the present study this species is recorded for the first time from Manipur.

45. ***Philonthus aeger*** Eppelsheim

1895. *Philonthus aeger* Eppelsheim, *W.E.Z.,* **14** : 59.

1932. *Philonthus aeger* : Cameron, *Fauna British India,* **3** : 83-84.

Material examined : 1 ex., India : Manipur, Thainga, Bishnupur dist., 1 ex., 20.ii.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur, Uttaranchal and Himachal Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Tolmerinus*** Bernhauer

1923. *Tolmerinus* Bernhauer, *W.E.Z.*, **40** : 63.

46. ***Tolmerinus obscurus*** Cameron

1932. *Tolmerinus obscurus* Cameron, *Fauna British India,* **3** : 166.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Staphylinus*** Linnaeus

1758. *Staphylinus* Linnaeus, *Syst. Nat. ed.*, **10** : 421.

Key to the species of *Staphylinus* Linnaeus

1. Antennae rather long and slender, the intermediate segments much longer than broad, the penultimate at least as long as broad .... *(Tasgius) antennalis* Cameron

— Antennae shorter and stouter, the penultimate segments transverse .... *(S. Str.) maculicollis* Fauvel

47. ***Staphylinus* (S. Str.) *maculicollis*** Fauvel

1895. *Staphylinus maculicollis* Fauvel, *Rev. d' Ent.*, **14** : 253.

1932. *Staphylinus* (S. Str.) *maculicollis* : Cameron, *Fauna British India,* **3** : 200-201.

Material examined : Not studied.

Distribution : India : Manipur.

Elsewhere : Burma.

48. ***Staphylinus (Tasgius) antennalis*** Cameron

1932. *Staphylinus (Tasgius) antennalis* : Cameron, *Fauna British India,* **3** : 208.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Pammegus*** Fauvel

1895. *Pammegus* Fauvel, *Rev. d' Ent.*, **14** : 271.

49. ***Pammegus flavipes*** (Fauvel)

1884. *Euryporus flavipes* Fauvel, *Not. Leyden Mus.*, **6** : 241.

1895. *Pammegus flavipes* var. *ruficollis* Fauvel, *Rev. d' Ent.*, **14** : 272.

1932. *Pammegus flavipes* : Cameron, *Fauna British India,* **3** : 254-255.

Material examined : Not studied.

Distribution : India : Manipur, Sikkim, Uttaranchal and Tamil Nadu.

Elsewhere : Sumatra.

Remark : It was early recorded from Manipur.

Genus ***Tachyporus*** Gravenhorst

1806. *Tachyporus* Gravenhorst, *Col. Micro.* : 1.

50. ***Tachyporus himalayicus*** Bernhauer

1918. *Tachyporus himalayicus* Bernhauer, *Arch. Naturgesch.*, **84** (A) : 187.

1926. *Tachyporus nigromaculatus* Cameron, *Trans. ent. Soc. Lond.*, : 183.

1932. *Tachyporus himalayicus* : Cameron, *Fauna British India,* **3** : 382.

Material examined : 5 exs., India : Manipur, Matbuk, Senapati dist., 1 ex., 16.iv.1992, D. N. Biswas Coll.; Thanion, Churachandpur dist., 4 ex., 23.v.1993, S. K. Saha Coll.

Distribution : India : Manipur, West Bengal, Sikkim and Uttar Pradesh.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Symmixus*** Bernhauer

1915. *Symmixus* Bernhauer, *Col. Rundsch.*, : 56.

51. ***Symmixus sikkimensis*** Bernhauer

1915. *Symmixus sikkimensis* Bernhauer, *Col. Rundsch.*, : 57.

1932. *Symmixus sikkimensis* : Cameron, *Fauna British India,* **3** : 426.

Material examined : Not studied.

Distribution : India : Manipur, Sikkim.

Elsewhere : Burma.

Genus ***Gyrophaena*** Mannerheim

1830. *Gyrophaena* Mannerheim, *Mem. Acad. St. Petersb.*, 1 : 74.

52. ***Gyrophaena*** (S. Str.) ***difficilis*** Cameron

1939. *Gyrophaena* (S. Str.) *difficilis* Cameron, *Fauna British India*, **4** : (1) : 129.

Material examined : Not studied.

Distribution : India : Manipur, West Bengal.

Genus ***Lampromalota*** Cameron

1920. *Lampromalota* Cameron, *Trans. Ent. Soc. Lond.*, : 246.

53. ***Lampromalota brunneicollis*** Cameron

1920. *Lampromalota brunneicollis* Cameron, *Trans. Ent. Soc. Lond.*, 246.

1939. *Lampromalota brunneicollis* : Cameron, *Fauna British India*, **4** (1) : 199-200.

Material examined : Not studied.

Distribution : India : Manipur.

Elsewhere : Singapore and Indonesia.

Genus ***Cordalia*** Jacobson

1924. *Cordalia* Jacobson, *Ent. Zeitschr.*, **38** : 82.

54. ***Cordalia vestita*** (Boh.)

1858. *Falagria vestita* Boh., *Eugen. Resa Ins. Col.*, : 25.

1920. *Falagria vestita* : Cameron, *Trans. Ent. Soc. Lond.*, : 392.

1939. *Cordalia vestita* : Cameron, *Fauna British India*, **4** (1) : 237-238.

Material examined : 1 ex., India : Manipur, Thanion, Churachandpur dist., 1 ex., 23.v.1993, S. K. Saha Coll.

Distribution : India : Manipur, Uttar Pradesh.

Elsewhere : Burma, China, Malay, Peninsula and Sumatra.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Falagria*** Mannerheim

1830. *Falagria* Mannerheim, *Mem. Acad. Sci. St. Petersb.*, **1** : 14-18.

55. ***Falagria (Anaulacaspis) latesulcata*** Cameron

1939. *Falagria (Anaulacaspis) latesulcata* : Cameron, *Fauna British India*, **4** : (1) : 256.

Material examined : 2 ex., India : Manipur, Matbuk, Senapati dist., 2 ex., 16.iv.1992, S. K. Saha & Party Coll.

Distribution : India : Manipur.

Other Indian State : Assam.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Amaurodera*** Fauvel

1905. *Amaurodera* Fauvel, *Rev. d' Ent.*, **24** : 142.

56. ***Amaurodera veluticollis*** (Motschulsky)

1858. *Falagria veluticollis* Motschulsky, *Bull. Soc. Nat. Mosc.*, **31** (3) : 261.

1939. *Amaurodera veluticollis* : Cameron, *Fauna British India*, **4** (2) : 456.

Material examined : 1 ex., India : Manipur, Tuilaphai, Churachandpur dist., 1 ex., 5.iv.1992, D. N. Biswas Coll.

Distribution : India : Manipur, Uttar Pradesh.

Elsewhere : Burma and Riouw Archipelago.

Remark : In the present study this species is recorded for the first time from Manipur.

Genus ***Mimacrotona*** Cameron

1920. *Mimacrotona* Cameron, *Trans. Ent. Soc. Lond.*, : 268.

57. ***Mimacrotona uniformis*** Cameron

1939. *Mimacrotona uniformis* : Cameron, *Fauna British India*, **4** (2) : 427.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Orphnebius*** Motschulsky

1858. *Orphnebius* Motschulsky, *Bull. Soc. Nat. Mosc.*, **31** (3) : 263.

58. ***Orphnebius (Mesocephalobius) indicus*** Cameron

1939. *Orphnebius (Mesocephalobius) indicus* : Cameron, *Fauna British India,* **4 :** (2) : 486-487.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Oxypoda*** Mannerheim

1830. *Oxypoda* Mannerheim, *Mem. Acad. St. Petersb.*, **1** : 483.

59. ***Oxypoda (Podoxya) dohertyi*** Cameron

1939. *Oxypoda (Podoxya) dohertyi* : Cameron, *Fauna British India,* **4** (2) : 606.

Material examined : Not studied.

Distribution : India : Manipur, Uttar Pradesh.

Genus ***Aleochara*** Gravenhorst

1802. *Aleochara* Gravenhorst, *Col. Micr. Brunsw.*, : 67.

60. ***Aleochara (Polychara) dohertyi*** Cameron

1939. *Aleochara (Polychara) dohertyi* : Cameron, *Fauna British India,* **4** (2) : 645-646.

Material examined : Not studied.

Distribution : India : Manipur.

Genus ***Pseudoplandria*** Fenyes

1921. *Pseudoplandria* Fenyes, *Bull. Mus. Comp. Zool., Harvard Coll.*, **65** : 30.

1920. *Hoplandria* Cameron, *Trans. Ent. Soc. Lond.*, : 362, 397.

61. ***Pseudoplandria dohertyi*** Cameron

1939. *Pseudoplandria dohertyi* : Cameron, *Fauna British India,* **4** (2) : 674.

Material examined : Not studied.

Distribution : India : Manipur.

SUMMARY

153 examples comprising 61 species under 36 genera distributed in 6 subfamilies are represented in this paper. 37 species are newly recorded from Manipur of which 2 species are first time recorded from India. Key to the sub-families, tribes and genera are dealt with in State Fauna Series 3 : Fauna of West Bengal, part 6 (A) : 201-361, 1995. Key to species and distributional data of each species of the family Staphylinidae for Manipur have been provided.

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INSECTA : COLEOPTERA : COCCINELLIDAE

S. K. CHAKARABORTY
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The Coccinellidae beetles, popularly called the Lady-bird beetles, are very common in forests and agricultural area. They generally draw attention by their beautiful colours. These beetles are of great economic importance because some of its are phytophagous while many others are carnivorous. Phytophagous members (Subfamily : Epilachninae) causing severe damage to the agricultural products whereas carnivorous members predating on crop pests like *Aphids, Coccids, Aleuryds, Planimites* and other soft bodied insects.

Kapur (1952) described a new species of Coccinellidae from the state and subsequently recorded another eleven species in 1954. This was the primary information available before proceeding to this present study.

In this present study another twenty six species have been added from the state. It is believed that further exploration in this state, specially in Ukhrul and Chandel districts will reveal many more species.

Materials for this study was available from different survey parties of this department. Present study including thirty eight species under nineteen genera belonging to seven tribes under five subfamilies.

This work provides keys to the tribes, genera and species. Necessary geographical distribution, synonymies and literature references have also dealt here. Key to the subfamilies has not been repeated here as it is available in my previons works.

SYSTEMATIC ACCOUNT

Family COCCINELLIDAE

Subfamily I. SCYMNINAE

Tribe 1. **Scymnini**

Genus 1. ***Pullus*** Mulsant

1. *P. bourdilloni* Kapur
2. *P. testacecollis* Kapur

Genus 2. ***Scymnus*** Kugelann

3. *S.* (*Pullus*) *brunnescens* Motschulsky
4. *S.* (*Pullus*) *pyrocheilus* (Mulsant)
5. *S.* (*Pullus*) *victoris* Motschulsky
6. *S.* (*Scymnus*) *folchini* Canepari

Genus 3. ***Axinoscymnus*** Kamiya

7. *A. nigripennis* Kamiya

Tribe 2. **Aspidimerini**

Genus 4. ***Cryptogonus*** Mulsant

8. *C. bimaculatus* Kapur
9. *C. postmedialis* Kapur

Subfamily II. COCCIDULINAE

Tribe 3. **Noviini**

Genus 5. ***Rodolia*** Mulsant

10. *R. breviuscula* Weise

Subfamily III. CHILOCORINAE

Tribe 4. **Chilocorini**

Genus 6. ***Brumus*** Mulsant

11. *B. suturalis* (Fabricius)

Subfamily IV. COCCINELLINAE

Tribe 5. **Coccinellini**

Genus 7. ***Aiolocaria*** Crotch

12. *A. dodecaspilota* (Hope)

Genus 8. ***Calvia*** Mulsant

13. *C. trilochana* Kapur
14. *C. sykesi* (Crotch)

Genus 9. ***Leis*** Mulsant

15. *L. dimidiata* (Fab.)

Genus 10. ***Callineda*** Crotch

16. *C. sedecimnotata* (Fabricius)

Genus 11. ***Coelophora*** Mulsant

17. *C. bissellata* Mulsant
18. *C. saucia* (Mulsant)
19. *C. sexareata* Mulsant

Genus 12. ***Oenopia*** Mulsant

20. *O. kirbyi* Mulsant
21. *O. luteopustulata* Mulsant
22. *O. quadripunctata* Kapur
23. *O. sauzeti* Mulsant

Genus 13. ***Harmonia*** Mulsant

24. *H. arcuata* (Fabricius)

Genus 14. ***Coccinella*** Linnaeus

25. *C. repanda* Thunberg
26. *C. septempunctata* Linnaeus
27. *C. transversalis* Fabricius

Genus 15. ***Menochilus*** Timberlake

28. *M. sexmaculatus* (Fabricius)

Genus 16. ***Micraspis*** Dejean

29. *M. allardi* (Mulsant) Comb.nov.
30. *M. discolor* (Fabricius)
31. *M. vincta* (Gorham)

Tribe 6. **Psylloborini**

Genus 17. ***Illeis*** Mulsant

32. *Illeis* sp.

Subfamily V. EPILACHNINAE

Tribe 4. **Epilachnini**

Genus 18. ***Epilachna*** Chevrolat

33. *E. flavicollis* (Thunberg)

Genus 19. ***Henosepilachna*** Li

34. *H. dodecastigma* (Wiedmann)
35. *H. kaszabi* (Biel. & Fur.)
36. *H. manipurensis* (Kapur) Comb.nov.
37. *H. septima* (Dieke)
38. *H. vigintioctopunctata* (Fabricius)

Subfamily I. SCYMNINAE

Key to the tribes of *Scymninae*

1. Eyes exposed anteriorly, moderate in size. Antennae 9-11 segmented. Elytral epipleurae with or without distinct foveae. Femora and tibia slender, cylindrical; trochanters normal; tarsi trimerous or cryptotetramerous. The first abdominal segment not convex posteriorly .. .. *Scymnini*

– Eyes covered anteriorly by the expanded head capsule, moderate in size. Antennae 9 segmented and very short. Elytral epipleurae very narrow with distinct foveae. Femora broadly expanded concealing the compressed tibiae; trochanters elongate; tarsi true trimerous. The first abdominal segment convex posteriorly ..... *Aspidimerini*

Tribe 1. **Scymnini**

Key to the genera of tribe Scymnini

1. Femoral line on first abdominal sternum complete 2

– Femoral line on first abdominal sternum incomplete. Antennae 10-11 segmented, 2 basal segments and 4-5 segmented club; maxillari palpi cylindrical with oblique truncated apex; prosternum with distinct inter coxal carinae; tarsi cryptotetramerous .... ***Scymnus* (*Scymnus*)** Kugelann

2. Eyes large, narrowly separated by frons; apical segments of maxilary palpi divergent apically; prosternum with weakly developed and incomplete carinae at the base .... ***Axinoscymnus*** Kamiya

– Eyes normal, widely separated by frons; apical segments of maxillary palpi usually elongate or parallel sided; prosternum with well developed carinae ....***Pullus, Scymnus (Pullus)*** Mulsant

Genus 1. ***Pullus*** Mulsant

1846. *Pullus* Mulsant, *Sulcicolles-Securipalpes,* **4** : 241.

1963. *Pullus* Mulsant : Kapur, *Bull. Br. Mus. nat. Hist. (Ent.),* **14** : 22-23.

Key to the species of the genus *Pullus*

1. Pronotum reddish testaceous to black; scutellum fuscous red or piceous to black, elytra reddish testaceous to black except the apical one-seventh which is testaceous with straight and oblique at the base; occassionally the black elytra is occupied by a large, oval testaceous spot; under side dark piceous to black except for the narrow testaceous pronotal epipleura, the dark testaceous tibiae, tarsi and the external margins of the apical abdominal sternite. Length - 2.5 mm., width - 1.75 mm. ..... *bourdilloni* Kapur

– Pronotum testaceous, scutellum testaceous; elytra black except the apical one-fourth which is testaceous, widely concave at the base. Under side testaceous excepting the piceous to black mesosternum, black metasternum and elytral epipleurae. Length - 2.20 mm, width - 1.50 mm. ..... *testacecollis* Kapur

1. ***Pullus bourdilloni*** Kapur

1955. *Pullus bourdilloni* Kapur *Rec. Indian Mus.,* **53** : 335-338, (Type-loc. : Nepal).

Material Studied: 2 exs, Chajng village, Kangpopi, 6.IV.1992, S. K. Chatterjee Coll.

Distribution : India : Manipur, Sikkim. Also known from Nepal.

Remarks : This is the first record of the species from Manipur.

2. ***Pullus testacecollis*** Kapur

1963. *Pullus testacecollis* Kapur, *Bull. Br. Mus. nat. Hist. (Ent.),* **14** : 21-22 (Type-loc. : Sikkim).

2000. *Pullus testacecollis* Kapur : Chakraborty & Biswas, *Zool. Surv. India State Fauna Series* 4 : *Fauna of Meghalaya,* Part 5 : 211.

Material Studied: 1 ex., Turibari, Senapati Dist., 11.VI. 1992, A. K. Mondal Coll.

Distribution : India : Manipur, Meghalaya and Sikkim.

Remarks : Recorded first time from Manipur.

Genus 2. ***Scymnus*** Kugelann

1794. *Scymnus* Kugelann, *Neues Magazin Liebh. Ent.,* 1 (5) : 545-546.

1931. *Scymnus* Kugelann : Korschefsky. *Coleoptm. Cat.,* Pars, 118 : 115.

Key to the species of the genus *Scymnus*

1. Femoral line on the first abdominal sternite complete 2

– Femoral line on the first abdominal sternite incomplete. Pronotum testaceous with a sub-triangular black spot at the base, extending to the anterior margin leaving a very narrow testaceous margin; elytra completely black without any testaceous apical margin .... *folchini* Canepari

2. Pronotum reddish brown, without any spots; elytra reddish brown, sutural margins dark brown or piceous, thicker at the base, gradually tapering towards apex, lateral margins blackish ..... *brunnescens* Mots.

– Pronotum testaceous with a basal spot at the middle, leaving narrow anterior margin; elytra black 3

3. Elytra black except the apical one-thirds, which is testaceous, extends upto two-fifth or less at the external margin .... *pyrocheilus* Mulsant

– Elytra testaceous yellow with a large central black spot, confluent with the basal spot on pronotum, leaving narrow apical and lateral testaceous margins ..... *victoris* Mots.

3. *Scymnus (Pullus) brunnescens* Motschulsky

1863. *Scymnus brunnescens* Motschulsky, *Bull. Soc. Nat. Moscou,* **36** : 425 (Type-loc. : Ceylon).

1931. *Scymnus (Pullus) brunnescens* Motschulsky : Korschefsky – *Coleoptm. Cat.,* **16** : 122.

Material Studied : 1 ex., Singda, Imphal, 25.II.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur, Assam, Meghalaya, Tripura, Sikkim, West Bengal, Central and South India, Andamans. Also known from Sri Lanka.

Remarks : This is a new record of the species from Manipur.

4. *Scymnus (Pullus) pyrocheilus* Mulsant

1853. *Scymnus (Pullus) pyrocheilus* Mulsant, *Ann. Soc. Linn. Lyon,* **1** : 281 (Type-loc. : Calcutta).

1931. *Scymnus (Pullus) pyrocheilus* Mulsant, : Korschefsky, *Coleoptm. Cat.,* **16** : pars 118 : 144.

Material Studied : 4 exs., Gularthal, Jiribam, Imphal Dist., 4.III.1993, S. K. Saha & Party Coll., 1 ex., Harinagar, Jiribam, 10.V.1993, S. K. Chakraborty & Party Coll.

Distribution : India : Manipur, Meghalaya Tripura, Sikkim, West Bengal and Andamans. Also known from Nepal.

Remarks : New record from the state.

5. *Scymnus (Pullus) victoris* (Motschulsky)

1858. *Scymnus limbatus* Motschulsky, *Etud. Ent. Helsingfors,* p. 118 (Type-loc. : Himalaya, India).

1874. *Scymnus victoris* (Mots.) : Crotch, *Revis. Cocc.,* P.-253.

1931. *Scymnus (Pullus) victoris* (Mots.) : Korschefsky, *Coleoptm. Cat.,* **16** : Pars 118 : 145.

Material Studied : 1 ex., Lairo river bank, Moreh, Chandel Dist., 12.IV.1992, S. K. Chatterjee & Party Coll.

Distribution : India : Manipur, Meghalaya. Also known from Sri Lanka and Phillipines.

Remarks : First record of the species from Manipur.

6. *Scymnus (Scymnus) folchini* Canepari

1979. *Scymnus (Pullus) folchini* Canepari, *Doriana* **5** : 1-5 (Type-loc. : Pechino (Peking), China).

1986. *Scymnus (Scymnus) folchini* Canepari : Pang Xiong-Fei & Gordon, *The Coleopterists Bulletin,* **40** (2) : 163.

Material Studied : 2 exs., Lower Hundung, 8.IV.1992, P. C. Aguan Coll.; 8 exs. Hundung, 8.IV.1992 and 4 exs., Wino Bazar, 9.IV.1992, S. K. Chatterjee Coll. All from Ukhrul Dist.

Distribution : India : Manipur. Also known from China.

Remarks : This is the first record of this species from Indian sub continent as well as from Manipur.

Genus 3. *Axinoscymnus* Kamiya

1963. *Axinoscymnus* Kamiya, *Mushi,* **37** : 127.

1965. *Axinoscymnus* Kamiya : Kapur & Munshi, *Bull. Syst. Zool.,* Calcutta, **1** : 5-8.

7. *Axinoscymnus nigripennis* Kamiya

1963. *Axinoscymnus nigripennis* Kamiya, *Mushi,* **37** : 127-131, (Type-loc. : Japan).

1986. *Axinoscymnus nigripennis* Kamiya : Pang Xiong-Fei & Gordon, *The Coleopterists Bulletin,* **40** (2) : 186 (Key).

Material Studied : 1 ex., Lamfao, Churachandpur Dist., 3.IV.1992, S. K. Chatterjee Coll.

Distribution : India : Manipur. Also known from Japan.

Remarks : This is a new record of the species from Manipur.

Tribe 2. **Aspidimerini**

Genus 4. *Cryptogonus* Mulsant

1850. *Cryptogonus* Mulsant, *Spec. Trim. Securipalp* P. 944-945.

1931. *Cryptogonus* Mulsant : Korschefsky, *Coleoptm. Cat.,* Pars 118 : P. 172.

Key to the species of the genus *Cryptogonus*

1. Elytra reddish brown, each elytron with one large oblong-oval, discal black spot, closer to

the suture than the lateral margins .... *bimaculatus* Kapur

– Elytra entirely black, without any markings ..... *postmedialis* var. *sushila* Kapur

8. *Cryptogonus bimaculatus* Kapur

1948. *Cryptogonus bimaculatus* Kapur, *Trans. R. ent. Soc. Lond.*, **99** : 100-101 (Type-loc. : Assam, Patkai Mountains).

Material Studied : 1 ex., State Guest House Compound, Imphal, 30.III.1992, P. C. Aguan Coll.

Distribution : India : Manipur, Nagaland, Assam, Tripura, Sikkim and West Bengal (Darjeeling). Also known from Burma and Thailand.

Remarks : It is a new record of this species from Manipur.

9. *Cryptogonus postmedialis* var. *sushila* Kapur

1948. *Cryptogonus postmedialis* var. *sushila* Kapur, *Trans. R. ent. Soc. Lond.*, **99** : 97 (Type-loc. : Kumaon Hills).

Material Studied : 1 ex., Shantipur, Churachandpur Dist., 3.IV.1992, S. K. Chatterjee Coll.

Distribution : India : Manipur, Sikkim, West Bengal and Kumaon Hills. Also known from Bhutan and burma.

Remarks : This also is a new record of the species from Manipur.

Subfamily II. COCCIDULINAE

Tribe 3. **Noviine**

Genus 5. *Rodolia* Mulsant

1850. *Rodolia* Mulsant, *Spec. Trim. Securipalp*, P. 901-902.

1931. *Rodolia* Mulsant : Korschefsky, *Coleoptm. Cat.*, **16** Pars 118 : P. 98.

10. *Rodolia breviuscula* Weise

1892. *Rodolia breviuscula* Weise, *Ann. Soc. ent. Belg.*, **36** : 16-30 (Type-loc. : Mandar, Chota Nagpur, India).

1931. *Rodolia breviuscula* Weise : Korschefsky, *Coleoptm. Cat.*, **16** Pars 118 : P. 99.

Material Studied : 1 ex., Lairo River bank, Chandel Dist., 13.IV.1992, P. C. Aguan Coll.

Distribution : India : Manipur, West Bengal, M.P. and South India. Also known from Sri Lanka and Thailand.

Remarks : New record of the species from Manipur.

Subfamily III. CHILOCORINAE

Tribe 4. **Chilocorini**

Genue 6. *Brumus* Mulsant

1850. *Brumus* Mulsant, *Spec. Trim. Securipalp*, P. 492.

1932. *Brumus* Mulsant : Korschefsky, *Coleoptm. Cat.*, **16**, Pars 120, P. 265.

11. *Brumus suturalis* (Fabricius)

1798. *Coccinella suturalis* Fabricius, *Suppl. Ent. Syst.*, : **78**, (Type-loc. : India).

1850. *Brumus suturalis* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon*, (2) **2** : 494.

1932. *Brumus suturalis* (Fab.) : Korschefsky, *Coleoptm. Cat.*, **16**, Pars 120, P. 267.

Material Studied : 1 ex., Uchathal, Jiribam, Imphal Dist., 30.XI.1992, A. K. Mondal Coll.

Distribution : India : Manipur, Meghalaya, Tripura, West Bengal, Madhya Pradesh, Maharashtra, Karnataka and Goa. Also known from Nepal, Bhutan, Sri Lanka and Luzon.

Remarks : A very wide spread species. Recorded first time from Manipur. It can be easily recognised by its short-oval, moderately convex body; pronotum reddish brown; elytra testaceous, each elytron with a narrow black longitudinal strip at middle and a black sutural border forming 3 black stripes in total. Stripes are free at both ends.

Subfamily IV. COCCINELLINAE

Key to the tribes of the subfamily *Coccinellinae*

1. Anterior margin of Clypeus weakly convex with a lateral projection on each corner;

antennae inserted very close to the eyes, antennal club compact, the pre-apical segment broader than long; mandibles always with a bifid tip, inner margin entire; maxillary galea conical, anterior margin of pronotum usually deeply emarginate and with angulate corners; body yellow to reddish testaceous with usually black markings on the pronotum and elytra; habit carnivorous ..... *Coccinellini*

– Anterior margin of clypeus truncate without any lateral projection on each corner; antennae inserted in front, a little away from the eyes, antennal club loosely set, the pre-apical segment longer than broad; mandibles bifid, often with multidenticulate tip, inner margin finely serrated; maxillary galea quadrate; anterior margin of pronotum weakly sinuate with rounded corners; body yellowish or light testaceous, pronotum with a pair of black spots but elytra without any black markings; habit fungivorous ..... *Psylloborini*

Tribe 5. **Coccinellini**

Key to the genera of tribe Coccinellini

1. Pronotum with a longitudinal impression along the lateral margin 2

– Pronotum without any longitudinal impression along the lateral margin 4

2. Lateral margin of elytra broadly expanded, not marginate externally 3

– Lateral margin of elytra narrowly expanded, marginate externally. Anterior and posterior corners of pronotum somewhat angulate, lateral side of pronotum weakly arcuate and marginated; terminal segment of antennae elongate oval, nearly as wide as tenth, the ninth segment much longer than wide, the tenth longer than wide ..... ***Calvia***

3. Pronotum strongly rounded laterally, widest at the middle, weakly sinuous at the antero-lateral corners; femoral line incomplete with an oblique lateral part ..... ***Aiolocaria***

– Pronotum weakly rounded laterally, widest at the base, weakly sinuous at the basal corners; femoral line incomplete, irregularly arched, close to the posterior margin of the 1st abdominal sternite, with a fine oblique lateral part ..... ***Leis***

4. Terminal segment of antennae divergent 5

– Terminal segment of antennae convergent pointed at apex, ninth segment transverse, the tenth nearly as wide as long, basal segment broader than long, strongly rounded and produced; prosternum with a pair of carinae, mesosternum bisinuate anteriorly; first abdominal sternite with an incomplete femoral line and an oblique lateral carina ..... ***Menochilus***

5. Terminal segment of antennae large, oblique, securiform; prothoracic hypomeron impressed anteriorly; elytral epipleuron shallowly grooved; prosternum with a pair of carinae, reaching beyond middle, anterior margin of mesosternum carinate and weakly emarginate; femoral line incomplete, confluent with the posterior margin of the 1st obdominal sternite ..... ***Callineda***

– Terminal segment of antennae transverse, truncated 6

6. Anterior margin of mesosternum weakly sinuate 7

– Anterior margin of mesosternum bisinuate; antennal club distinct, the ninth segment transverse, the tenth nearly twice as wide as long, basal segment elongate; prosternal process with parallel carinae; first abdominal sternite with an incomplete femoral line ..... ***Micraspis***

7. Medium sized beetles (length 5-7.5 mm) .. 8

– Small sized beetles (length 2.77-5.44 mm) ..9

8. Anterior margin of mesosternum entire or flat; femoral line arched inwardly, generally close to the posterior border of the 1st abdominal sternite; body rather rounded and convex ..... ***Coccinella***

– Anterior margin of mesosternum emarginate, rarely entire; femoral line – V shaped, arched inwardly, more or less away from the posterior

border of the 1st abdominal sternite; body rather less rounded and less convex ..... ***Harmonia***

9. Thoracic fovea well marked, antennae short, club compact, subfusiform, segments less longer than broad; elytral epipleurae more inclined, without any fovea; prosternal carinae reaching almost to the anterior margin of the prosternal process ..... ***Oenopia***

– Thoracic fovea not marked; antennae long, slender, club loosely set, 9th and 11th segments generally longer than broad; elytral epipleurae with distinct foveae; prosternal carinae reaching almost half of the prosternal process ..... ***Coelophora***

Genus 7. *Aiolocaria* Crotch

1874. *Aiolocaria* Crotch, *Revis. Cocc.*, P. 178.

1932. *Aiolocaria* Crotch : Korschefsky, *Coleoptm. Cat.*, **16** : Pars 120, P. 277.

12. *Aiolocaria dodecaspilota* (Hope)

1831. *Coccinella 12-spilota* Hope, *in Gray, Zoological Miscellany*, P. 31, (Type-loc. : Nepal)

1874. *Aiolocaria dodecaspilota* (Hope) : Crotch, *Revis. Cocc.*, P. 178.

1932. *Aiolocaria dodecaspilota* (Hope) : Korschefsky, *Coleoptm. Cat.*, **16** : Pars 120, P. 278.

1963. *Aiolocaria dodecaspilota* (Hope) : Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)*, **14** (1) : 26.

Material Studied : 1 ex., Chandel, 14.VI.1992, R. Mathew Coll. and 1 ex., Lahnjo, Chura-Chandpur, 18.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Sikkim. and West Bengal. Also known from Nepal, Bhutan, Burma and Thailand.

Remarks : It's a new record of the species from Manipur. The species is easily recognised by its round, convex shape, yellow colour of the pronotum and elytra with large black maculae on them. There are two black maculae on pronotum and six black maculae on each elytron of which scutellar and apical spots of both the elytron meet their counter part on the other elytron to form a single macula. So the total spots become ten on the elytrae and two on the pronotum.

Genus 8. *Calvia* Mulsant

1850. *Calvia* Mulsant, *Spec. Trim. Securipalp.*, P. 140.

1932. *Calvia* Mulsant : Korschefsky, *Coleoptm. Cat.*, **16** : Pars 120, P. 520.

Key to the species of the genus *Calvia*

1. Elytrae greenish ochreous tinged with red along the suture, each elytron with three very small black dots (one near the margin at one-third, one near the suture in a transverse line with the first, one also near the margin at two-thirds); pronotum light brown with an irregular 'M' in brownish red .... *sykesi* (Crotch)

– Elytrae testaceous, each elytron with three, straw-yellow rather narrow vittae of uneven breadth, joined along the base and at the external apical area, pronotum testaceous, with three, rather ill-defined, longitudinal, straw yellow vittae ..... *trilochana* Kapur

13. *Calvia trilochana* Kapur

1963. *Calvia trilochana* Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)*, **14** (1) : 42-43. (Type-loc. : Singhik, Sikkim).

Material Studied : 1 ex., Ukhrul, 30.III.1975, M. S. Shisodia Coll.

Distribution : India : Manipur and Sikkim.

Remarks : This is a new record of the species from Manipur.

14. *Calvia sykesi* (Crotch)

1874. *Anisocalvia sykesi* Crotch, *Revis. Cocc.*, P. 146. (Type-loc. : Dukhun, India)

1932. *Calvia (Anisocalvia) sykesi* (Crotch) : Korschefsky, *Coleoptm. Cat.*, **16**, Pars 120, P. 529.

1963. *Calvia sykesi* Crotch : Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)*, **14** (1) : 39-40.

Material Studied : 1 ex., Tamenglong, Tamenglong Dist., 20.XI. 1992, A. K. Mondal & Party Coll.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal.

Remarks : This is a new record of the species from Manipur.

Genus 9. *Leis* Mulsant

1850. *Leis* Mulsant, *Spec. Trim. Securipalp.*, P. 241.

1932. *Leis* Mulsant : Korschefsky, *Coleoptm. Cat.*, **16** : Pars 120, P. 273.

15. *Leis dimidiata* (Fabricius)

1781. *Coccinella dimidiata* Fabricius, *Spec. Insect.*, I, P. 94 (Type-loc. : Coromandel, India).

1850. *Leis dimidiata* (Fabricius) : Mulsant, *Spec. Trim. Securipalp.*, P. 242.

Material Studied : No material was available for the present study.

Distribution : India : Manipur, Sikkim, West Bengal and Southern India. Also known from Bhutan, China and Japan.

Remarks : This species is much variable in Colour-pattern. Already 15 varieties have been recorded. Kapur (1954) recorded this species for the first time from Manipur.

Genus 10. *Callineda* Crotch

1874. *Callineda* Crotch, *Revis. Cocc.*, P. 161.

1932. *Callineda* Crotch : Korschefsky, *Coleoptm. Cat.*, **16**, Pars 120, P. 282.

16. *Callineda sedecimnotata* (Fabricius)

1801. *Coccinella 16-notata* Fabricius, *Syst. Eleuth*, 1, P. 370 (Type-loc. : Philippines).

1874. *Callineda sedecimnotata* (Fabricius) : Crotch, *Revis. Cocc.*, P. 161.

1932. *Callineda sedecimnotata* (Fab.) : Korschefsky, *Coleoptm. Cat.*, **16**, Pars 120, P. 282.

Material Studied : 1 ex., Tamenglong, Tamenglong Dist., 24.XI. 1992, A. K. Mondal & Party Coll.; 1 ex., Circuit House, Churachandpur, Churachandpur Dist., 19.V.1993, S. K. Chakraborty & Party Coll. ex. "at light"

Distribution : India : Manipur, Sikkim and West Bengal. Also known from Philippines, Java, Borneo, Malacca, Celebes and Ceram.

Remarks : This is a new record of the species from Manipur.

Genus 11. *Coelophora* Mulsant

1850. *Coelophora* Mulsant, *Spec. Trim. Securipalp.*, PP. 374.

1932. *Coelophora* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 290.

Key to the species of the genus *Coelophora*

1. Elytra black, each elytron with a single, large, reddish, oblique spot in the middle, resembling a short fascia; pronotum black except the antero-lateral margins which is flavus, the inner surface of the flavus area is convex ... . *saucia* Mulsant

– Elytra yellowish brown 2

2. Pronotum yellowish with two median, broadly oval black spots near the base and two small round black spots, one at each posterolateral corners; each elytron with six large, round, black spots of which two semicircular and sutural common to both the elytron .... *bissellata* Mulsant

– Pronotum black except the lateral margins which are flavus, almost quadrangular and extends near the base; each elytron completely margined with black border and divided into two anterior and one posterior compartments by black markings ..... *sexareata* Mulsant

17. *Coelophora bissellata* Mulsant

1850. *Coelophora bissellata* Mulsant, *Spec. Trim. Securipalp.*, P. 400, (Type-loc. : Bengal).

1932. *Coelophora bissellata* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 291.

Material Studied : 1 ex., Churachandpur, 19.III.1974, K. R. Rao Coll.; 1 ex., Churachandpur, 21.III.1975, M. S. Shisodia Coll.; 1 ex., Churachandpur, 3.IV.1992, S. K. Chatterjee Coll.; 1 ex., Chandel, 10.VI.1992, R. Mathew Coll., 1 ex., Harinagar Vill., Jiribam, Imphal Dist., 10.V.1993, 4 exs., Sielmat Res. Forest, Churachandpur Dist, 17.V.1993; 1 ex., Sendra Lake, Bishenpur Dist., 21.V.1993, S.K. Chakraborty Coll.

Distribution : India : Manipur, Assam, Meghalaya, Tripura, West Bengal, Kumaon Hills and South India. Also known from Bhutan, Nepal, Indonesia, Malacca, Philippines and New Guinea.

Remarks : Very widely distributed species. Spot patterns varies, sometimes without any spot on elytrae. Kapur (1954) recorded the species from Manipur for the first time.

18. ***Coelophora saucia*** (Mulsant)

1850. *Lemnia saucia* Mulsant, *Spec. Trim. Securipalp.*, P. 380, (Type-loc. : India).

1874. *Coelophora saucia* (Mulsant) : Crotch, *Revis. Cocc.*, P. 148.

1932. *Coelophora saucia* (Mulsant) : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 296.

Material Studied: 1 ex., Loktak Lake, 15.III.1974, A. K.a Rao Coll.; 1 ex., around Kongpokpi I.B., 16.I.1976, A. K. Ghosh Coll.; 1 ex., Imphathong river bank, Imphal 29.III.1992, A. K. Sanyal Coll.; 1 ex., T. Nagaloimuol, Churachandpur Dist., 4.IV.1992, P. C. Aguan Coll.; 2 exs., Pangmol, Senapati Dist., 1.III.1993, S. K. Saha & Party Coll.; 1 ex., Keibal Lamjao National Park, Bishenpur Dist., 23.III.1993, D. K. Mondal Coll.; 5 exs., Sendra, Bishenpur Dist., 21.V.1993, S. K. Chakraboryt Coll.; 2 exs., Moirang, Bishenpur Dist., 22.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Tripura. Also known from Nepal, China, Philippines, Taiwan and Thailand.

Remarks : It is a new record of this species from Manipur.

19. ***Coelophora sexareata*** Mulsant

1853. *Coelophora sexareata* Mulsant : *Ann. Soc. Linn. Lyon.*, **1** : 181 (Type-loc. : North India).

1932. *Coelophora sexareata* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 296.

Material Studied: 1 ex., T. Nagaloimuol, 4.IV.1992, P. C. Aguan Coll.; 1 ex., Singhat, 18.XII.1992, A. R. Lahiri Coll; 2 exs., Checklaphai Reserve Forest, 3.IV.1992, A. K. Sanyal Coll., 1 ex., S. Vaojans, 4.IV.1992, S. K. Chatterjee Coll., all from Churachandpur Dist.

Distribution : India : Manipur, Assam, Meghalaya, Tripura, Sikkim , West Bengal and Northern India. Also known from Nepal, Bhutan, Burma and China.

Remarks : Kapur (1954) recorded this species from Manipur for the first time. He also recroded the variety *lacerata.*

Genus 12. ***Oenopia*** Mulsant

1850. *Oenopia* Mulsant, *Spec. Trim. Securipalp.*, P. 420.

1932. *Oenopia* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 287.

Key to the species of the genus *Oenopia*

1. Elytra black, each elytron with a sub-basal, obliquely oval and a post-median roundish flavus spot; lateral margin flavus with two semicircular spots on it .... *quadripunctata* Kapur

– Elytra testaceous yellow or yellowish brown 2

2. Each elytron completely bordered black on its lateral as well as sutural margin. Sutural black 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 antero lateral two-third flavus .... *kirbyi* Mulsant

– Each elytron bordered black only on the sutural margin 3

3. 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* Mulsant

– 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 large black spots on each elytron, one quadrangular discoidal, just

touching the callus, the other rounded near the margin at posterior two-thirds .... *sauzeti* Mulsant

20. *Oenopia kirbyi* Mulsant

1850. *Oenopia kirbyi* Mulsant, *Spec. Trim. Securipalp.*, P. 425, (Type-loc. : Eastern India).

1932. *Oenopia kirbyi* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 288.

Material Studied: 1 ex., Loktak, Bishenpur Dist., 26.III.1993, D. K. Mondal & Party Coll.

Distribution : India : Manipur, Meghalaya, Sikkim and West Bengal. Also known from Bhutan, Burma, Thailand and China.

Remarks : Widely distributed species. Recorded for the first time from Manipur.

21. *Oenopia luteopustulata* Mulsant

1850. *Oenopia luteopustulata* Mulsant, *Spec. Trim. Securipalp.*, P. 421, (Type-loc. : Assam).

1874. *Coelophora luteopustulata* (Mulsant) : Crotch, *Revis. Cocc.*, P. 156.

1932. *Oenopia luteopustulata* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 288.

Material Studied: 4 exs., Sunusuphai Vill., Churachandpur Dist:, 2.IV.1992, A. K. Sanyal & P. C. Aguan Coll.; 2 exs., Keibul National Park, Bishenpur Dist., 2.IV.1992; 1 ex., Chajing Vill., Kangpopi, Imphal Dist., 6.IV.1992, and 1 ex., Forest near calvert, L. Hundung, Ukhrul Dist., 8.IV.1992; 1 ex., Granen Vill. and 1 ex., Wino Bazar, Ukhrul Dist., 9.IV.1992, S. K. Chatterjee Coll.; 1 ex., Uchathal, Jiribam, Imphal Dist., 30.XI.1992, A. K. Mondal Coll., 1 ex., Tamenglong Dist., 6.XII.1992, P. H. Roy & Party Coll.

Distribution : India : Manipur, Meghalaya, Assam, Tripura, Sikkim, H.P., and Kumaon Hills, Plains of Uttar Pradesh, West Bengal and Andaman Islands. Also known from Nepal, Bhutan, Burma, Thailand and Tibet.

Remarks : A very widely distributed species. Kapur (1954) recorded the typical form as well as the variety *pedicata* Mulsant from Manipur. In the present study another var. *subpedicata* Kapur is added apart from the typical form and var. *pedicata* Muls.

22. *Oenopia quadripunctata* Kapur

1963. *Oenopia quadripunctata* Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)* **14** (1) : 27-29 (Type-loc. : Shillong, India).

Material Studied: 1 ex., Gularthal, Jiribam, Imphal Dist., 4.III.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim and West Bengal. Also known from Bhutan and Burma.

Remarks : This is a new record of the species from Manipur.

23. *Oenopia sauzeti* Mulsant

1866. *Oenopia sauzeti* Mulsant, *Monogr. Coccinell.*, P. 281.

1932. *Oenopia sauzeti* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 288.

Material Studied : 6 exs., Forest around Lower Hundung, Ukhrul Dist., 8.IV.1992, S. K. Chatterjee, P. C. Aguan and A. K. Sanyal Coll.

Distribution : India : Manipur, Tripura, Sikkim, West Bengal, Kumaon Hills (Uttaranchal), Murree and Dalhousie Hills (Punjab). Also known from Nepal, Bhutan, Burma, Thailand and China.

Remarks : This is a new record of the species from Manipur. Miyatake (1966) placed this species under the genue *Gyrocaria* Timb. but Sasaji (1982) removed the genus *Oenopia* from the synonymy with *Gyrocaria.*

Genus 13. *Harmonia* Mulsant

1850. *Harmonia* Mulsant, *Spec. Trim. Securipalp.*, PP. 74-75.

1932. *Harmonia* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 280.

24. *Harmonia arcuata* (Fabricius)

1787. *Coccinella arcuata* Fabricius, *Mantissa Insectorum* etc., *I*, P. 55 (Type-loc. : China).

1850. *Harmonia arcuata* Fabricius : Mulsant, *Ann. Soc. Agric. Lyon*, **2** (2) : 77.

1954. *Harmonia arcuata* Fabricius : Kapur, *Rec. Indian Mus.*, **52** (2-4) : 332.

Material Studied: 1 ex., Churachandpur, 19.III.1974, K. R. Rao Coll., 3 exs., New Churachandpur, 10.IV.1975; 1 ex., Bungmual, 29.IX.1975 and 1 ex., Forest Rest House, Imphal, 2.X.1975, M. S. Shisodia Coll, 2 exs., Senapati, 3.IV.1992, S. K. Saha & Party Coll., 1 ex., Tamenglong, 20.XI.1992, A. K. Mondal & Party Coll., 1 ex., Behiang, Churachandpur, 24.II.1993; 3 exs., Singda, Imphal, 25.II.1993; 1 ex., Pangmal, Senapati Dist., 1.III.1993, S. K. Saha & Party Coll., 1 ex., Circuit House, Churachandpur Dist., 19.V.1993 and 1 ex., Thanga, Bishenpur Dist., 23.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Meghalaya, Tripura, West Bengal, Goa and Andaman Islands. Also known from Burma, China, Formosa, Philippines, Sunda Islands, New Guinea and Australia.

Remarks : This is a very widely distributed species. It is easily recognised by its less rounded and less convex body, yellow to reddish brown colour; Pronotum generally with two pairs of black spots (two basal, two discal) often fused to form an almost square large median spot; each elytron with two humaral, two median, one transverse post median and one apical black spots, scutellum black, sutural margin black. Colour patterns varies considerably.

Genus 14. *Coccinella* Linnaeus

1758. *Coccinella* Linnaeus, *Syst. Nat.*, ed. 10, P. 364.

1965. *Coccinella* Linnaeus : Kamiya, *Mem. Fac. Lib. Art.*, Fukui Univ., Ser. 11, *Nat. Sci.*, No. 15, P. 35.

Key to the species of the genus *Coccinella* known from Manipur

1. Elytra with transverse, wavy bands 2

– Elytra without transverse bands. 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 ..... *septempunctata* Linnaeus

2. Elytra yellowish, sutural margin black, forming an obcordate, scutellar and a subapical black spot; discal area with one or two short transverse black bands, anterior one tricuspid, posterior one elliptical, a small black spot on the posterior external margin .... *repanda* Thunberg

– Elytra yellowish, sutural margin and spots on it as above; sub humeral area with a triangular black marking, discal area with a post median black, wavy band, confluent with the sutural margin, a sub quadrate black spot at three-fourths the external margin .... *transversalis* Fabricius

25. *Coccinella repanda* Thunberg

1781. *Coccinella repanda* Thunberg, *Nov. Ins. Spec., I* : 18, (Type-loc. : 'Cape of Good Hope')

1932. *Coccinella repanda* Thunberg : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 483-485.

Material Studied: No material was available for the present study.

Distribution : India : Manipur, Assam, West Bengal, Bihar, Orissa, Bombay, Rajasthan, Madhya Pradesh, Uttar Pradesh, South India and Andaman. Also known from Burma, Indonesia, China, Sunda Islands, Molucca Islands, New Guinea, Australia and New Zealand.

Remarks : This species is very similar to the *C. transversalis* F. and many times have been synonymized to *C. transversalis* and removed from the synonymy simultaneously. So controversy is there. Kapur (1954) recorded this species from Manipur.

26. *Coccinella septempunctata* Linnaeus

1758. *Coccinella 7-punctata* Linnaeus, *Syst. Nat.*, ed. 10, P. 365, (Type-loc. : Europe).

1932. *Coccinella septempunctata* Linnaeus : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, PP. 486-494.

Material Studied: 1 ex., Nungthukang, 16.III.1974; 1 ex., Loktak Lake, Bishenpur Dist., 17.III.1974; 1 ex., Moirung, Bishenpur, 18.III. 1974; 2 exs., East Churachandpur, Churachandpur Dist., 22.III.1974, K. R. Rao Coll.; 1 ex., Tor bungbash, 27.III.1975, M. Dutta Coll.; 2 exs., M. E. Schoalmao, 16.IX.1975 and 1 ex., Ukhrul

Dist., 3.X.1975, M. S. Shisodia Coll.; 4 exs., Jiribam, Imphal Dist., 11-13.XI.1975, P. T. Cherian Coll.; 3 exs., Massamphat, 10.I.1976; 2 exs., Keithermanbi, 14.I.1976, A. K. Ghosh Coll.; 2 exs., Imphathong River bank, Imphal, 29.III.1992; 1 ex., Maolai, Churachandpur, 1.IV.1992; 2 exs., Keibul-Lamjao National Park, Bishenpur, 2.IV.1992; 1 ex., Sunusuphai, Churachandpur, 2.IV.1992, A. K. Sanyal Coll.; 1 ex., Imphathong River bank, Imphal, 27.III.1992; 4 exs,. Keibul-Lamjao National Park, Bishenpur, 2.IV.1992; 1 ex., *Shantipur* Churachandpur, 3.IV.1992; Chajing Vill., Kangpopi, Imphal, 6.IV.1992; 1 ex., Greenen Vill., Ukhrul Dist., 9.IV.1992 and 1 ex., State Guest House, Imphal, 15.IV.1992, S. K. Chatterjee Coll., 1 ex., State Guest House Compound, Imphal, 30.III.1992; 1 ex., Muolaoi, Churachandpur, 1.IV.1992 and 1 ex. T. Nagaloimuol, Churachandpur Dist., 4.IV.1992, P. C. Aguan Coll.; 1 ex., Turibari, Senapati Dist., 11.IX.1992, A. K. Mondal Coll.; 1 ex., Res. Forest area, Churachandpur, 11.XII.1992, P. H. Roy & Party Coll, 1 ex., Hundung, Ukhrul Dist., 12.XII.1992, R. S. Mirdha Coll.; 2 exs., Hmarveng and 1 ex., Muoviphai, Churachandpur, 2.IV.1992; 1 ex., Koirengei, Imphal, 15.III.1993 and 5 exs., Tuithapi Vill., Churachandpur, 21.III.1993, D. K. Mondal Coll.; 3 exs., Pangmol., Senapati Dist., 1.III.1993, S. K. Saha & Party Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim and West Bengal. Also known from Nepal, Bhutan and Japan.

Remarks : Kapur (1954) recorded this species from Manipur. In the present study we did not get any 'confluent'variety although mentioned in the key.

27. ***Coccinella transversalis*** Fabricius

1781. *Coccinella transversalis* Fabricius, *Spec. Ins.*, P. 97 (Type-loc. : Coromandel, S. India).

1980 *Coccinella transversalis* Fabricius : Chunaram & Sasaji, *Oriental Insects*, **14** (4) : 485.

Material Studied: 4 exs., Churachandpur, 19.III.1974; 3 exs., Nungthukang, 16.III.1974; 2 exs., Loktak Lake, Bishenupur, 17.III.1974; 11 exs., E. Churachandpur, 22.III.1974 and 2 exs., Churachandpur, Churachandpur Dist., 24.III.1974, K. R. Rao Coll.; 2 exs., M. E. School Mao, 16.IX.1975; 1 ex., N. Churachandpur, 21.IX.1975; 1 ex., Bungmual, 29.IX.1975; 1 ex., Moreh, Moreh Dist., 24.IX.1975; 7 exs., Ukhrul, Ukhrul Dist., 30.IX.1975; 1 ex., Awangtang, 1.X.1975; M. S. Shisodia Coll.; 15 exs.; Jiribam, Imphal Dist., 11-13.II.1975, P. T. Cherian Coll.; 1 ex., Sankai, 25.I.1977, S. G. Patil Coll., 1 ex., Chandelpokri, Chandel Dist., 11.VI.1992, R. Mathew Coll.; 1 ex., Keibul-Lamjao National Park, Bishenpur Dist., 2.IV.1992 and 1 ex., Imphathong River bank, Imphal, 29.III. 1992, A. K. Sanyal Coll.; 1 ex., Loktak lake area, Bishenpur Dist., 20.XII.1992 and 1 ex., around Hanuman Mandir, Imphal, 29.XII.1992, R. S. Mridha Coll.; 4 exs., Keibul Lamjao National Park, Bishenpur Dist., 2.IV.1992, S. K. Chatterjee Coll.; 1 ex., Bahiang, Churachandpur Dist., 24.II.1992; 17 exs., Pangmol, 1.III.1993 and 2 exs., Sapermaina, 2.III.1993, Senapati Dist.; 4 exs., Gularthal, Jiribam, Imphal Dist., 4.III.1993, S. K. Saha & Party Coll.; 1 ex., Tuithapi Vill., 21.III.1993 and 1 ex., Mamangleikei, 27.III.1993, Churachandpur Dist., 1 ex., Imphal, 31.III.1993, D. K. Mondal Coll., 1 ex., Harinagar Vill., Jiribam, Imphal Dist., 10.V.1993 and 1 ex., Thanga, Bishenpur Dist., 23.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim, West Bengal, S. India, Kerala, Goa and Andaman Islands. Also known from Burma, China, Thailand, Japan, Taiwan, Sri Lanka, Moluccas, Tasmania, Sunda Island, New Grinea and Australia.

Remarks : This is a new record of the species from Manipur. Very widely distributed species. Generally found in plains.

Genus 15. ***Menochilus*** Timberlake

1943. *Menochilus* Timberlake, *Hawaii Plant. Rec.*, **47** (1) : 40.

1965. *Menochilus* Timberlake : Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ., Ser. II, Nat. Sci., No. 15, P. 61.

28. ***Menochilus sexmaculatus*** (Fabricius)

1781. *Coccinella sexmaculatus* Fabricius, *Spec. Ins.*, P. 96 (Type-loc. : East India)

1850. *Chilomenes sexmaculatus* (Fab.) : Mulsant, *Spec. Trim. Securipalp.*, P. 114.

1943. *Menochilus sexmaculatus* (Fab.) : Timberlake, *Bull. Hawaiian Sug. Plrs. Ass. Exp. Stn.*, (Ent Series) **47** (22) : 40-41.

Material Studied : 2 exs., State Guest House Compound, Imphal, 30.III.1992, P. C. Aguan Coll.; 1 ex., Kangpokpi, Senapati Dist., 17.III.1993 and 1 ex., Chandel, Chandel Dist., 28.III.1993, D. K. Mondal Coll.; 1 ex., Senapati, Senapati Dist., 3.IV.1992; 1 ex., Sendra Loktak Lake, Bishenpur Dist., 10.IV.1992; 4 exs., Gularthal, Jiribam, Imphal Dist., 4.III.1993; 8 exs., Dianamoing, Tamenglong Dist., 6.III.1993, S. K. Saha & Party Coll.; 1 ex., Lilong, South of Imphal, 14.V.1993; 1 ex., Sielmat Res. Forest, Churachandpur Dist., 17.V.1993; 2 exs., Sendra, 21.V.1993 and 2 exs., Thanga, Bishenpur Dist., 23.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Meghalaya, Tripura, West Bengal and Andaman Islands. Also known from Nepal, China, Japan, Burma, Malaya, Philippines, Indonesia, Sumba, Sri Lanka, Taiwan, Thailand, Cambodia, Celebes, Iran, Ryukyus and New Guinea.

Remarks : It's a widely distributed species. Elytral colour varies from straw yellow to black, marking become indistinct. It's a new record of the species from Manipur.

Genus 16. ***Micraspis*** Dejean

1853. *Micraspis* Dejean, *Cat. Coleopt.*, P. 459.

1965. *Micraspis* Dejean : Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ., Ser. II, *Nat. Sci.*, No. 15, P. 59.

Key to the species of the genus *Micraspis*

1. Elytra without any markings. Elytra yellowish brown, sutural margin black, slightly thickened at middle; pronotum yellowish brown with a narrow basal black margin and two discal small black spots ..... *discolor* (Fabricius)

– Elytra with spots or markings 2

2. Elytra testaceous yellow, sutural margin black, each elytron with two black spots, shape and sizes of which varies, one before the middle and another behind the mid-line. Pronotum without any black basal margin, only with two small black spots at the base .... *allardi* (Mulsant)

– Elytra brownis-yellow, sutural margin black, each elytron with a longitudinal black marking, starting from *humeral* callus and extending upto the sub-apical area, external margin black; pronotum with the basal margin black and two discoidal, small black spots ..... *vincta* (Gorham)

29. ***Micraspis allardi*** (Mulsant) Comb. nov.

1866. *Lemnia allardi* Mulsant, *Mem. Acad. Lyon*, **17** : 28 (Type-loc. : Northern India)

1932. *Verania allardi* (Mulsant) : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 307.

Material Studied : No material was available for the present study.

Distribution : India : Manipur, Bihar and Northern India. Also known from Burma.

Remarks : Kapur (1954) recorded this species from Manipur. Its occurence is poor. Differs from the other species of *Micraspis* by the absence of basal black margin on the pronotum.

30. ***Micraspis discolor*** (Fabricius)

1798. *Coccinella discolor* Fabricius, *Suppl. Ent. Syst.*, P. 77 (Type-loc. : India).

1850. *Verania discolor* (Fabricius) : Mulsant, *Spec. Trim. Securipalp.*, P. 369.

1965. *Micraspis discolor* (Fab.) : Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ., Ser. 11, *Nat. Sci.*, No. 15, P. 60.

Material Studied : 1 ex., Ukhrul, Ukhrul Dist., 3.X.1975, M. S. Shisodia Coll.; 4 exs., Julabthal West, 8.XI.1975; 21 exs., Jiribam, Imphal Dist., Imphal, 11-13.XI.1975, P. T. Cherian Coll.; 1 ex., Uchathal, Jiribam, Imphal Dist., 30.XI.1992, A. K. Mondal Coll.

Distribution : India : Manipur, Meghalaya, Tripura, West Bengal, Tamil Nadu, Goa and Andaman Islands. Also known from China, Japan,

Taiwan, Thailand, Philippines, Sri Lanka, Timor and Ryukyus.

Remarks : It is a new record of the species from Manipur.

31. *Micraspis vincta* (Gorham)

1895. *Verania vincta* Gorham, *Ann. Mus. Civ. Genova*, **34** (2) 686, (Type-loc. : Burma).

1968. *Micraspis vincta* (Gorham) : Sasaji, Mushi, Furuoka, **42** : 132.

Material Studied: 2 exs., Keibul Sanctuary, 16.II.1975; 15 exs., Tota Hill, Keibul Sanctuary, Churachandpur Dist., 18.II.1975, P. T. Cherian Coll.; 2 exs., Sunusuphai Vill., Churachandpur Dist., 2.IV.1992, P. C. Aguan Coll.; 2 exs., Imphathong River bank, Imphal, 29.III.1992; 1 ex., Golabothi Basti, Imphal, 30.III.1992; 7 exs., Keibul National Park, Bishenpur Dist., 2.IV.1992; 2 exs., Chajirg Vill., Kangpopi, Imphal, 6.IV.1992, S. K. Chatterjee Coll.; 1 ex., Agricultural college field, Imphal, 30.XI.1992, P. H. Roy & Party Coll.; 1 ex., Singda, 25.II.1993; 1 ex., Sangoimang, Imphal, 27.II.1993; 9 exs., Pangmol, Senapati Dist., 1. III.1993, S. K. Saha & Party; 1 ex., Circuit House, Churachandpur Dist., 19.V.1993, S. K. Chakraborty Coll., ex. "at light"

Distribution : India : Manipur, Assam, Meghalaya, Tripura, West Bengal, Bihar and South India. Also known from Burma, Bangladesh, Thailand, Nepal and Bhutan.

Remarks : Kapur (1954) recorded the species from Manipur.

Tribe 6. **Psylloborini**

Genus 17. ***Illeis*** Mulsant

1850. *Illeis* Mulsant, *Spec. Trim. Securipalp.*, P. 1026.

1932. *Illeis* Mulsant : Korschefsky. *Coleoptm. Cat.*, **16**, Pars 120, P. 558.

32. ***Illeis*** sp.

Material Studied: 1 ex., Julabthal West, 8.XI.1975; 1 ex., Jirighat, 9.XI.1975; 1 ex., Jiribam, Imphal Dist., 11.XI.1975, P. T. Cherian Coll.

Remarks : All the examples are female. Available key by Bielawski (1961) is mainly based on the male genitalia so was of no help for their identification. The species is apparently close to *I. cincta* (F.) and *I. indica* Timberlake but differs by the structure of spermatheca. In the above two species the spermatheca is strongly looped, like an oval ring with a narrow gap between the two ends whereas in the species under discussion the loop is incomplete, the spermatheca is only strongly curved, leaving a wide gap between the two ends. By this structure it appears close to *I. confusa tonkinensis* Bielawski from Tonkin, China.

Subfamily V. EPILACHNINAE

Tribe 7. **Epilachnini**

Key to the genera of tribe *Epilachnini*

1. Tarsal claws without basal tooth; sixth visible abdominal sternite of female occassionally with a deep notch or impression but never splitted longitudinally .... *Epilachna* Chevrolat

– Tarsal claws with basal tooth; sixth visible abdominal sternite of female longitudinally splitted ..... *Henosepilachna* Li

Genue 18. ***Epilachna*** Chevrolat

1837. *Epilachna* Chevrolat, IN Dejean's *"Catalogue des Coleopteres."*, ed. 3, **5** : 460.

1898. *Solanophila* Weise, *Deutsche Ent. Zeitschr.*, 1898 : 99, 101.

1947. *Afissa* Dieke, *Smithsonian Misc. Coll.*, **106** (15) : 8, 113.

1961. *Epilachna* Li & Cook, *Pacific Insects*, **3** : 51.

33. ***Epilachna flavicollis*** (Thunberg)

1781. *Coccinella flavicollis* Thunberg, *Nov. Ins. Spec.*, **1** : 18.

1850. *Epilachna flavicollis* (Thunberg) : Mulsant, *Spec. Trim. Securipalp*, P. 800.

1947. *Afissa flavicollis* (Thunberg) : Dieke, *Smithson. Misc. Coll.*, **106** (15) : 135.

1961. *Epilachna flavicollis* (Thunberg) : Li & Cook, *Pacific Insects*, **3** : 63.

Material Studied : 1 ex, Lairo River bank, Moreh, Chandel Dist., 12.IV.1992, S. K. Chatterjee Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim, West Bengal. Also known from Sri Lanka, Burma, Indonesia, Celebes, Sarawak, Taiwan, Penang, Philippines and Thailand.

Remarks : This is a new record of the species from Manipur. The species is yellow-orange in colour. Pronotum is also of same colour, without any spot; each elytron with 5 medium sized black spots arranged as 2 humeral + 2 transverse-medial + 1 subapical.

Genue 19. ***Henosepilachna*** Li

1961. *Henosepilachna* Li, *Pacific Insects*, **3** : 35.

Key to the species of the genus *Henosepilachna* Li

1. Elytral spots are surrounded by brown to rather light brown ring of moderate width. Pronotum with a pair of black spots on the lateral sides or both confluent to form the entire pronotum black except the antero-lateral margin, which is light brown; the scutellar spot is common to both the elytra, extended towards and almost touching their base and surrounding the scutellum on the two sides, enclosed by a single brown ring .... *manipurensis* Kapur

– Elytral spots are devoid of any such ring, simple spots all over 2

2. Elytral apex with distinct sutural angle. Pronotum either spotless or with 5-7 black spots; each elytron with 6-14 black spots. Male genitalia : Sipho bented at the basal third and near the apex, parameres narrow and straight with tuft of hairs at tips, median lobe with a small hook at apex, dorsal side with a blade, almost half of its length. Female genital plate subtriangular, with a semi-oval emargination on its inner margin near the base ..... *vigintioctopunctata* (Fab.)

– Elytral apex without distinct sutural angle .. 3

3. External median spot (Spot No. 4) on each elytron touching the external margin. Pronotum generally with 5, sometimes 7 black spots; number of elytral spot varies from 6-14 on each elytron. Male genitalia : Sipho nearly straight at the apex which has an eyelet; parameres straight and narrow with tuft of hairs at its apex; median lobe almost straight, narrow, weakly curved to a pointed tip, inner surface dentulate. Female genital plate sub-triangular with a rounded notch on the inner margin near base ..... *dodecastigma* (Wied.)

– External median spot on each elytron very close to the margin but not always touching the margin 4

4. Body oval; pronotum spotless or with 5-7 black spots; number of elytral spots varies from 6-14 on each elytron. Male genitalia : Sipho bented near the basal third, apex sharply narrowed on one side and pointed; parameres narrow, straight with tuft of hairs at apex; median lobe with a sudden curve at apex to form a large pointed hook, dorsal side with a blade or kniefedge of nearly half the length of median lobe. Female genital plate sub-triangular, with a deep cut marks near the base ..... *septima* (Dieke)

– Body semi-circular; Pronotum either spotless or with 5 black spots; each elytron with 6 black spots of which spot No. 1 and 5 are sutural and close to their counterpart on the other elytron, external median spot (Spot No. 4) occassionally touching the external margin. Male genitalia : Sipho bented near the basal third, apex abruptly tapered at apex; parameres narrow, straight, with tuft of hairs at tips; median lobe with a sudden curve at apex to form a pointed tip, dorsal side with an wide blade nearly half the length of median lobe. Female genital plate subtriangular, with a concavity on the inner margin near the base ..... *kaszabi* Biel. & Furs.

34. ***Henosepilachna dodecastigma*** (Wiedmann)

1823. *Coccinella dodecastigma* Wiedmann, *Zool. Mag.*, Kiel, **2** : PP. 73-74 (Type-loc. : Bengal).

1850. *Epilachna dodecastigma* (Wiede) : Mulsant, *Ann. Soc. Agric. Lyon.*, **2** : 789.

1978. *Henosepilachna dodecastigma* (Wiede.) : Hoang, *Entomol. Rev.*, **56** (1) : 98-108.

Material Studied : 8 exs., New Churachandpur, Churachandpur Dist., 10,19.IX.1975; 1 ex., Bungmual, 29.IX.1975; 1 ex., Forest Rest House, Imphal, 6.X.1975, M. S. Shishodia Coll.; 1 ex., Uchathal Vill., Jiribam, Imphal Dist., 9.V.1993, B. Mitra Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim, West Bengal and Andaman Islands. Also known from Burma. North Vietnam and Indonesia.

Remarks : This is a new record of the species from Manipur.

35. ***Henosepilachna kaszabi*** (Bielawski & Fursch)

1960. *Epilachna kaszabi* Bielawski & Fursch, *Mitt. münch. ent. Ges.*, **50** , P. 68 (Type-loc. : Burma : Rangoon).

1981. *Henosepilachna kaszabi* (Biel. & Fursch) : Chunaram and Sasaji, *Oriental Insects*, **14** (4) : 484.

Material Studied : 1 ex., New Churachandpur, 19.IX.1975; 4 exs., Sunusuphai Vill., 2.IV.1992, both from Churachandpur Dist., 1 ex., Lower Hundung, Ukhrul Dist., 8.IV.1992, A. K. Sanyal Coll.; 1 ex., Lumba, 5.III.1993, S. K. Saha Coll. and 1 ex., Uchathal Vill., 9.V.1993, B. Mitra Coll., both from Jiribam, Imphal Dist.

Distribution : India : Manipur and Andaman Islands. Also known from Burma, Philippines and Thailand.

Remarks : This is a new record of the species from Manipur. The elytral sutural spot slightly differs from the Andaman (Kapur 1967) type and more close to the Burmeese type.

36. ***Henosepilachna manipurensis*** (Kapur) Comb. nov.

1950. *Epilachna manipurensis* Kapur, *Rec. Indian Mus.*, **48** (3 & 4), PP. 26-28.

Material Studied : No material was available for the present study.

Distribution : India : Manipur, Assam.

Remarks : This species appears to be strictly indigenous to Manipur.

37. ***Henosepilachna septima*** (Dieke)

1947. *Epilachna septima* Dieke, *Smithson. misc. Coll.*, **106** (15) : 58-59 (Type-loc. : Indochina, Annam).

1978. *Henosepilachna septima* (Dieke) : Hoang, *Entomol. Rev.*, **56** (1) : 98-108.

Material Studied : 1 ex., around Moirang I.B., Bishenpur Dist., 18.III.1974, 1 ex., Churachandpur, Churachandpur Dist., 19.III.1974, K. R. Rao Coll.; 7 exs., New Churachandpur, 19,21.IX.1975; 1 ex., Moreh, Chandel Dist., 24.IX.1975, M. S. Shishodia Coll.; 1 ex., Zulabthal. Jiribam, Imphal Dist., 8.XI.1975, P. T. Cherian Coll.; 1 ex., Harinagar, Jiribam, Imphal Dist., 10.V.1993; 1 ex., Sendra, 21.V.1993 and 2 exs., Thangä, Bishenpur Dist., 23.V.1993, S. K. Chakraborty Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim, West Bengal, Bihar, Uttar Pradesh, Madhya Pradesh, Maharashtra, Punjab, Andhra Pradesh, Tamil Nadu and Andaman Islands. Also known from Sri Lanka, Indonesia and Vietnam.

Remarks : This is a new record of the species from Manipur.

38. ***Henosepilachna vigintioctopunctata*** (Fabricius)

1775. *Coccinella 28-punctata* Fabricius, *Syst. ent.*, P. 84, (Type-loc. : Tranquebar).

1850. *Epilachna vigintioctopunctata* (Fab.) : Mulsant, *Spec. Trim. Securipalp.*, P. 834.

1980. *Henosepilachna vigintioctopunctata* (Fab.) : Chunaram and Sasaji, *Oriental Insects*, **14** (4) : 484.

Material Studied : 1 ex., Churachandpur, Churachandpur Dist., 19.III.1974, K. R. Rao Coll.; 1 exs., New Churachandpur, 19.IX.1975, M. S. Shishodia Coll.; 6 exs., Jiribam, Imphal Dist., 13.XI.1975; 1 ex., Taya Hill, Churachandpur Dist., 18.XI.1975, P. T. Cherian Coll.; 1 ex., Leikul, Chandel Dist., 30.III.1993, D. K. Mondal Coll.; 2 exs., Luloo E. of Jiribam, Imphal Dist., 11.V.1993,

4 exs., Lilong, S. of Imphal, 14.V.1993; 2 exs., Sendra, Bishenpur Dist., 21.V.1993; 4 exs., Moirang, 22.V.1993 and 3 exs., Thanga, 23.V.1993, both Bishenpur Dist., S. K. Chakraborty Coll.

Distribution : India : Manipur, Meghalaya, Tripura, Sikkim, 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 Island, Thailand, New Guinea, Australia and Tasmania.

Remarks : This is a new record of the species from Manipur.

SUMMARY

The present paper deals with 398 example of thirty eight species under nineteen genera belonging to seven tribes under five subfamilies. Of which twenty six species are recorded as new from the state. *Henosepilachna manipurensis Micraspis allardi* (Mulsant) and (Kapur) have been proposed as *Comb. nov.* Keys to the subfamilies, tribes, genera and species have been provided. Relevent synonymies, collection data and geographical distribution have also been included.

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Table 1. Showing the district wise distribution of the species recorded from Manipur.

Name of the species	Imphal	Tamenglong	Senapati	Chandel	Churachandpur	Ukrul	Toubal	Bishenpur
1. *Pullus bourdilloni* Kapur	+							
2. *P. testacecollis* Kapur			+					
3. *Scymnus (Pullus) brunnescens* Mots.	+							
4. *Scymnus (Pullus) pyrocheilus* Muls.	+							
5. *Scymnus (Pullus) victoris* (Motos.)				+				
6. *Scymnus (Pullus) folchini*						+		
7. *Axinoscymnus nigripennis* Kamiya					+			
8. *Cryptogonus bimaculatus* Kapur	+							
9. *C. postmedialis* Kapur					+			
10. *Rodolia breviuscula* Weise				+				
11. *Burmus suturalis* (Fab.)	+							
12. *Aiolocaria dodecaspilota* (Hope)				+	+			
13. *Calvia trilochana* Kapur						+		
14. *C. sykesi* (Crotch)		+						
15. *Callineda sedecimnotata* (Fab.)		+			+			
16. *Coelophora bissellata* Muls.	+			+	+			+
17. *C. saucia* (Muls.)	+		+		+			+
18. C. sexareata Muls.					+			
19. *Oenopia kirbyi* Muls.								+
20. *O. luteopustulata* Muls.	+	+			+	+		+
21. *O. quadripunctata* Kapur	+							
22. *O. sauzeti* Muls.						+		
23. *Harmonia arcuata* (Fab.)	+	+	+		+			+
24. *Coccinella septempunctata* Linnaeus	+		+		+	+		+
25. *C. transversalis* Fab.	+		+	+	+	+		+
26. *Menochilus sexmaculatus* (Fab.)	+	+	+	+				+
27. *Micraspis discolor* (Fab.)	+					+		
28. *M. vincta* (Gorham)	+		+		+			+
29. *Illeis* sp.	+							
30. *Epilachna flavicollis* (Thunberg.)				+				
31. *Henosepilachna dodecastigma* (Wied.)	+				+			
32. *H. kaszabi* (Biel & Furs.)	+				+	+		
33. *H. septima* (Dieke)	+			+	+			+
34. *H. vigintioctopunctata* (Fab.)	+			+	+			+

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INSECTA : COLEOPTERA : CERAMBYCIDAE

P. MUKHOPADHYAY and S. K. HALDER
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

The members of the family Cerambycidae are commonly known as 'longicorn beetles' It belongs to the superfamily chrysomeloidea of the order Coleoptera (Insecta). The family includes a huge assemblage of phytophagous insects of great economic importance.

More than 35,000 species under 4000 genera are known from all over the world. Beeson (1941) has recorded 1200 species from Indian region. Later Breuning (1960-66) added a little over 300 species from India. The group is very economically important for its agricultural and forests pests of different plants. Gahan (1906) divided the family into two sections viz. Lamiinae and Cerambycinae and further divided the section Cerambycinae into 4-tribes viz Prionini, Disteniini, Lepturini and Cerambycini. Fowler (1916) treated Lamiidae as separate family and divided into two groups viz. Lamiinae and Saperdinae. Other chief workers who dealt the group are Aurivillius (1912), Lameere (1913), Breuning (1960-75), Beeson & Bhatia (1939), Beeson (1941), Stebbing (1941) etc. Stebbing (1914) recorded 38 species from *Shorea robusta* and the species, *Stromatium brabatum* from 311 plants.

As regards to the Cerambycid fauna of Manipur, there is no consolidated work. The present author has tried to bring all scattered informations together considering the material which are also not available during the study to get an up to date account of longicorn beetles of Manipur. The study mainly based on the collections made by different survey parties of Zoological Survey of India and the national collection present in the instutute. Prior to study 37 species under 28 genera are recorded from Mainpur. The first species viz. *Stromatium barbatum* of the subfamily Cerambycinae was discribed by Fabricius (1775). Present study added 7 more species under 6 genera for the first time from this state.

SYSTEMATIC ACCOUNT

LIST OF TAXA

Family CERAMBYCIDAE

Subfamily I. LAMIINAE

Tribe (A) **Monochamini**

Genus 1. ***Aristobia*** Thomson, 1868

1. *Aristobia approximator* (Thoms)
2. *Aristobia testudo* Voet.

Genus 2. ***Monochamus*** Guèr- Meneville, 1826

3. *Monochamus* sp.

Tribe (B) **Batocerini**

Genus 3. ***Apriona*** Chevr., 1852

4. *Apriona germari* (Hope)

Tribe (C) **Gleneini**

Genus 4. ***Glenea*** Newm., 1842

5. *Glenea* (S. Str.) *pulchella* Thoms.

Tribe (D) **Phytoeciini**

Genus 5. ***Nupserha*** Thoms., 1860

6. *Nupserha annulata* Thoms.

Tribe (E) **Xylorhizini**

Genus 6. ***Xylorhiza*** Cast., 1840

7. *Xylorhiza* sp.

Tribe (F) **Crossotini**

Genus 7. ***Moechohecyra*** Breuning, 1938

8. *Moechohecyra verrucicollis* Gahan

Subfamily II. PRIONINAE

Group (A) PRIONINI

Genus 8. ***Lophosternus*** Guèr., 1844

9. *Lophosternus socius* Gahan

Genus 9. ***Ancyloprotus*** White, 1853

10. *Ancyloprotus bigibbosus* White

Group (B) AEGOSOMINI

Genus 10. ***Aegosoma*** Serville, 1832

11. *Aegosoma costipenne* White (Megopis)

12. *Aegosoma ornaticolle* White

Genus 11. ***Dinoprionus*** Bates, 1875

13. *Dinoprionus cephalotes* Bates

Genus 12. ***Sarmydus*** Pasc., 1867

14. *Sarmydus antennatus* Pasc.

Subfamily III. DISTENIINAE

Genus 13. ***Cyrtonops*** White, 1853

15. *Cyrtonops nigra* Gahan

Genus 14. ***Distenia*** Serville, 1825

16. *Distenia dohertii* Gahan

Genus 15. ***Dynamostes*** Pascoe, 1857

17. *Dynamostes audax* Pasc.

Subfamily IV. LEPTURINAE

Genus 16. ***Leptura*** Linn., 1758

18. *Leptura manipurensis* Gahan

Genus 17. ***Pyrocalymma*** Thomson, 1864

19. *Pyrocalymma pyrochroides* Thoms.

Subfamily V. CERAMBYCINAE

Group (A) PROTAXINI

Genus 18. ***Protaxis*** Gahan, 1906

20. *Protaxis fulvescens* Gahan

Group (B) ÓEMINI

Genus 19. ***Xystrocera*** Serv., 1834

21. *Xystrocera globosa* Oliv. (Cerambyx)

Group (C) HESPEROPHANINI

Genus 20. ***Stromatium*** Serville, 1834

22. *Stromatium barbatum* F. (Callidium)

Group (D) CALLIDIOPSINI

Genus 21. ***Stenygrinum*** Bates, 1873

23. *Stenygrinum quadrinotatum* Bates

Group (E) CALLICHROMINI

Genus 22. ***Chloridolum*** Thoms., 1864

24. *Chloridolum bivittatum* White (Callichroma)

25. *Chloridolum nympha* White (Callichroma)

Genus 23. ***Aphrodisium*** Thoms., 1864

26. *Aphrodisium cribricolle* Van de Poll

27. *Aphrodisium rubripennis* Hope (Purpuricenus)

Genus 24. ***Chelidonium*** Thoms., 1864

28. *Chelidonium argentatum* Dalm. (Cerambyx)

29. *Chelidonium sinense* Hope (Promeces)

Genus 25. ***Polyzonus*** Casteln., 1840

30. *Polyzonus tetraspilotus* Hope (Cerambyx)

Group (F) PYRESTINI

Genus 26. ***Erythrus*** White, 1853

31. *Erythrus westwoodi* White

Group (G) THRANINI

Genus 27. ***Thranius*** Pascoe, 1859

32. *Thranius simplex* Gahan

33. *Thranius triplagiatus* Gahan

Group (H) CLYTINI

Genus 28. ***Xylotrechus*** Chevrolat, 1869

34. *Xylotrechus contortus* Gahan

35. *Xylotrechus incurvatus* Chevr.

Genus 29. ***Clytus*** Leicharting, 1784

36. *Clytus minutissimus* Nonfried

37. *Clytus montanus* Nonfried

Genus 30. ***Perissus*** Chevr., 1863

38. *Perissus dohertii* Gahan

Genus 31. ***Rhaphuma*** Pascoe, 1858

39. *Rhaphuma horsfieldii* White (Clytus)
40. *Rhaphuma manipurensis* Gahan

Genus 32. ***Demonax*** Thoms., 1861

41. *Demonax dohertii* Gahan
42. *Demonax leucoscutellatus* Hope (Clytus)

Group (I) GLAUCYTINI

Genus 33. ***Polyphida*** Pascoe, 1869

43. *Polyphida metallica* Nonfried (Clytus)

Family CERAMBYCIDAE

Subfamily I. LAMIINAE

Tribe (A) **Monochamini**

Genus 1. ***Aristobia*** Thomson, 1868

1868. *Aristobia* Thomson, *Physis*, **2** : 178.

1. ***Aristobia approximator*** (Thomson)

1865. *Celosterna approximator* Th., *Syst. Ver.*, 552.

1891. *Aristobia approximator* : Brongniart, *Nouv. Arch. Hist. Nat.*, (3) **3** : 247.

Material examined : 2 exs., India : Manipur : Bungmual, 18.IX.75., M. S. Shishodia; 3 exs., Bungmual, 19.IX.75, M. S. Shishodia; 1 ex., Manipur, 18.IX.75, M. S. Shishodia; 2 exs., Manipur, 20.IX.75, Shishodia.

Distribution : India : Manipur.

Elsewhere : Myanmar, Thailand, Cambodia, S. Vietnam, Laos.

Remarks : This species is recorded here for the first time from Manipur.

2. ***Aristobia testudo*** Voet.

1778. *Aristobia testudo* Voet., *Cat. Col.*, **2** : 12, t-10, f-39.

Material examined : 1 ex., Manipur : Khundenglhab in Chanda dist., 24.VI.92, R. Mathew; 1 ex., Churachandpur, 7.VI.92, R. Mathew.

Distribution : India : Manipur, Meghalaya, Sikkim.

Elsewhere : China.

Remarks : This species is recorded here for the first time from Manipur.

Genus 2. ***Monochamus*** Guèr-Meneville, 1826

1826. *Monochamus* Guèr-Meneville, *Dict. Class. Hist. Nat.*, **9** : 186.

3. ***Monochamus*** sp.

Material examined : 1 ex., Manipur : Vaczang, 4.IV.92, A. K. Sanyal.

Remarks : More example needed for identification upto species

Tribe (B) **Batocerini**

Genus 3. ***Apriona*** Chevr., 1852

1852. *Apriona* Chevr., *Rev. Mag. Zool.*, (2) **4** : 414.

4. ***Apriona germari*** (Hope)

1831. *Lania germari* Hope in Gray, *Zool. Miscell*, **1** : 28.

2000. *Apriona germari* (Hope) : Mukhopadhyay & Biswas, *Zool. Surv. India*, State Fauna Serise 4 : Fauna of Meghalaya, Part 5, pp. 58.

Material examined : 1 ex., Manipur : Churachandpur, 5.VI.92, R. Mathew.

Distribution : India : Manipur, West Bengal, Meghalaya, Sikkim.

Elsewhere : Pakisthan, Bangladesh.

Remarks : This species is recorded here for the first time from Manipur.

Tribe (C) **Gleneini**

Genus 4. ***Glenea*** Newm., 1842

1842. *Glenea* Newm., *Entomologist*, **1** : 301.

1920. Subgen. *Macroglenea* Auriv., *Arkiv f. Zool.*, **13** (9) : 30.

1920. Subgen. *Stiroglenea* Auriv., I.C., P. 31.

1922. *Glenea* : Auriv., in *Junk. Col. Cat.*

5. ***Glenea*** (S. Str.) ***pulchella*** Thoms.

1860. *Glenea* (S. Str.) *pulchella* Thoms., *Classif. Ceramb.*, P. 58.

Material examined : 1 ex., Manipur : Imphal, VII.45, Maj. M. L. Roonwal.

Distribution : India : Manipur, West Bengal, Meghalaya, Sikkim, Karnataka, Tamil Nadu.

Elsewhere : Myanmar, Bangladesh.

Tribe (D) **Phytoeciini**

Genus 5. ***Nupserha*** Thomson, 1860

1860. *Nupserha* Thomson, *Classif. Ceramb.*, P. 41, 60.

6. ***Nupserha annulata*** Thoms.

1857. *Nupserha annulata* Thoms., *Archives Ent.*, **1** : 147.

1894. *Nupserha annulata* : Gahan, *Ann. Mus. Civ. Genova*, **34** : 194.

2000. *Nupserha annulata* : Mukhopadhyay & Biswas, *Zool. Surv. India.*, State Fauna Series 4 : Fauna of Meghalaya, Part 5, pp. 62.

Material examined : 1 ex., Manipur : Phaogakchaolkhai in Bishnupur dist., 7.VI.92, R. Mathew.

Distribution : India : Manipur, West Bengal, Meghalaya, Sikkim.

Remarks : This species is recorded here for the first time from Manipur.

Tribe (E) **Xylorhizini**

Genus 6. ***Xylorhiza*** Cast., 1840

1840. *Xylorhiza* Cast., *Hist. Nat. Col.*, **2** : 476.

7. ***Xylorhiza*** sp.

Material examined : 1 ex., Manipur : Tauranglong dist., 7.II.92, A. K. Mandal.

Remarks : More example needed for species identification.

Tribe (F) **Crossotini**

Genus 7. ***Moechohecyra*** Breuning, 1938

1938. *Moechohecyra* Breuning, *Festschr. E. Strand.*, **4** : 231.

8. ***Moechohecyra verrucicollis*** Gahan

1895. *Moechohecyra verrucicollis* Gahan, *Ann. Mus. Civ. Genova.*, **34** : 60.

Material examined : 1 ex., Manipur : Tamenlong dist., 22.II.92, A. K. Mandal & Party.

Distribution : India : Manipur.

Elsewhere : Burma, North Vietnam, Laos.

Remarks : This species is recorded here for the first time from India (Manipur).

Subfamily PRIONINAE

GROUP PRIONINI

Genus ***Lophosternus*** Guèr., 1844

1844. *Lophosternus* Guèr., *Icon. Règne Anim.*, Ins. P. 209.

1844. *Cyrtosternus* Guèr., *Icon. Règne Anim, Ins.*, P. 210.

1869. *Cyrtosternus* (Part.), Lacord., *Gen. Coleopt.* **8** : 53.

1906. *Lophosternus* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 9-13.

9. ***Lophosternus socius*** Gahan

1906. *Lophosternus socius* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 11.

Material examined : Not seen.

Distribution : India : Manipur.

Genus ***Ancyloprotus*** White, 1853

1853. *Ancyloprotus* White, *Cat. Coleopt. B. M. Logic.* **1** : 19.

10. ***Ancyloprotus bigibbosus*** White

1853. *Ancyloprotus bigibbosus* White, *Cat. Coleopt. B. M. Logic.* **1** : 19, pl. 1. fig. 4.

1906. *Ancyloprotus bigibbosus* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 19.

Material examined : Not seen.

Distribution : India : Manipur, Assam.

Elsewhere : Myanmar.

Remarks : This species is recorded here for the first time from Manipur.

GROUP AEGOSOMINI

Genus ***Aegosoma*** Serville, 1832

1832. *Aegosoma* Serville, *Ann. Soc. ent. Fr.*, **1** : 162.

1906. *Aegosoma* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 44-49.

11. ***Aegosoma costipenne*** White (Megopis)

1853. *Aegosoma costipenne* White (Megopis), *Cat. Coleopt. B. M. Longic*, **1** : 28, pl. 2, fig. 2.

1867. *Aegosoma lacertosum* Pasc., *Ann Mag. Nat. Hist.*, (3) **19** : 413.

1906. *Aegoscma costipenne* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 49.

Material examined : Not seen.

Distribut'on : India : Assam, Manipur, Sikkim.

12. *Aegosoma ornaticolle* White

1853. *Aegosoma ornaticolle* White, *Cat. Coleopt. B. M. Logic.* P. 30.

1906. *Aegosoma ornaticolle* : Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 45.

Material examined : Not seen.

Distribution : India : Manipur, Assam.

Elsewhere : Myanmar.

Genus *Dinoprionus* Bates, 1875

1875. *Dinoprionus* Bates, *Ent. Mon. Mag.*, **12** : 49.

1906. *Dinoprionus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 43-44.

13. *Dinoprionus cephalotes* Bates

1875. *Dinoprionus cephalotes* Bates, *Ent. Mon. Mag.*, **12** : 50.

1906. *Dinoprionus cephalotes*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 43-44.

Material examined : Not seen.

Distribution : India : West Bengal, Manipur.

Genus *Sarmydus* Pasc., 1867

1867. *Sarmydus* Pasc., *Ann. Mag. Nat. Hist.* (3) **19** : 410.

1906. *Sarmydus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 51-52

14. *Sarmydus antennatus* Pasc.

1867. *Sarmydus antennatus* Pasc., *Ann. Mag. Nat. Hist.* (3) **19** : 410.

1906. *Sarmydus antennatus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 52.

Material examined : Not seen.

Distribution : India : Manipur, Andaman & Nicobar Is.

Elsewhere : Myanmar, Indonesia.

Subfamily DISTENIINAE

Genus *Cyrtonops* White, 1853

1853. *Cyrtonops* White, *Cat. Coleopt. B. M.*, Longic, P. 32.

1886. *Cladopalpus* Lansb., *Notes Leyd. Mus.*, **8** : 35.

15. *Cyrtonops nigra* Gahan

1906. *Cyrtonops nigra*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 60-61.

Material examined : Not seen.

Distribution : India : Manipur.

Genus *Distenia* Serville, 1825

1825. *Distenia* Serville, *Encycl. Méth.*, **10** : 485.

1906. *Distenia*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 62-65.

16. *Distenia dohertii* Gahan

1906. *Distenia dohertii*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 64.

Material examined : Not seen.

Distribution : India : Manipur.

Genus *Dynamostes* Pascoe, 1857

1857. *Dynamostes* Pascoe, *Trans. Ent. Soc*, (2) **4** : 90, pl. 22, fig 1.

1906. *Dynamostes*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 61-62.

17. *Dynamostes audax* Pasc.

1857. *Dynamostes audax* Pasc., *Trans. Ent. Soc*, (2) **4** : 90, pl. 22, fig 1.

1906. *Dynamostes audax*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 61-62.

Material examined : Not seen.

Distribution : India : Manipur, Sikkim.

Subfamily LEPTURINAE

Genus *Leptura* Linn., 1758

1758. *Leptura* Linn., *Syst. Nat.*, ed. 10, P. 397.

1869. *Leptura*, Lacord., *Gen. Coléopt.*, **8** : 445.

18. *Leptura manipurensis* Gahan

1906. *Leptura manipurensis*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 86.

Material examined : Not seen.

Distribution : India : Manipur.

Genus *Pyrocalymma* Thomson, 1864

1864. *Pyrocalymma* Thoms. *Syst. Ceramb.*, P. 159.

1869. *Pyrocalymma*, Lacord., *Gen. Coléopt.*, **8** : 516.

1906. *Pyrocalymma*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 88-90.

19. *Pyrocalymma pyrochroides* Thoms.

1864. *Pyrocalymma pyrochroides* Thoms. *Syst. Ceramb.*, P. 160.

1906. *Pyrocalymma pyrochroides*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 89.

Material examined : Not seen.

Distribution : India : West Bengal, Sikkim, Manipur.

Elsewhere : Myanmar.

Subfamily CERAMBYCINAE

Group PROTAXINI

Genus *Protaxis* Gahan, 1906

1906. *Protaxis* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 93-94.

20. *Protaxis fulvescens* Gahan

1906. *Protaxis fulvescens*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 93-94.

Material examined : Not seen.

Distribution : India : Manipur, Nagaland.

Group ÓEMINI

Genus *Xystrocera* Serv., 1834

1834. *Xystrocera* Serv., *Ann. Soc. ent. Fr.*, P. 69.

1869. *Xystrocera*, Lacord, *Gen. Cloéopt.*, **8** : 229.

1906. *Xystrocera*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 105-107.

21. *Xystrocera globosa* Oliv. (Cerambyx)

1795. *Xystrocera globosa* Oliv. (Cerambyx), *Entom.* **4** (No. 67) : 27, pl. 12, fig. 81.

1906. *Xystrocera globosa*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 106-107.

Material examined : 2 ex., India : Manipur, North of Imphal, 2.X.45, Dr. M. L. Roonwal; 1 ex., Manipur, below Modbang near Imphal, XI.45, Dr. M. L. Roonwal.

Distribution : India : Manipur, West Bengal, Assam, Maharashtra, Karnataka, Tamil Nadu.

Elsewhere : Srilanka, Myanmar, Malay Peninsula, Indonesia, Philippines, Egypt, Mauritius, Hawaiian Islands, Siam.

Remarks : This species is recorded here for the first time from Manipur.

Group HESPEROPHANINI

Genus *Stromatium* Serville, 1834

1834. *Stromatium* Serville, *Ann. Soc. ent. Fr.*, P. 80.

1869. *Stromatium*, Lacord, *Gen. Coléopt.*, **8** : 282.

1906. *Stromatium*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 114-115.

22. *Stromatium barbatum* Fab. (Callidium)

1775. *Stromatium barbatum* Fab. (Callidium), *Syst. Ent.*, P. 189.

1906. *Stromatium barbatum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 114-115.

Material examined : 7 exs., India : Manipur : Churachandpur, 3.VI.92, R. Mathew.

Distribution : India : Manipur, Andaman Is..

Elsewhere : Srilanka, Myanmar Mauritius, Bourbon, Madagascar.

Remarks : This species is recorded here for the first time from Manipur.

Group CALLIDIOPSINI

Genus *Stenygrinum* Bates, 1873

1873. *Stenygrinum* Bates, *Ann. Mag. Nat. Hist.*, (4) **12** : 154.

1906. *Stenygrinum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 163-164.

23. ***Stenygrinum quadrinotatum*** Bates

1873. *Stenygrinum quadrinotatum* Bates, *Ann. Mag. Nat. Hist.*, (4) **12** : 154.

1906. *Stenygrinum quadrinotatum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 164.

Material examined : Not seen

Distribution : India : Manipur, Meghalaya.

Elsewhere : Myanmar, China, Japan.

Group CALLICHROMINI

Genus ***Chloridolum*** Thoms., 1864

1864. *Chloridolum* Thoms., *Syst. Ceramb.*, P. 174.

1869. *Chloridolum*, Lacord., *Gen. Coléopt.*, **9** : 18.

1906. *Chloridolum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 198-202.

24. ***Chloridolum bivittatum*** White (Callichroma)

1853. *Chloridolum bivittatum* White (Callichroma) *Coleopt. B. M.*, Longic, P. 162.

1906. *Chloridolum bivittatum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 198-199.

Material examined : Not seen

Distribution : India : Assam, Manipur.

Elsewhere : Bhutan.

25. ***Chloridolum nympha*** White (Callichroma)

1853. *Chloridolum nympha* White (Callichroma) *Coleopt. B. M.*, Longic, P. 161.

1906. *Chloridolum nympha*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 201.

Material examined : Not seen

Distribution : India : Manipur, West Bengal, Sikkim.

Genus ***Aphrodisium*** Thoms., 1864

1864. *Aphrodisium* Thoms., *Syst. Ceramb.*, P. 173.

1869. *Aphrodisium*, Lacord, *Gen. Coléopt.*, **9** : 11.

1906. *Aphrodisium*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 205-210.

26. ***Aphrodisium cribricolle*** Van de Poll

1890. *Aphrodisium cribricolle* Van de Poll, *Notes Leyd. Mus.*, **12** : 157.

1906. *Aphrodisium cribricolle*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 207.

Material examined : 2 exs., India : Manipur : 16 miles north of Imphal, 9.XI.45, Dr. M. L. Roonwal.

Distribution : India : Manipur, Sikkim.

Remarks : This species is recorded here for the first time from Manipur.

27. ***Aphrodisium rubripennis*** Hope (Purpuricenus)

1843. *Aphrodisium rubripennis* Hope (Purpuricenus), *Trans. Linn. Soc.*, **19** (2) : 110, pl. 10, fig 6.

1906. *Aphrodisium rubripennis*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 210.

Material examined : Not seen.

Distribution : India : Manipur, Assam Meghalaya.

Genus ***Chelidonium*** Thomson, 1864

1864. *Chelidonium* Thomson, *Syst. Ceramb.*, P. 175.

1869. *Leontium*, Lacord. (ncc. Thomson), *Gen. Coléopt.*, **9** : 19.

1906. *Chelidonium*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 210-213.

28. ***Chelidonium argentatum*** Dalm. (Cerambyx) Schönh

1817. *Chelidonium argentatum* Dalm. (Cerambyx) Schonh., *Syn. Ins. App.*, P. 151.

1906. *Chelidonium argentatum*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 211-212.

Material examined : Not seen.

Distribution : India : Manipur, Nagaland, Meghalaya, Tamil Nadu.

Elsewhere : China.

29. *Chelidonium sinense* Hope (Promeces)

1841. *Chelidonium sinense* Hope (Promeces) *Proc.Ent. Soc. Lond.*, P. 63.

1894. *Leontium*, Gahan, *Ann. Mus. Civ. Genova*, **34** : 17.

1906. *Chelidonium sinense*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 212.

Material examined : Not seen.

Distribution : India : Manipur, Sikkim.

Elsewhere : Myanmar, China.

Genus *Polyzonus* Casteln., 1840

1840. *Polyzonus* Casteln., *Hist. Nat. Coléopt.*, **2** : 438.

1869. *Polyzonus*, Lacord., *Gen. Coléopt.*, **9** : 21.

1906. *Polyzonus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 213-220.

30. *Polyzonus tetraspilotus* Hope (Cerambyx)

1835. *Polyzonus tetraspilotus* Hope (Cerambyx), *Silberm. Rev. Ent.*, **3** : 71, pl. 32.

1853. *Polyzonus quadrimaculatus*, White, *Cal. Coleopt. B. M.*, Longic, P. 170.

1906. *Polyzonus tetraspilotus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 214-215.

Material examined : Not seen.

Distribution : India : Manipur, Assam, Tamil Nadu.

Group PYRESTINI

Genus *Erythrus* White, 1853

1853. *Erythrus*, White, *Cat. Coleopt. B. M.*, Longic, P. 242.

1861. *Disidâema*, Thomson, *Essai Classif. Ceramb.*, P. 147.

1906. *Erythrus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 229-232.

31. *Erythrus westwoodi* White

1853. *Erythrus westwoodi*, White, *Cat. Coleopt. B. M.*, Longic, P. 143.

1906. *Erythrus westwoodi*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 231.

Material examined : Not seen.

Distribution : India : Manipur, Himalayas, Northern India, Uttaranchal.

Group THRANINI

Genus *Thranius* Pascoe, 1859

1859. *Thranius* Pascoe, *Trans. Ent. Soc.* (2) **5** : 22.

1869. *Thranius*, Lacord., *Gen. Coléopt.*, **8** : 470.

1906. *Thranius*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 236-239.

32. *Thranius simplex* Gahan

1894. *Thranius simplex* Gahan, *Ann. Mus. Civ. Genova*, **34** : 15.

1906. *Thranius simplex*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 237-238.

Material examined : Not seen.

Distribution : India : Manipur.

Elsewhere : Myanmar.

33. *Thranius triplagiatus* Gahan

1906. *Thranius triplagiatus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 238.

Material examined : Not seen.

Distribution : India : Manipur.

Group CLYTINI

Genus *Xylotrechus* Chevrolat, 1869

1869. *Xylotrechus* Chevrolat, *Ann. Soc. ent. Fr.*, P. 456.

1906. *Xylotrechus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 241-250.

34. *Xylotrechus contortus* Gahan

1906. *Xylotrechus contortus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 249.

Material examined : Not seen.

Distribution : India : Sikkim, Manipur.

35. ***Xylotrechus incurvatus*** Chevr.

1863. *Xylotrechus incurvatus* Chevr. (Amaurâesthes), *Mém. Soc. R. Sci. de Liége,* **18** : 331.

1906. *Xylotrechus incurvatus,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 248-249.

Material examined : Not seen.

Distribution : India : Manipur.

Elsewhere : Upper Myanmar.

Genus ***Clytus*** Leicharting, 1784

1784. *Clytus* Leicharting, *Verz. Tyrol. Ins.,* **2** : 88.

1906. *Clytus,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 250-253.

36. ***Clytus minutissimus*** Nonfried

1893. *Clytus minutissimus* Nonfried, *Berl. ent. Zeit.,* **33** : 339.

1906. *Clytus minutissimus,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 253.

Material examined : Not Seen.

Distribution : India : Manipur.

37. ***Clytus montanus*** Nonfried

1893. *Clytus montanus* Nonfried, *Berl. ent. Zeit.,* **38** : 337.

1906. *Clytus montanus,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 253.

Material examined : Not seen.

Distribution : India : Manipur.

Genus ***Perissus*** Chevr., 1863

1863. *Perissus* Chevr., *Mém. Soc. R. Sci. De Liége,* **18** : 262.

1906. *Perissus,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 254-259.

38. ***Perissus dohertii*** Gahan

1906. *Perissus dohertii,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 258.

Material examined : Not seen.

Distribution : India : Manipur.

Genus ***Rhaphuma*** Pascoe, 1858

1858. *Rhaphuma* Pascoe, *Trans. Ent. Soc.* (2) **4** : 240.

1863. *Rhaphuma,* Chevr., *Mém. Soc. R. Sci. de Liége,* **18** : 275.

1861. *Rhaphuma,* Thoms., *Essai Classif. Ceramb.,* P. 221.

1906. *Rhaphuma,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 271-279.

39. ***Rhaphuma horsfieldii*** White (Clytus)

1855. *Rhaphuma horsfieldii* White (Clytus), *Cat Coleopt. B. M.,* Longic, P. 284.

1906. *Rhaphuma horsfieldii,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 272-273.

Material examined : Not seen.

Distribution : India : Manipur, West Bengal, Nagaland.

Elsewhere : Myanmar, Indonesia.

40. ***Rhaphuma manipurensis*** Gahan

1906. *Rhaphuma manipurensis,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 274-275.

Material examined : Not seen.

Distribution : India : Manipur.

Genus ***Demonax*** Thoms., 1861

1861. *Demonax* Thoms., *Essai Classif. Ceramb.,* P. 226.

1863. *Grammographus* Chevr., *Mém. Soc. R. Sci. de Liége,* **18** : 285.

1869. *Elezira,* Pascoe, *Trans. Ent. Soc.* (3) **3** : 637.

1906. *Demonax,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 280-299.

41. ***Demonax dohertii*** Gahan

1906. *Demonax dohertii,* Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 291-292.

Material examined : Not seen.

Distribution : India : Manipur.

42. ***Demonax leucoscutellatus*** Hope (Clytus)

1831. *Demonax leucoscutellatus* Hope (Clytus), *Gray's Zool. Misc.,* P. 28.

1863. *Raphuma semiscutellata* Chevr., *Mém. Soc. R. Sci. de Liége*, **18** : 282.

1906. *Demonax leucoscutellatus*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 286-287.

Material examined : Not seen.

Distribution : India : Manipur, Sikkim, Assam, Nagaland.

Elsewhere : Nepal.

Group GLAUCYTINI

Genus ***Polyphida*** Pascoe, 1869

1869. *Polyphida* Pascoe, *Trans. Ent. Soc.* (3) **3** : 652.

1906. *Polyphida*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 321-322.

43. ***Polyphida metallica*** Nonfried (Clytus)

1893. *Polyphida metallica* Nonfried (Clytus), *Berl. ent. Zeit.*, **38** : 338.

1894. *Polyphida feâe* Gahan, *Ann Mus. Civ. Genova*, **34** : 29, pl, 1. fig. 8.

1906. *Polyphida metallica*, Gahan, *The Fauna of British India including Ceylon and Burma* (Col : Cerambycidae), **1** : 321-322.

Material examined : Not seen.

Distribution : India : Manipur.

Elsewhere : Upper Myanmar.

SUMMARY

The present paper consolidates the cerambycid fauna recorded from Manipur. It deals with 43 species under 33 genera belonging to five subfamilies. Of which the species, *Moechohecyra verrucollis* Gahan is recorded for the first time from India and a total of 7 species under 6 genera are recorded for the first time from Manipur. Distributional data of each species has been given from the published records as well as actual study of the specimens. Key to the subfamilies, genera and species has already given in earlier publication made by the author.

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INSECTA : COLEOPTERA : HISTERIDAE

S. K. CHAKRABORTY
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Family Histeridae belongs to superfamily Histeroidea and is well represented in the Indian sub-continent. Members of this family are very small to medium in size; round, oval or elongated in shape; generally black and shining with hard exoskeleton. They are predacious in habit both in larval and adult form. These beetles occur in a variety of habitats namely in soil, in dung of various animals, in termite and ant nests and under bark. Members of the subfamily Trypaneinae are predating on wood boring insects; Saprininae and Histerinae occur in dung, leaf litter or Carrion and predate on maggots. Some of the Histerinae beetles are predators of the under bark fauna.

Nothing was known about the Histeridae fauna of Manipur. As Manipur is very close to Burma, the fauna is also similar. The Burma fauna has already been worked out by Lewis (1888-1894) which helped us a lot in this work.

In the present work I have recorded six species under five genera for the first time from the state. Amongst these, two species, namely *Chronus socialis* Lewis and *Apobletes malaccensis* Marseul, are recorded for the first time from India.

At present about 175 species under 34 genera are known from India in comparison to about 200 genera and 3000 species all over the world.

The present paper deals with materials accumulated in Coleoptera Section from different survey parties of this Institute. From the study it appears that our collection was very poor. It requires more survey work to the state of Manipur.

In our early work, State fauna of West Bengal; State fauna of Meghalaya etc. We have provided details informations about the workers on Histeridae. Key to the subfamilies and other many informations which I do not like to repeat here once again. This paper should be considered as the primary information about the Histeridae beetles of Manipur.

SYSTEMATIC ACCOUNT

Family HISTERIDAE

Subfamily HISTERINAE

Tribe **Histerini**

Genus 1. ***Pachylister*** Lewis 1904

1. *P. Chinensis* (Quens)

Genus 2. ***Hister*** Linnaeus 1767

2. *H. squalidus* Erichson

Genus 3. ***Chronus*** Lewis 1914

3. *C. scaliformis* Desbordes
4. *C. socialis* Lewis

Tribe 2. **Platysomini**

Genus 4. ***Apobletes*** Marseul, 1860

5. *A. malaccensis* Marseul

Genus 5. ***Platylister*** Lewis 1892

6. *P. strialis* Marseul

Key to the tribes of Subfamily HISTERINAE

1. Tarsal groove of front tibiae straight, inner edge of the groove distinctly emerginate .... **Histerini**

— Tarsal groove of front tibiae 'S' shaped, strongly Cleft, sharply defined ..... **Platysomini**

Key to the genera of the tribe Histerini

1. Body finely and microscopically punctate above and below; anterior margin of mesosternum straight or feebly arcuate; pronotum without any impression ..... ***Chronus*** Lewis

— Body not finely punctated; anterior margin of mesosternum emarginate 2

2. Large size beetles, Length 8.11-12.33 mm.; Width 5.77-8.55 mm., left mandible generally longer than right in male; labrum produced and accuminate in the middle..... ***Pachylister*** Lewis

— Medium sized beetles, Length 4.66-6.00 mm; width 3.44-4.00 mm., mandibles equal in length, labrum straight or little produced ..... ***Hister*** Linn.

Tribe **Histerini**

Genus 1. ***Pachylister*** Lewis

1904. *Pachylister* Lewis, *Ann. Mag. Nat. Hist.* (7) **14** : 145.

1910. *Pachylister,* Bickhardt, *Coleopt. Cat.* pars 24 : 37

1. ***Pachylister chinensis*** (Quens)

1806. *Hister chinensis* Quens, *in Schonh Syn. Ins.*, **1** : 88.

1916. *Pachylister chinensis* : Bickhardt, *General Insectorum,* p. 174.

1995. *Pachylister chinensis,* Chakraborty & Biswas, *Zool. Surv. India State Fauna Series* 3 : *Fauna of West Bengal,* part 6(A) : 191

Material studied : 1 ex., Kongrai, 22.iii.1975, M. Dutta Coll., 2 exs., Sankai, 25.2.1977 and 1 ex., Domba, 28.2.1977, S.G. Patil Coll., 3 exs., Lumba, 5.iii.1993, S.K. Saha & Party Coll., ex. "cowdung"

Distribution : India : Manipur, Assam, Meghalaya, Tripura, Arunachal Pradesh, West Bengal and Karnataka. Also known from China, Burma and Malayasia.

Remarks : This species was earlier recorded from Assam. Manipur was a part of Assam at that time. This is the first record of this species from Manipur.

Genus 2. ***Hister*** Linnaeus

1767. *Hister* Linnaeus, *Syst. Nat.*, ed 12, 11, P-566

1910. *Hister* Bickhardt, *Coleopt, Cat.*, Pars 24 : 35

2. ***Hister squalidus*** Erichson

1834. *Hister squalidus* Erichson, *in Klug,* Jahrb. Ins. **1** : 148.

1910. *H. squalidus,* Bickhardt, *Coleopt. Cat.*, Pars 24 : 50

2000. *H. squalidus,* Chakraborty & Biswas, *Zool. Surv. India State Fauna Series-4, Fauna of Meghalaya,* Part 5 : 105.

Material examined : 1 ex., Gulazeng, 25.iii.1975, M. Dutta Coll., 1 ex., Kohima, II.i.1976; 1 ex., Keithen manbi, 14.1.1976; 2 exs., Moreh, 21.i.1976, A. K. Ghosh Coll. 1 ex., T. M. Kasom (Litan), 21.i.1977; 4 exs., Shakpao, (Litan), 22.i.1977; 2 exs., Tangon, 23.i.1977; 1 ex., Sankai, 25.i.1977; 12 exs., Ishikimai, 26.i.1977; 13 exs., Newheaven, 27.i.1977; 6 exs., Domba, 28.i.1977; 2 exs., Ukhrul Road, 29.i.1977 S.G. Patil Coll., 1 ex., on road, Chandel Dist., 10.vi.1992, R. Mathew & Party Coll., (E.R.S. Reg. No. 35396). 2 exs., Sagang Res. Forest, Chura Chandpur Dist., 21.xii.1992, A. R. Lahiri Coll.

Distribution : India : Manipur and Meghalaya (Garo Hills). Also known from Myanmar and China.

Remarks : This species is recorded for the first time from Manipur.

Genus 3. ***Chronus*** Lewis

1914. *Chronus* Lewis, *Ann. Mag. Nat. Hist.*, (8) **14** : 285

Key to the species of the genus *Chronus*

1. Oblong oval, brownish; frontal stria feeble; lateral stria on pronotum subparallel to the margin; elytral striae 6, 1-3 entire, sutural shorter than 4 and 5; Propygidium and Pygidium very finely punctate, length- 3mm ..... *scaliformis* Desb.

— Short oval, shining black; frontal stria wellmarked; interstice between lateral stria and lateral margin of pronotum widened at middle; elytral stria 6, 1-3 entire, sutural stria longer than 4 and 5; propygidium and pygidium closely punctate with various sizes of punctures; length 3.5 mm ..... *socialis* Lewis

3. *Chronus scaliformis* Desbordes

1923. *Chronus scaliformis* Desbordes, *Bull. Soc. Ent. Fr.* **26** : 60-61

2000. *Chronus scaliformis*, Chakraborty & Biswas, *Zool. Surv. India, State Fauna Series* 4 : *Fauna of Meghalaya*, Part 5 : 107

Material studied : 4 exs., Thoubal, Thoubal Dist., 25.ii.1993, S.K. Saha & Party Coll., ex. "bannana sheath"

Distribution : India : Manipur, Meghalaya, West Bengal and Sikkim.

Remarks : Recorded first time from Manipur.

4. *Chronus socialis* Lewis.

1914. *Chronus socialis* Lewis, *Ann. Mag. Nat., Hist.* (8) : **14** : 285-286

Material studied : 1 ex., Thoubal, Thoubal Dist., 25.ii.1993, S.K. Saha & Party Coll., ex. "banana sheath"

Distribution : India : Manipur. Also from Tong king (China), the Type-locality.

Remarks : This species recorded from the first time from Manipur as well as India.

Tribe 2. **Platysomini**

Key to the genera of tribe Platysomini

1. Small sized beetles, length 3.66 mm, width 1.88 mm., body evenly depressed, prosternum very large and broad; pygidium triangular, weakly convex, inclined, border slightly elevated ..... ***Apobletes*** Mars.

— Medium sized beetles, length 3.88 mm, width 2.44 mm., body not depressed, prosternum narrower; pygidium semilunar, concave with external margin arched ..... ***Platylister*** Lewis

Genus 4. ***Apobletes*** Marseul

1860. *Apobletes* Marseul, *Ann. Soc. Ent. Fr.* (3) **8** : 852.

1910. *Apobletes*, Bickhardt, *Coleopt. Cat.*, Pars **24** : 16

5. ***Apobletes malaccensis*** Marseul

1870. *Apobletes malaccensis* Marseul, *Ann. Soc. Ent. Belgique*, **13** : 64-65

1910. *Apobletes malaccensis*, Bickhardt, *Coleopt. Cat., Pars* **24** : 17

Material studied : 1 ex., Behiang, Churachandpur Dist., 24.ii.1993, S.K. Saha & Party Coll., ex. "bannana sheath"

Distribution : India : Manipur. Also known from Malacca.

Remarks : This is a new record of this species from Manipur as well as India.

Genus 5. ***Platylister*** Lewis

1892. *Platylister* Lewis, *Ent. Month. Mag.*, **28** : 103

1916. *Platylister*, Bickhardt, *Gen. Ins. Fasc.*, 166a.

6. ***Platylister strialis*** Marseul

1864. *Platylister strialis* Marseul, *Abeille* 1, p. 301

1910. *Platylister strialis*, Bickhardt, *Coleopt, Cat.*, Pars **24** : 20

2000. *Platylister strialis*, Chakraborty & Biswas, *Zool. Surv. India State Fauna Series 4, Fauna of Meghalaya* part 5 : 111

Material studied : 1 ex., New heaven, 27.i.1977, S.G. Patil Coll.

Distribution : India : Manipur Meghalaya, Arunachal Pradesh, West Bengal and Tripura. Also known from Celebes, Vietnam, Borneo, Sumatra, Sumba Island, Nepal and Bhutan.

Remarks : This also is a new record of this species from Manipur.

SUMMARY

The present paper deals with 6 species under 5 genera, 2 tribes of one subfamily. All are recorded for the first time from Manipur. *Chronus socialis* Lewis and *Apobletes malaccensis* Marseul

District-wise distribution of Histeridae beetles in Manipur

Name of the species	Imphal	Bishenpur	Chandel	Churachandpur	Senapati	Tamenglong	Thoubal	Ukhrul
1. *Pachylister-chinensis* (Quens)	-		-	-	-	-	-	-
2. *Hister squalidus* Erichson	-	-	+	+	-	-	-	+
3. *Chronus scaliformis* Desbordes	-	-	-	-	-	-	+	-
4. *Chronus socialis* Lewis	-	-	-	-	-	-	+	-
5. *Apobletes malaccensis* Marseul	-	-	-	+	-	-	-	-
6. *Platylister strialis* Marseul		-	-	-	-	-		-

are recorded for the first time from India. Relevant collection data and important references under each species have also been provided.

ACKNOWLEDGEMENT

Author is thankful to Dr. J. R. B. Alfred, Director, Zoological Survey of India for facilities of work. I am also thankful to Dr. G.K. Srivastava, Additional Director and Dr. S. K. Mitra, Joint Director for their valuable suggestions. I am indebted to Dr. P. Mukhopadhyay, Scientist C, Officer-in-charge, Coleoptera Section for kindly going through the manuscript. I am also thankful to the sectional staffs for their various helps. I also acknowledge the helps provided by the Forest Officials, Govt. of Manipur for successfully surveying of the area.

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State fauna series 4 : *Fauna of Meghalays* Part 5:

State fauna series : *Fauna of Tripura* 2000.

State fauna series : *Fauna of Sikkim* 2003.

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1892 Histeridae from Burma *Ann. Mus.* Genova (2) **12** : 16-39

MARSEUL, S. A. 1854 Essai monograph sur la fam. Histeridae in *Ann. Soc. Ent. Fr.* **(3)** : 161-311, 525-592, 671-707

Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 437-444, 2004

INSECTA : COLEOPTERA : SILVANIDAE

T. K. PAL and B. BARAIK
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata-700 053

INTRODUCTION

The Silvanidae are a moderately large family of the section Clavicornia of the superfamily Cucujoidea. The silvanids are usually small (1.3-4.5mm.), reddish-brown and occasionally with dorsal spots. They are largely associated with litter or vegetable debris and a good number of species are subcorticolous by habit. A few species cause considerable damage to stored food products of vegetable origin. The Silvanidae seem to be more diversely represented in the tropical and subtropical climates than in the temperate zones. The representatives of the family occur in all the main continental area of the world, but so far, only a few species have been recorded from New Zealand and the oceanic islands. After Grouvelle (1908,1912) the works of Pal and Sengupta (197,1979,1984); Pal (1981,1985); Pal, Sengupta and Crowson (1984); and Sengupta and Pal (1996) have contributed to the knowledge of the Silvanidae of India. Later, Pal and Halstead (1998) recorded *Acathartus* Grouvelle from Mizoram: India with a new species. The present work is based on the collection by the author from Manipur in 1996 and 1998. These represent 7 species under 4 genera.

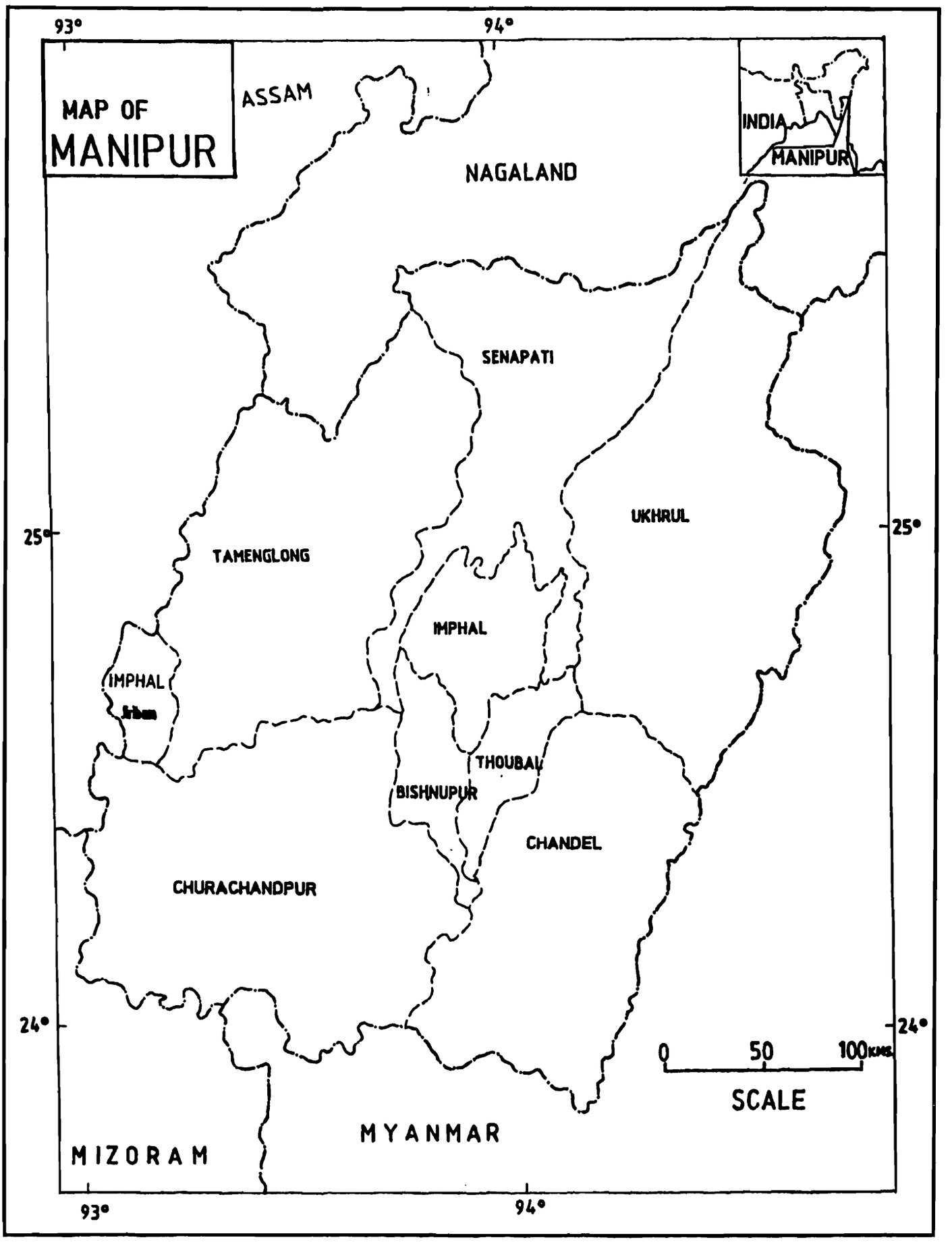
CHARACTER OF THE FAMILY

Body small to moderately large (1.3 – 11.5 mm.), usually parallel-sided and somewhat flattened or sometimes ovoid and subconvex, elytral punctation in rows.

Head usually little elongate, sometimes transverse, usually with a transverse impressed line on vertex behind eyes, fronto-clypeal suture present or absent, antennal insertions hidden or exposed but never distinctly dorsal; gular sutures well separated, anterior part of gular region without longitudinal grooves, genal process normal; antenna 11-segmented, often with 3-sgmented club and sometimes without club; mandible with two or three apical teeth, well developed mola, sometimes with a large cavity on dorsal side, otherwise cavity reduced to a vestige and without dorsal tubercle; maxilla with distinct lacinia and galea, lacinia narrow and with or without apical spine, galea broad and its apex densely hairy, palpi with apical segment rarely securiform; labium with mentum transverse; palpi with apical segment rarely securiform or transverse or distinctly smaller than segment 2.

Prothorax usually elongated and sometimes transverse, side margins often serrated and sometimes with distinct teeth, pronotum without distinct prebasal impression, prosternum moderately broad with apical margin almost straight, front coxae usually closely and rarely widely situated, trochantins hidden; coxal cavities somewhat rounded, usually externally closed behind and rarely open.

Elytra punctured in regular rows and usually with 9 rows of punctures, rarely with scutellary striole, epipleura usually complete. Wing usually with single anal vein, sometimes with three or five anal veins; devoid of radial cell, R-m cross vein and subcubital fleck.


MAP OF
MANIPUR
ASSAM
NAGALAND
INDIA
MANIPUR
SENAPATI
UKHRUL
TAMENGLONG
IMPHAL
IMPHAL
THOUBAL
BISHNUPUR
CHANDEL
CHURACHANDPUR
MYANMAR
MIZORAM
93°
94°
25°
24°
0 50 100 KMS
SCALE

Mesocoxae often closely situated, sternal fitting between mesocoxae usually in a straight line and sometimes with a narrow projection from metasternum, mesocoxal cavities broadly opened outwardly; hind coxae transverse and moderately widely separated; metendosternite often reduced and without lateral plates, sometimes well developed with anterior tendons.

Legs moderately long, trochanters short and simple, femora swollen towards middle, tibiae slightly broadened at apex and usually with two spurs, tarsal formula 5-5-5 in both sexes, tarsal segments 1-3 usually simple or slightly lobed below.

Abdomen covered by elytra, all ventrites freely articulated, ventrite 1 longest and ventrites 2-5 more or less equal in length, ventrite 1 sometimes with open femoral lines, intercoxal process variable. Aedeagus inverted cucujoid-type, median lobe usually broadly elongated and with a median strut, articulated parameres well developed. Ovipositor well developed with separate paraprocts, valvifers, coxites and styli.

LIST OF TAXA

Family SILVANIDAE

Subfamily SILVANINAE

1. *Silvanus difficilis* Halstead
2. *Silvanoprus scuticollis* (Walker)
3. *Silvanoprus indicus* Pal and Sengupta
4. *Silvanoprus longicollis* (Reitter)
5. *Silvanoprus cephalotes* (Reitter)
6. *Monanus concinnulus* (Walker)

Subfamily PSAMMOECINAE

7. *Psammoecus trimaculatus* Motschulsky

Family SILVANIDAE

Subfamily SILVANINAE

Genus ***Silvanus*** Latreille

1804. *Silvanus* Latreille, *Histoire Naturelle, générale et particuliére, des crustaces et des insectes* 11:158 [Type species: *Ips unidentata* Olivier].

Diagnosis : Head devoid of fronto-clypeal suture, eyes moderately large and coarsely facetted, temple often flattened beneath eye, transverse impressed line on vertex behind eyes, 11- segmented antenna with 3- segmented club, antennal insertions hidden under projection of frons, mandible with 3 apical teeth, apical segments of maxillary and labial palpi fusiform; prothorax usually elongate, side margins finely serrated, front coxal cavities closed and prosternal process broad at apex, mesocoxae narrowly separated; wing with single anal vein; each elytron with 9 rows of strial punctures, tarsi of legs simple; intercoxal process of first abdominal ventrite broad and its apical margin broadly pointed, femoral lines closed.

1. ***Silvanus difficilis*** Halstead

1973. *Silvanus difficilis* Halstead, *Bull. Br. Mus. Nat. Hist. (Ent.)* **29** (2) : 73.

1977. *Silvanus difficilis*: Pal and Sengupta, *Oriental Ins.* **11** (2) : 279.

Diagnosis : Reddish-brown and covered with short pubescence; eyes slightly shorter than half of length of head, temple about as long as 1.5 to 2 eye facets with broad outer apical angle, puncturation on vertex coarse and dense; elongated prothorax, anterior spine about half as long as eye with slightly blunt tip, well developed lateral depressions on pronotal disc, puncturation on pronotum coarse and dense and almost similar to that of vertex of head; elytra little more than twice as long as broad, side margins little wavy, punctures deep and large. Length : 2.20-2.50 mm.

Material : 1 ex. India : Manipur, Bishenpur Dist., Thanga, 6.x.1996, T.K. Pal.

Distribution : India : Manipur (New record), Arunachal Pradesh, Assam, Meghalaya, Mizoram, Sikkim, West Bengal, Himachal Pradesh, Uttar Pradesh, Madhya Pradesh, Maharastra, Karnataka, Kerala, Tamil Nadu, Andaman Is..

Elsewhere : Sri Lanka; Myanmar; Vietnam; Taiwan; Malaysia; Singapore; Indonesia; Philippines; Moluccas; I. Delcas; Solomon Is.; Samoan Is.; Australia; New Ireland; West Africa.

Genus *Silvanoprus* Reitter

1911. *Silvanoprus* Reitter, *Fauna Germanica* **3** : 45 [Type species: *Silvanus fagi* Guérin –Méneville].

Diagnosis : Head devoid of fronto-clypeal suture, eyes moderately large and coarsely facetted, temple usually flattened beneath eye, vertex with a transverse impressed line behind eyes, 11- segmented antenna with 3- segmented club, antennal insertions hidden under projection of frons, mandible with well developed mola and 3 apical teeth, apical segments of maxillary and labial palpi fusiform; prothorax usually elongate and rarely transverse, side margins finely serrated, front angles with more or less prominent spines, front coxal cavities closed and prosternal process broad at apex, mesocoxae closely situated; wing with single anal vein; each elytron with 9 rows of strial punctures; tarsal segment 3 of legs strongly lobed below; intercoxal process of first abdominal ventrite broad but narrowed towards apex and slightly pointed, femoral lines closed and usually narrowly separated from posterior margins of hind coxal cavities.

2. *Silvanoprus scuticollis* (Walker)

1859. *Silvanus scuticollis* Walker, *Ann. Mag. Nat. Hist.* (3) **3** : 53.

1886. *Silvanus triangulus* Reitter, *Col. Hefle* **15** : 60.

1908. *Silvanus scuticollis* Grouvelle, *Annls. Soc. ent. Fr.* **77** : 491.

1912. *Silvanoprus scuticollis* Grouvelle, *Annls. Soc. ent. Fr.* **81** : 342.

1979. *Silvanoprus scuticollis* : Pal and Sengupta, *Entomologica Basiliensia* **4** : 70.

Diagnosis : Yellowish- to reddish-brown and covered with short pubescence; eyes slightly shorter than half of length of head, temple about as long as one eye facet and its outer apical angle slightly pointed, puncturation on vertex coarse and dense; prothorax broader than long and distinctly narrowed posteriorly, widest across anterior spines, anterior spine about two-thirds as long as eye, lateral depressions on pronotum slightly developed, puncturation on pronotum almost similar to that of vertex of head; elytra slightly less than twice as long as broad, side margins little wavy, punctures deep and large. Length- 2.15 - 2.55 mm.

Material : 8 ex. India : Manipur, Bishenpur Dist., Numaikong, nr. Keibul, 4 ex., 27.i.1998, T.K. Pal, *ex.* haystack; Thanga, 4 ex., 6. x : 1996, T.K. PaL, *ex.* haystack.

Distribution : India : Manipur, (New record), Assam, Meghalaya, Mizoram, Sikkim, West Bengal, Bihar, Uttar Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka; Malaysia; Indonesia; Japan; East Africa; Madagascar; France; Guyana; West Indies.

3. *Silvanoprus indicus* Pal and Sengupta

1979. *Silvanoprus indicus* Pal and Sengupta, *Entomologica Basiliensia* **4** : 71.

Diagnosis : Yellowish- to reddish-brown and covered with short pubescence; eyes less than half of length of head, temple about as long as 2 to 3 eye facets and its outer apical margin broad, temple not flattened beneath eye, puncturation on vertex coarse and dense; prothorax elongate, slightly narrowed posteriorly, anterior spine short and its tip broadly pointed, side margins curved and situate near extremities, lateral depression on pronotum slightly developed, puncturation on pronotum almost similar to that of vertex of head; elytra about twice as long as broad, side margins little wavy, punctures deep and large. Length–2.29-2.33mm.

Material : 1 ex. India : Manipur, Bishenpur Dist., Thnga, 6.x.1996, T.K. Pal, *ex.* haystack.

Distribution : India : Manipur (New record), Assam, Meghalaya, Mizoram, Sikkim.

Elsewhere : Bhutan.

4. *Silvanoprus longicollis* (Reitter)

1876. *Silvanus longicollis* Reitter, *Col. Hefle,* **15** : 60

1908. *Silvanus longicollis* Grouvelle (nec. Reitter), *Annls. Soc. ent. Fr.* **77** : 491.

1912. *Silvanoprus longicollis* Grouvelle (nec. Reitter),*Annls Soc. ent. Fr.* 81 : 341.

1984. *Silvanoprus longicollis* : Pal, *Rec. Zool. Surv. India.* **81**(3-4) : 339.

Diagnosis : Yellowish- to blackish-brown and covered with short pubescence; eyes short, temple long, slightly longer than length of eye and its outer margin slightly rounded, antennal scape large and about twice as long as broad, antennal segments 2-8 narrow-elongate, puncturation on vertex coarse and ocellate; prothorax elongated and almost parallel-sided, anterior spine small, about half as long as eye and projected forward, puncturation on pronotum almost similar to that of vertex of head and little finer anteriorly, lateral depressions on pronotum indistinct; elytra about twice as long as broad, side margins little wavy, punctures deep and large. Length–2.20 - 2.28mm.

Material : 2 ex. India : Manipur, Bishenpur Dist., Thanga, 6.x.1996, T.K. Pal, *ex.* haystack.

Distribution : India : Manipur (New record), Assam, Meghalaya, Mizoram, Sikkim, West Bengal, Uttar Pradesh, Tamil Nadu.

Elsewhere : Sri Lanka; Malaysia; Indonesia; China; Japan; Madagascar; East Africa.

5. ***Silvanoprus cephalotes*** (Reitter)

1876. *Silvanus cephalotes* Reitter, *Col. Hefle* **15** : 62.

1908. *Silvanus longicollis*: Grouvelle (nec. Reitter),*Annls. Soc. ent. Fr.* **77** : 492.

1912. *Silvanoprus longicollis*: Grouvelle (nec.Reitter), *Annls. Soc. ent. Fr.* **81** : 342.

1979. *Silvanoprus cephalotes*: Pal & Sengupta, *Entomologica Basiliensia* **4** : 70.

1984. *Silvanoprus cephalotes* : Pal, *Rec. Zool. Surv. India* **81** (3-4) : 339.

Diagnosis : Yellowish- to reddish-brown and covered with pubescence; eyes slightly shorter than half as long as head, temple about as long as one eye facet and its outer apical angle slightly pointed, temple flattened beneath eye, puncturation on vertex coarse and dense and not ocellate-type; elongated prothorax widest near middle, anterior spine small, about one-fourth as long as eye or shorter and projected forward, lateral depressions on pronotum slightly developed, puncturation on pronotum almost similar to that of vertex of head; elytra more than twice as long as broad, side margins little wavy, punctures deep and large. Length- 2.20 - 2.40mm.

Material : 110 ex. India : Manipur, Bishenpur Dist., Keibul Lamjao Nat. Park, 930m., 21 ex., 25.i.1998, T.K. Pal, *ex.* beating bush; Itahi, nr. Keibul, 2 ex., 27.i.1998, T.K. Pal, *ex.* beating bush; Numaikong, nr. Keibul, 16 ex., 27.i.1998, T.K. PaL, *ex.* haystack; Numaikong, 25 ex., 26.i.1998, T.K. Pal, *ex.* vegetable debris; Thanga, 40 ex., 6.x.1996, T.K. Pal, *ex.* haystack; Imphal Dist., 12 km. O- Imphal, 940m., 6 ex., 10.x.1996, T.K. Pal.

Distribution : India : Manipur (New record), Assam Meghalaya, Mizoram, Sikkim, West Bengal, Bihar, Uttar Pradesh, Delhi, Karnataka, Tamil Nadu.

Elsewhere : Bhutan; Nepal; Sri Lanka; Indonesia; Japan; China.

Genus ***Monanus*** Sharp

1879. *Monanus* Sharp, *Trans. Ent. Soc. Lond.* **2** : 85. [Type species : *Monanus crenatus* Sharp].

1899. *Emporius* Ganglbauer, *Die Käfer von Mitteleuropa* **3** : 429.

Diagnosis : Head devoid of fronto-clypeal suture, eyes moderately large and coarsely facetted, temple flattened beneath eye, no transverse impressed line on vertex behind eyes, 11-segmented antenna with 3-segmented club, antennal insertions hidden under projection of frons, mandible with well developed mola and three apical teeth, apical segments of maxillary and labial palpi longer than other segments and fusiform, maxillary lacinia without apical spine; prothorax as broad as long, side margins with a few setose denticles, front coxae contiguous and coxal cavities closed behind, sterno-pleural suture extending usually to anterior denticle, mesocoxae contiguous; wing with single anal vein; each elytron with 9 rows of strial punctures, alternate interstices with single and double rows of pubescence; tarsal segments 2 and 3 of legs strongly lobed below; intercoxal process of first abdominal ventrite broad and its apex slightly rounded, femoral lines closed.

6. *Monanus concinnulus* (Walker)

1858. *Monanus concinnulus* Walker, *Ann. Mag. Nat. Hist.* (3) **2** : 207.

1867. *Silvanus signatus* Frauenfeld, *Verh. Zool. Bot. Ges. Wien* **17** : 438.

1874. *Cryptamorpha fasciatus* Wollaston, *Entomologist's mon. Mag.* **10** : 169.

1876. *Cryptamorpha concinnula:* Waterhouse, *Entomologists mon. Mag.* **13** : 122.

1899. *Emporius signatus:* Ganglbauer, *Die Käfer von Mitteleuropa* **3** : 586.

1908. *Emporius concinnulus:* Grouvelle, *Annls. Soc. ent. Fr.* **77** : 489.

1911. *Emporius concinnulus* : Reitter, *Fauna Germanica* **3** : 48.

1912. *Monanus* (s. str.) *concinnulus:* Grouvelle, *Annls. Soc. ent. Fr.* **81** : 371.

1981. *Monanus* (s. str.) *concinnulus* : Pal, *Oriental Ins.* **15** (3) : 247.

Diagnosis : Moderately convex, rather shiny, yellowish- to reddish-brown and with black markings on elytra, covered with short pubescence; eyes shorter than one-third as long as head, temple about as long as 1.5 eye facets and its outer apical angle slightly pointed, antenna shorter than head and prothorax together, puncturation on vertex coarse and dense; quadrate prothorax slightly rounded anteriorly, side margin with about ten small and blunt denticles and each denticle bear an anteriorly directed seta, puncturation on pronotum almost similar to that of vertex of head; elytra shorter than twice as long as broad, side margins almost uniformly curved, a transverse black spot near middle and that extends towards apex along suture, punctures large. Length- 2.00 - 2.30mm.

Material : 52 ex. India : Manipur, Bishenpur Dist., Numaikong, nr. Keibul, 48 ex., 27.i.1998, T.K.Pal, *ex.* haystack; Thanga, 4 ex.,6.i.1996, T.K. Pal, *ex.* haystack.

Distribution : India : Manipur (New record), Meghalaya, Mizoram, Sikkim, West Bengal, Bihar, Uttar Pradesh, Dehli, Tamil Nadu, Karnataka; Outside India this species is widely distributed in both the Old and New Worlds.

Subfamily PSAMMOECINAE

Genus *Psammoecus* Latreille

1829. *Psammoechus* Latreille : *In. Cuv. Regne Anim. Ed.* **2,** 5 : 135 [Type species: *Dermestes bipunctatus* (Fabricius)].

1830. *Crypta* Stephen, *Illustration of British Entomology: Mandibulata* **3** : 103.

1846. *Psammoecus:* Erichson, *Naturgeschichte der Insekten Deutschlands* 1, Coleoptera, **3** : 329.

Diagnosis : Elongate, slightly ovoid; head with fronto-clypeal suture, two lateral longitudinal striae on vertex originating near bases of antennae, eyes small to moderately large and coarsely facetted, temple may or may not extend beneath eye, transverse impressed line on vertex behind eyes, 11-segmented antenna with no distinguishable club, antennal insertions somewhat dorso-lateral, mandible with large basal mandibular cavity and three apical teeth, apical segments of both maxillary and labial palpi securiform or transverse, maxillary lacinia without apical spine; prothorax usually transverse, side margins with more or less prominent denticles, front coxae contiguous and coxal cavities closed behind, apical margin of prosternal process little sinuate, sterno-pleural suture extending to lateral margin; wing with single anal vein; each elytron with 10 rows of strial punctures; tarsal segments 1-3 of legs lobed below; intercoxal process of first abdominal ventrite broad and its apical margin broadly pointed, femoral lines almost marginal striae of hind coxal cavities.

7. *Psammoecus trimaculatus* Motschulsky

1858. *Psammoecus trimaculatus* Motschulsky *Etud. Ent.* **7** : 45.

1859.? Cucujus *incommodus* Walker, *Ann. Mag. Nat. Hist.* (3) **3** : 53.

1876. *Psammoecus trimaculatus*: Waterhouse, *Entomologist's mon. Mag.* **13** : 124.

1876. *Telephanus cruciger* Waterhouse, *Entomologist's mon. Mag.* **13** : 125.

1879. *Psammoecus trimaculatus*: Reitter, *Verh. Zool.Bot.Ges. Wien* **29** : 509.

1906. *Psammoecus trimaculatus*: Grouvelle, *Annls. Soc. ent. Fr.* **75** : 125.

1908. *Psammoecus trimaculatus*: Grouvelle, *Annls. Soc. ent. Fr.* **77** : 406.

1979. *Psammoecus trimaculatus* : Pal & Sengupta, *Entomologica Basiliensia* **4** : 75.

1984. *Psammoecus trimaculatus*: Pal, *Rec. zool. Surv. India* **81** (3-4) : 352.

1985. *Psammoecus trimaculatus*: Pal, *Misc. Publ. Rec. zool. Surv. India, Occ. Pap.* **71** : 41.

Diagnosis : Elongate-oval, moderately convex, slightly shiny, yellowish-brown with blackish spots on elytra and antennal segments 7–10 blackish, elytra covered with moderately long pubescence; eyes slightly shorter than half as long as head, temple short and slightly flattened beneath eye, antenna long and slender, scape moderately large and elongate, segments 2-6 shorter, subequal and elongate, segments 7-11 slightly wider than segment 6, segment 7 slightly elongate, segments 8-10 about as broad as long or slightly transverse, segment 11 elongate and acuminate apically; prothorax transverse, anterior margin narrower than head across eyes, front margin and side margins feebly rounded, side margin with six or seven teeth of variable length, longest tooth in posterior half, slightly elongate and blunt apically, puncturation on pronotum coarse and dense, disc setose; elytra shorter than one and a half times as long as broad, widest near middle, punctures moderately large, interstices about as wide as or wider than punctures, a more or less rounded blackish spot on each elytron in posterior half and a longitudinal sutural spot present behind them. Length–2.5-3.00 mm.

Material : 9 ex. India : Manipur, Imphal Dist., 12 km. O-Imphal, 940m., 1 ex., 10.i.1996, T.K. Pal, *ex.* haystack; Bishenpur dist., Thanga, 3 ex., 6.x.1996, T.K.Pal, *ex.* haystack; Numaikong, nr. Keibul, 5 ex. 26.i.1998, T.K. Pal, *ex.* vegetation debris.

Distribution : India : Manipur (New record), Arunachal Pradesh, Assam, Meghalaya, Mizoram, Sikkim, West Bengal, Bihar, Orissa, Uttar Pradesh, Jammu & Kashmir, Delhi, Karnataka, Tamil Nadu, Kerala.

Elsewhere : Nepal; Bhutan; Sri Lanka; Myanmar; Malaysia; Japan; Madagascar.

Key to the subfamilies, genera and species

1. Head without fronto-clypeal suture and devoid of longitudinal groove or striae on vertex; antennal insertions hidden under projection of frons, with distinct antennal club. .... (Silvaninae)..... 2

– Head with a distinct fronto-clypeal sutre and a pair of longitudinal striae on vertex; antennal insertions more or less exposed and dorso-lateral; no distinguishable antennal club (Psammoecinae). Prothorax not strongly depressed in front of prothoracic base and latral margin not widely explanate; teeth on lateral margin variable, not markedly long and maximum three times as longs as braod..... ..... *P. trimaculatus* Motschulsky

2. Lateral margin of prothorax finely serrated and without large lateral teeth or denticles; tarsi simple or only segment 3 lobed.....3

– Lateral margin of prothorax with about ten blunt denticles; tarsal segments 2 and 3 strogly lobed. Transverse blackish spot near middle of elytra ..... *Monanus concinnulus* (Walker)

3. Tarsi simple and not lobed. Temple of head distinct and thick, longer than one eye facet and its outer apical angle broad .... *Sivanus difficilis* Halstead

– Tarsal segment 3 strongly lobed below. 4

4. Prothorax broader than long, width across anterior spines more than 1.5 times as broad as across posterior angles, prothorax distinctly narrowed posteriorly, sides almost straight, shape of prothorax rather triangular .... *Silvanoprus scuticollis* (Walker)

– Prothorax longer than broad, width across anterior spines less than 1.25 times as broad as across posterior angles, prothorax slightly narrowed posteriorly behind middle, sides often sinuate, shapes of prothorax different. 5

5. Temple of head moderately long and not flattened beneath eye, about as long as 2-3 eye facets and inwardly notched ....*Silvanoprus indicus* Pal & Sengupta

- Temple of head very short or long and somewhat extended beneath eye; temple either short, thin with outer apical angle pointed, or long with outer margin blunt or round 6

6. Temple of head short, about as long aas 1-2 eye facets and its outer apical angle somewhat pointed; puncturation of head and pronotum reticulate-type, coarse and dense. Sides of prothorax more or less uniformly curved outwardly; anterior spine of prothorax small, about one-fourth as long as eye and projected in front.....*Silvanoprus cephalotes* (Reitter)

- Temple of head long, about as long as eye or longer and its outer margin blunt or rounded; puncturation of head and pronotum ocellate-type, coarse and somewhat globular. Antennal scape large, robust and segments 2-8 markedly narrower than scape.....
.....*Silvanoprus longicollis* (Reitter)

SUMMARY

The paper deals with 7 species under 4 genera of 2 subfamilies from the State of Manipur. All the species are recorded first time from the State as no study of Silvanidae was undertaken from this State earlier. The species are systematically keyed and characterized.

ACKNOWLEDGEMENTS

The authors are indebted to the Director, Zoological survey of India for providing necessary facilities for the work.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 445-448, 2004

INSECTA : COLEOPTERA : ADEPHAGA : CICINDELIDAE (TIGER BEETLES)

P. MUKHOPADHYAY and S.K. HALDER
Zoological Survey of India, M-Block, New Alipour, Kolkata–700 053

INTRODUCTION

The members of the family Cicindelidae are commonly known as 'tiger beetles' because of their activity and ferocity. The family Cicindelidae belongs to the suborder Adephaga under the order Coleoptera of Insecta. They are predacious and usually feed on insects like ants, beetles, bugs, caterpillars, nymphs or dead bodies of large insects. Of the genera belonging to this family, the species of the genus *Cicindela* L. are usually found in open sunny places where the soil is sandy or dusty and in moist ground near streams, ponds, sea shore etc. Whereas the species of Neocollyris Horn and Tricondyla Latreille are found in foliage and bark.

Major workers who dealt with this group are Dover & Rebeiro (1923), Haynes Wood and Dover (1928), Mandl (1969-1978), Pajni & Bedi (1972), Saha, Halder & Biswas (1995), Mukhopadhyay & Halder (1999) etc.

So far fauna of Manipur is concerned, there is no comprehensive work on the group till to date. Present study is based on the materials collected by different survey parties of Zoological Survey of India during 1975 to 1992 and also on the National Zoological Collection present in the section. Prior to study four species under the genus *Neocollyris* Horn and four species under the genus *Cicindela* L. of this family were known from Manipur. Fabricius (1975) recorded the first species viz. *sexpunctata* F. under the genus *Cicindela* L. from Manipur. Present study includes a total of thirteen species under two genera belonging to two sub families, of which, five species under the genus *Cicindela* L. are recorded here for the first time from Manipur. No keys have been provided here as key to subfamilies, genera and species have already been provided in the Fauna of Sikkim. A systematic list, selected synonyms, distributional data and collection data of each species have also been provided. The astrix (*) marked species given in the list are being reported here from the literature.

SYSTEMATIC LIST

Order COLEOPTERA
Suborder ADEPHAGA
Family CICINDELIDAE
Division 1 ALOCOSTERNALIAE
Subfamily I COLLYRINAE
Genus 1. ***Neocollyris*** Horn, 1901

*1. *N. auripennis* Horn, 1905
*2. *N. orichalcina* (Horn), 1912
*3. *N. aptera* (Lund.) 1912
*4. *N. apteroides* Horn, 1901

Division 2. PLATYSTERNALIAE
Subfamily II. CICINDELINAE
Genus 2. ***Cicindela*** Linne, 1735

*5. *C. funebris* Schm.-Goeb, 1846
*6. *C. duponti* var. *barmanica* Gestro, 1893
*7. *C. assamensis* Parry, 1845
8. *C. funerea* Macleay, 1825

9. *C. vittigera* Dejean, 1806
10. *C. aurulenta* F. *virgula* Fleut, 1912
11. *C. angulata* F., 1798
12. *C. octonotata* Wied, 1819
13. *C. sexpunctata* F., 1775

SYSTEMATIC ACCOUNT

Family CICINDELIDAE

Division I. ALOCOSTERNALIAE

Subfamily I. COLLYRINAE

Genus 1. ***Neocollyris*** Horn, 1901

1901. *Neocollyris* Horn, *Deutsche Ent. Zeit.*, P. 25.

1. ***Neocollyris auripennis*** Horn, 1905

1905. *Neocollyris auripennis* Horn, *Deutsche Ent. Zeit.*, p. 7.

Material examined : Not seen.

Distribution : India : Manipur, Assam.

Elsewhere : Tonkin.

2. ***Neocollyris orichalcina*** (Horn), 1912

1896. *Collyris orichalcina* Horn, *Deutsche Ent. Zeit.*, P. 149.

1912. *Neocollyris orichalcina* : Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Introduction and Cicindelidae and Paussidae*, P. 263.

Material examined : Not seen.

Distribution : India : N. Manipur (alt. 3500-5000), Tamil Nadu, Nagaland.

3. ***Neocollyris aptera*** (Lund.) 1912

1790. *Cicindela aptera* Lund, *Skrivt. Nat. Selsk.*, **1** : 65, pl. 6, fig. 1.

1864. *Cicindela aptera*, Chaudoir, *Ann. Soc. ent. Fr.*, p. 518, pl. 8, fig. 15.

1912. *Neocollyris aptera*, Fowler, *The Fauna of British India incl. Ceylon & Burma, Coleoptera : Genl. Introduction and Cicindelidae and Paussidae*, pp. 266.

Material examined : Not seen.

Distribution : India : N. Manipur, Nagaland.

Elsewhere : Bangladesh, Tenasserim.

4. ***Neocollyris apteroides*** Horn, 1901

1901. *Neocollyris apteroides* Horn, *Deutsche Ent. Zeit.*, p. 59

Material examined : Not seen.

Distribution : India : Manipur.

Division 2. PLATYSTERNALIAE

Subfamily II. CICINDELINAE

Genus 2. ***Cicindela*** Linne, 1735

1735. *Cicindela* Linne, *Syst. Nat.*, **2** : 657.

1854. *Cicindela* Laccordaire, *Gen. Col.*, **1** : 17.

5. ***Cicindela funebris*** Schm.-Goeb., 1846

1846. *Cicindela funebris* Schm.-Goeb., *Col. Faun. Birm.*, P. 8.

1886. *Cicindela dolens* Fleutiaux, *Bull. Soc. Ent. Fr.*, P. 111.

1912. *Cicindela funebris*, Fowler, *The Fauna of British India including Ceylon & Burma, Coleoptera : Genl. Introduction and Cicindelidae and Paussidae*, pp. 341-342.

Material examined : Not seen.

Distribution : India : West Bengal; Sikkim; Nagaland; North Manipur.

Elsewhere : Myanmar.

6. ***Cicindela duponti*** Dej. var. ***barmanica*** Gestro, 1893

1826. *Cicindela duponti* Dej., *Spec. Col.*, **2** : 419.

1893. *Cicindela duponti* var. *barmanica* Gestro, *Ann. Mus. Genova*, p. 360.

Material examined : Not seen.

Distribution : India : Tamil Nadu; North Manipur.

Elsewhere : Bangladesh, Myanmar.

7. ***Cicindela assamensis*** Parry, 1845

1845. *Cicindela assamensis* Parry, *Trans. Ent. Soc. Lond.*, **4** : 84.

1862. *Calostola assamensis* Mots.; *Etud. Ent.*, **11** : 22.

1912. *Cicindela assamensis* Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* pp. 395.

Material examined : Not seen.

Distribution : India : West Bengal; Assam; Sikkim; North Manipur; Meghalaya.

Elsewhere : Myanmar, Bangladesh, Penang.

8. *Cicindela funerea* MacLeay, 1825

1825. *Cicindela funerea* MacLeay, *Ann. Jav.,* p. 12.

1826. *Cicindela marginepunctata* Dejean, *Spec. Col.,* **2 :** 428.

1912. *Cicindela funerea* : Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* pp. 377.

Material examined : 10 ex., India : Manipur : Moreh West, 25.IX.1975, M.S. Shishodia Coll., 2 ex., Churachandpur, 4.VI.1992, R. Mathew Coll., 5 ex., Khandeng in Chandel dist., 14.VI.1992, R. Mathew Coll., 4 ex., from Chandel dist., 11.VI.1992, R. Mathew Coll., 10 ex., Lokchoo in Chandel dist., 14.VI.1992, R. Mathew Coll.

Distribution : India : Manipur; Assam; Sikkim; Bihar; Meharashtra; Himachal Pradesh; Tamil Nadu; Karnataka; West Bengal.

Elsewhere : Nepal, Myanmar, Tenasserim, Perak, Indonesia, Indo-China, Hainan, Celebes.

Remarks : This species is recorded here for the first time from Manipur.

9. *Cicindela vittigera* Dej., 1806

1806. *Cicindela vittigera* Dejean, Spec. Col., **1 :** 107.

1912. *Cicindela vittigera* : Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro, and Cicindelidae and Paussidae,* pp. 417.

Material examined : 1 ex., India : Manipur; Moreh West; 25.IX.1975, M.S. Shishodia Coll.

Distribution : India : West Bengal; Manipur.

Elsewhere : Bangladesh

Remarks : This species is recorded here for the first time from Manipur.

10. *Cicindela aurulenta* F. var. *virgula* Fleutiaux, 1893

1801. *Cicindela aurulenta* Fabricius, *Syst. El.,* **1 :** 239.

1893. *Cicindela aurulenta* F. var. *virgula* Fleu., *Bull. Soc. Ent. Fr.,* P. 491.

1912. *Cicindela aurulenta* var. *virgula* Fleu : Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* PP. 383-384.

Material examined : 1 ex., India : Manipur; Moreh West; 25.IX.1975, M.S. Shishodia Coll.

Distribution : India : Manipur; Sikkim; Assam; Nagaland; West Bengal.

Elsewhere : Nepal, Bhutan, Myanmar, Bangladesh, China.

Remarks : This species is recorded here for the first time from Manipur.

11. *Cicindela angulata* F., 1798.

1798. *Cicindela angulata* F., *Ent. Syst. Suppl.,* P. 62.

1825. *Cicindela angulata* Dejean, *Spec. Col.,* **1 :** 89.

1912. *Cicindela angulata* Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* PP. 370-371.

Material examined : 1 ex., India : Manipur; Lokchoo in Chandel dist., 14.VI.1992, R. Mathew Coll., 1 ex., Chandel dist., 11.VI.1992, R. Mathew Coll.

Distribution : India : Manipur, Bihar, West Bengal, Sikkim.

Elsewhere : Myanmar, Bangladesh, Pakistan, Hainan, Annam.

Remarks : This species is recorded here for the first time from Manipur.

12. *Cicindela octonotata* Wied., 1819.

1819. *Cicindela octonotata* Wied., *Zool. Mag.,* **1 (3) :** 168.

1825. *Cicindela octonotata* Dejean, *Spec. Col.,* **1 :** 45.

1912. *Cicindela octonotata* Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* P. 381.

Material examined : 1 ex., India : Manipur; Moreh West, 21.IX.1975, M.S. Shishodia Coll.; 1 ex., Lokchoo in Chandel dist., 14.VI.1992, R. Mathew Coll.

Distribution : India : Manipur; Assam; Bihar; Meghalaya; Himachal Pradesh; Uttar Pradesh; West Bengal; Sikkim.

Elsewhere : Bangladesh, Myanmar.

13. ***Cicindela sexpunctata*** F., 1775

1775. *Cicindela sexpunctata* F., *Syst. Ent.*, P. 226.

1862. *Calochroma sexpunctata* Mots., *Etud. Ent.*, **11** : 22.

1912. *Cicindela sexpunctata* Fowler, *The Fauna of British India including Ceylon and Burma, Coleoptera : Genl. Intro. and Cicindelidae and Paussidae,* 385-386.

Material examined : 2 ex., India : Manipur; Chandel dist., 14.VI.1992, R. Mathew Coll.

Distribution : India : West Bengal; Sikkim; Manipur; Bihar; Kashmir; Maharashtra; Karnataka; Andaman Islands.

Elsewhere : Myanmar, Siam, Cambodia, Annam, China, Formosa, Philippine Islands, Senegal.

Remarks : This species is recorded here for the first time from Manipur.

SUMMARY

The present paper is based on the study of the total collections made by different survey parties of Zoological Survey of India from different districts of Manipur including the species so far described from Manipur as per literature. This include a total of 13 species under 2 genera belonging to two subfamilies, of which five species are recorded here for the first time from Manipur. Besides this relevant references, collection and distributional data are also provided.

ACKNOWLEDGEMENT

We are highly indebted to Dr. J.R.B. Alfred, Director, Zoological Survey of India for giving the opportunity to study the group. Thanks are also due to Dr. G.K. Srivastava, Additional Director (Retd.) and Dr. S.K. Mitra, Joint Director (Retd.) for their encouragement and valuable suggestions.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 449-458, 2004

INSECTA : COLEOPTERA : POLYPHAGA : HYDROPHILOIDEA : HYDROPHILIDAE

P. MUKHOPADHYAY and MRS. S. SENGUPTA*
Zoological Survey of India, M-Block, New-Alipore, Kolkata–700 053

INTRODUCTION

Aquatic coleoptera forms an important constituent of aquatic insect fauna both in larval and adult stages. Of the 14 families of aquatic Coleoptera, members of 9 families belongs to the suborder Polyphaga either wholly or partly as aquatic fauna. The family Hydrophilidae belongs to the super-family Hydrophiloidea of the suborder Polyphaga. A large number of species of aquatic habitat are found in this family, though the members of the subfamily Sphaeridiinae are not aquatic in habit and they are usually found in moist habitat like dung, under banana sheath, in decaying vegetable matter etc. The members of this family are commonly known as water scavenger beetle.

As regards fauna of Hydrophilidae is concerned, the authors who contributed extensively to our knowledge of the group are Knisch (1924), Crowson (1981), Lawrence (1982), Sharp (1890), Regimbartia (1903), Champion (1920), d'orchymont (1928) Bal four Browne (1948) and very recently Schedl (1992-95), Bameul (1993, 1996), Sato (1979) and Biswas and Mukhopadhyay (1995) etc.

Knisch (1924) divided the family Hydrophilidae into 8-subfamilies viz. Hydraeninae, Limnebiinae, Spercheinae, Helophorinae, Epimentopinae, Hydrochinae, Sphaeridiinae and Hydrophilinae.

This group is widely distributed and about 2000 species are known from the world. Of which about 150 species have been known from India. Fabricius (1792) described the first species viz. *Dactylosternum abdominale* F. of the tribe Sphaeridiini belonging to the subfamily Sphaeridiinae from Manipur. Prior to study four species under three genera belonging to two subfamilies viz. Sphaeridiinae and Hydrophilinae were known from Manipur. Present study increases the number of species upto thirty under 15 genera belonging to four subfamilies viz. Hydraeninae, Hydrochinae, Sphaeridiinae and Hydrophilinae. Of which two species viz. *Pachysternum coomani* d'orchymont and *Helochares taprobanicus* Sharp are recorded for the first time from India and a total of 24-species under 13 genera belonging to four subfamilies viz. Hydraeninae, Hydrochinae, Sphaeridiinae and Hydrophilinae under this family are recorded for the first time from Manipur.

Present study is based on the collection made by different survey parties of Zoological Survey of India including the reported species made by early workers and not available with the collection to get an up-to-date account of scavenger beetles (Hydrophilidae) from Manipur. 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 and Sikkim.

SYSTEMATIC ACCOUNT: LIST OF TAXA

Family HYDROPHILIDAE

Subfamily HYDRAENINAE

Genus 1. ***Ochthebius*** Leach, 1815

1. *Q.* (Hymenodes) *foveolatus* Germer, 1824

* 30, Ramkrishna Samadhi Road, F.B. 18, Kolkata-700 054.

Subfamily II HYDROCHINAE

Genus 2. ***Hydrochus*** Leach, 1817

2. *H. annamita* Regimbart, 1903
3. *H. locustris* Nietner, 1856

Subfamily III. SPHAERIDIINAE

Tribe I. **Sphaeridiini**

Genus 3. ***Sphaeridium*** F. 1775

4. *S. severini* d'orchymont, 1919
5. *S. quinquemaculatum* F., 1798

Genus 4. ***Coelostoma*** Brulle, 1835

6. *C. subditum* d'orchymont

Genus 5. ***Dactylosternum*** Wollaston, 1854

7. *D. hydrophiloides* (M'Leay), 1825
8. *D. abdominale* F., 1792

Tribe II **Cercyonini**

Genus 6. ***Cercyon*** Leach, 1817

9. *C.* (C. s. str.) *punctigerum* Knisch, 1921
10. *C.* (C. s. str.) *vicinalis* Walker, 1859

Genus 7. ***Oosternum*** Sharp, 1882

11. *O. horni* d'orchymont, 1914

Tribe III **Megasternini**

Genus 8. ***Pachysternum*** Motschulsky, 1863

12. *P. coomani* d'orchymont, 1926
13. *P. nigrovittatum* Motschulsky, 1863

Subfamily IV HYDROPHILINAE

Tribe I **Hydrobiini**

Genus 9. ***Helochares*** Mulsant, 1844

14. *H. pallens* (Macleay), 1825
15. *H. anchoralis* Sharp, 1890
16. *H. lentus* Sharp, 1890
17. *H. crenatus* Regimbart, 1903
18. *H. taprobanicus* Sharp, 1890

Genus 10. ***Enochrus*** Thomson, 1859

19. *E. escuriens* (Walker), 1858
20. *E. rubrocinctus* Regimbart, 1903

Tribe II **Hydrophilini**

Genus 11. *Sternolophus* Solier, 1834

21. *S. rufipes* (F.), 1792.

Genus 12. ***Hydrophilus*** Muller, 1764

22. *H. olivaceus* (F.), 1781
23. *H. indicus* (Bedel), 1892
24. *H. temnopteroides* (d'Orchymont)

Tribe III. **Amphiopini**

Genus 13. ***Amphiops*** Erichson, 1843

25. *A. simplex* Sharp, 1890
26. *A. pedestris* Sharp, 1890

Tribe IV. **Berosini**

Genus 14. ***Berosus*** Leach, 1817

27. *B. fairmairei* Zaitzev, 1908
28. *B. indicus* Mots., 1861
29. *B. pulchellus* M'Leay, 1825

Genus 15. ***Regimbartia*** Zaitzev, 1908

30. *R. attenuata* F., 1801

Family HYDROPHILIDAE

Subfamily I. HYDRAENINAE

Genus 1. ***Ochthebius*** Leach, 1815

1815. *Ochthebius* Leach in *Brewster's Edinb. Enc.*, **9** : 95.

1924. *Ochthebius* Knisch, *Col. Cat.*, **14** (Pars 79) : 1-32.

Subgenus ***Hymenodes*** Muls.

1844. *Hymenodes* Muls., *Palp.*, P. 68.

1. ***Ochthebius (Hymenodes) foveolatus*** Germ.

1824. *Ochthebius (Hymenodes) foveolatus* Germ., *Ins. Spec. nov.*, P. 90.

1920. *Ochthebius (H.) foveolatus* Germ. : Champion, *Ent. Mon. Mag.*, **56** : 168.

1924. *Ochthebius (H.) foveolatus* : Knisch, *Col. Cat.*, **14**, (Pars 79) : 22-23.

Material examined : 1 ex., Behiang in Churachadpur dist., 24.II.1993, S.K. Saha Colln.; 1 ex., Pangmol in Senapati dist., 1. III. 1993, S.K. Saha Colln.

Distribution : India : Manipur, Uttaranchal.

Elsewhere : Europe; Italy; Balkan; Caucasus.

Remarks : This species was known from

Western Himalaya (Kumaon : Uttaranchal). This is the first time the species is recorded from North East India (Manipur).

Subfamily II. HYDROCHINAE

Genus 2. ***Hydrochus*** Leach, 1817

1817. *Hydrochus* Leach, *Zool. Misc.*, **3** : 90.

1924. *Hydrochus* Leach : Knisch, *Col. Cat.*, **14** (Pars. 79) : 96-104.

2. ***Hydrochus annamita*** Regimbart

1903. *Hydrochus annamita* Regimbart, *Ann. Soc. ent. Fr.*, **72** : 64.

1924. *Hydrochus annamita* : Knisch, *Col. Cat.*, **14** (Pars 79) : 98-99.

Material examined : 1 ex., Phubala Loktak Lake in Bishnupur Dist., 18.II.1993, S.K. Saha Colln.; 27 ex., Sendra Loktak Lake in Bishnupur dist., 19.II.1993, S.K. Saha Colln.; 1 ex., Thanga Loktak Lake in Bishnupur dist., 20.II.1993, S.K. Saha colln.; 4 ex., Keibul Lamjo Nat. Park in Bishnupur dist., 21.II.1993, S.K. Saha Colln.; 18 ex., Thinghat in Churachandpur dist., 22.II.1993, S.K. Saha Colln.; 37 ex., Thanion in Churachandpur dist., 23.II.1993, S.K. Saha Colln.; 4 ex., Behiang in Churachandpur dist., 24.II.1993, S.K. Saha Colln.; 28.ex., Sangoinang in Imphal dist., 27.II.1993, S.K. Saha Colln.; 3 ex., Imphal, 27.II.1993, S.K. Saha Colln.; 13 ex., Pangmol in Senapati dist., 1.III.1993, S.K. Saha Colln.

Distribution : India : Manipur, Assam.

Elsewhere : Annam.

Remarks : This is the first time the species is being recorded from Manipur.

2a. ***Hydrochus locustris*** Nietner

1856. *Hydrochus locustris* Nietner, *Journ. As. Soc. Beng.*, **25** : 537.

Material examined : 2 ex., Sendra (Loktak lake), 10.IV.1992, S.K. Saha and Party.

Distribution : India : Manipur.

Elsewhere : Sri Lanka.

Subfamily III. SPHAERIDIINAE

Tribe I. **Sphaeridiini**

Genus 3. ***Sphaeridium*** F., 1775.

1775. *Sphaeridium* Fabricius, *Syst. Ent.*, PP. 66.

1924. *Sphaeridium* Fabricius : Knisch, *Col. Cat.*, **14** (Pars. 79) : 119-127.

3. ***Sphaeridium severini*** D'Orchymont

1919. *Sphaeridium severini* d'orchymont, *Ann. Soc. ent. Fr.*, **88** : 116, f 7.

1924. *Sphaeridium severini* : Knisch, *Col. Cat.*, **14** (Pars 79) : 127.

Material examined : 1 ex., Loktak lake, 21.V.1981, C. Radhakrishnan Colln.; 2 ex., Kongokpi I.B., 13.I.1976, Dr. A.K. Ghosh Colln., 1 ex., Tuitapi near Churachandpur, 20.XII.1992, A. R. Lahiri Colln.

Distribution : India : Manipur, Meghalaya; Tamil Nadu.

Elsewhere : Cambodia, Indonesia.

4. ***Sphaeridium quinquemaculatum*** F.

1798. *Sphaeridium quinquemaculatum* F., *Syst. Ent. Suppl.*, P. 39.

1924. *Sphaeridium quinquemaculatum* : Knisch, *Col. Cat.*, **14** (Pars. 79) : 124.

Material examined : 4 ex., Kongokpi I.B., 13.I.1976, Dr. A.K. Ghosh Colln.; 1 ex., Keithenmanbi, 14.I.1976, Dr. A.K. Ghosh Colln.; 3 ex., Uchathal (5 kms. E. of Jiriban) in Imphal dist., 29.XI.1992, A.K. Mandal Colln.; 1 ex., Tuitapi near Churachandpur, 20.XII.1992, A.R. Lahiri Colln.; 2 ex., Andro, Imphal, 27.XII.1992, R.S. Mirdha Colln.

Distribution : India : Manipur, West Bengal; Bihar; Assam; Meghalaya.

Elsewhere : Sri Lanka, S. Asia, China, Formosa, Sunda Is., Pakistan, Indonesia, Phillippines.

Genus 4. ***Coelostoma*** Brulle, 1835

1835. *Coelostoma* Brulle, *Hist. Nat. Ins.*, (5), **2** : 293.

1924. *Coelostoma* : Knisch, *Col. Cat.*, **14** (Pars. 79) : 109-113.

5. ***Coelostoma subditum*** d'orchymont

Material examined : 3 ex., Sendra Loktak lake in Bishnupur dist., 19.II.1993, S.K. Saha Colln,; 1 ex., Thanga Loktak lake in Bishnupur dist., 20.II.1993, S. K. Saha Colln.; 2 ex.; Thanion in Churachandpur dist., 23.II.1993, S. K. Saha Colln.; 1 ex., Circuit House : Churachandpur, 19.V.1993, M. Sil Colln.

Distribution : India : Manipur, West Bengal.

Remarks : This is the first time the species have been recorded from Manipur.

Genus 5. ***Dactylosternum*** Woll.; 1854

1854. *Dactylosternum* Woll., *Ins. Mader,* P. 99, t.3, f.1.

1924. *Dactylosternum* : Knisch, *Col. Cat.,* **14** (Pars 79) : 115-118.

6. ***Dactylosternum hydrophiloides*** M'Leay

1825. *Dactylosternum hydrophiloides* M'Leay, *Annul. Javan.,* P. 36.

1924. *Dactylosternum hydrophiloides* : Knisch, *Col. Cat.,* **14** (Para 79) : 116.

Material examined : 6 ex., Lairo river bed, 12.IV.1992, S.K. Chatterjee Colln.; 1 ex., Bank of a rivulet of Lairo river, 13.IV.1992, A.K. Hazra Colln.

Distribution : India : Manipur, West Bengal; Bihar; Assam; Meghalaya.

Elsewhere : Indochina, Tonkin, Fokien, Formosa, Sunda Is., Indonesia, Philippines, Laos, Annam, Myanmar, Singapore.

Remarks : This species is recorded here for the first time from Manipur.

7. ***Dactylosternum abdominale*** F.

1792. *Dactylosternum abdominale* F., *Ent. Syst.,* **1** : 79.

1924. *Dactylosternum abdominale* : Knisch, *Col. Cat.,* **14** (Pars. 79) : 115.

Material examined : 1 ex., Lairo river bed, 12.IV.1992, S.K. Chatterjee Colln.

Distribution : India : Manipur, West Bengal.

Elsewhere : North, Middle and South America.

Remarks : This species is recorded here for the first time from Manipur.

Tribe III. **Cercyonini**

Genus 6. ***Cercyon*** Leach, 1817

1817. *Cercyon* Leach, *Zool. Misc.,* **3** : 95.

1924. *Cercyon* Leach : Knisch., *Col. Cat.,* **14** (Pars. 79) : 127-152.

8. ***Cercyon*** (C.S. Str.) ***punctigerum*** Knisch

1921. *Cercyon* (C. S. Str.) *punctigerum* Knisch., *Archiv. Naturg.,* **85** (A-8) : 79.

Material examined : 1 ex., Sapermaina in Senapati dist., 2.III.1993, S. K. Saha Colln.; 2 ex., Ucharthal, 5 km., East of Jiribam in Imphal dist., 30.XI.1992, A.K. Mandal Colln.

Distribution : India : Manipur, Tamil Nadu.

Elsewhere : Sri Lanka, Indonesia.

Remarks : This species is recorded here for the first time from N.E. India, Manipur.

9. *Cercyon (Cercyon* S. Str.) *vicinalis* Walker

1859. *Cercyon* (C.S. Str.) *vicinalis* Walker, *Ann. Mag. Nat. Hist.,* (3) **3** : 258.

1924. *Cercyon* (C.S. Str.) *vicinalis* : *Knisch. Col. Cat.,* **14** (Pars. 79) : 150.

Material examined : 7 ex., Ucharthal, 5 kms E. of Jiribam in Imphal dist., 30.XI.1992, A.K. Mandal Colln.

Distribution : India : Manipur, West Bengal.

Elsewhere : Sri Lanka, Formosa, Sunda Is., Indochina, Tonkin, Indonesia, Philippines.

Genus 7. ***Oosternum*** Sharp, 1882

1882. *Oosternum* Sharp, *Biol. Centr. Amer.,* **1** (2) : 112.

1924. *Oosternum* : Knisch., *Col. Cat.,* **14** (Pars 79) : 154.

10. ***Oosternum horni*** d'orchymont

1914. *Oosternum horni* d'orchymont, *Ent. Mitteil,* **3** : 326, f.2, P. 327.

1924. *Oosternum horni* : Knisch., *Col. Cat.,* **14** (Pars. 79) : 154.

Material examined : 1 ex., Thoubal in Thoubal dist., 25.II.1993, S. K. Saha Colln.

Distribution : India : Manipur, West Bengal; Tamil Nadu.

Elsewhere : Sri Lanka, Formosa, Hongkong.

Remarks : This species is recorded here for the first time from Manipur.

Tribe III. **Megasternini**

Genus 8. ***Pachysternum*** Motsch, 1863

1863. *Pachysternum* Motsch, *Bull. Soc. Imp. Nat. Moscou.*, **36** (2) : 446.

1924. *Pachysternum* Motsch. : Knisch., *Col. Cat.*, **14** (Pars 79) : 158-159.

1928. *Pachysternum* : d'Orchymont, *Indian Insects Hydrophilidae*, Part 14 : 83-84.

11. ***Pachysternum coomani*** d'Orchymont

1926. *Pachysternum coomani* d'Orchymont, *Ann. & Bull. Soc. Ent. Belg.*, **66** : 221, 225.

Material examined : 2 ex., Ucharthal, 5 km. E. of Jiribam in Imphal Dist., 30.XI.1992, A.K. Mondal Colln.

Distribution : India : Manipur.

Elsewhere : Indo-China.

Remarks : This species is recorded here for the first time from India : Manipur.

12. ***Pachysternum nigrovittatum*** Motsch.

1863. *Pachysternum nigrovittatum* Motsch., *Bull. Soc. Imp. Nat. Moscou*, **36** (2) : 447, t. 9, f. 22.

1924. *Pachysternum nigrovittatum* : Knisch, *Col. Cat.*, **14** (Pars. 79) : 159.

Material examined : 1 ex., Andro, Imphal, 27.XII.1992, R.S. Mirdha Colln.

Distribution : India : Manipur.

Elsewhere : Sri Lanka.

Remarks : This species is recorded here for the first time from India : Manipur.

Subfamily IV. HYDROPHILINAE

Tribe I. **Hydrobiini**

Genus 9. ***Helochares*** Muls., 1844

1844. *Helochares* Mulsant, *Palp.*, P. 197.

1924. *Helochares* : Knisch., *Col. Cat.*, **14** (Pars 79) : 192-199.

13. ***Helochares pallens*** (MacLeay)

1825. *Enhydrus pallens* MacLeay, *Annul. Javan.*, P. 35.

1926. *Helochares pallens* : d'Orchymont, *Ann. Bull. Soc. Ent. Belg.*, **66** : 232.

Material examined : 6 ex., Sendra Loktak Lake in Bishnupur dist., 19.II.1993, S. K. Saha Colln.; 1 ex., Keibal Camjo National Park in Bishnupur dist., 21.II.1993, S. K. Saha Colln.; 1 ex., Sangoimang in Imphal dist., 27.II.1993, S. K. Saha Colln.; 6 ex., Pangmol in Senapati dist., 1.III.1993, S. K. Saha Colln.; 3 ex., Sendra (Loktak Lake), 10.IV.1992, S. K. Saha and Party.

Distribution : India : Manipur, West Bengal; Bihar; Assam.

Elsewhere : Syria, Madagascar, Trop, Africa, Egypt, Tonkin, F.M.S. Tropical Asia, Philippines, N. Oceania, Indonesia.

Remarks : This species is recorded here for the first time from Manipur.

14. ***Helochares anchoralis*** Sharp

1890. *Helochares anchoralis* Sharp, *Trans. Ent. Soc. Lond.*, P. 352.

1924. *Helochares anchoralis* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 193.

Material examined : 2 ex., Phubala Loktak Lake in Bishnupur Dist., 18.II.1993, S. K. Saha Colln.; 6 ex., Sendra in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 2 ex., Keibul Lamjo National Park, 21.II.1993, S.K. Saha Colln.; 4 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 1 ex., Pangmol in Senapati Dist., 1.III.1993, S.K. Saha Colln.

Distribution : India : Manipur; West Bengal; Bihar.

Elsewhere : Sri Lanka, Indo-China, Indonesia, Philippines, F.M.S., Laos, Tonkin, Cambodia, China, Annam.

Remarks : This species is recorded here for the first time from Manipur.

15. ***Helochares lentus*** Sharp

1890. *Helochares lentus* Sharp, *Trans. Ent. Soc. Lond.*, P. 352.

1924. *Helochares lentus* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 193.

Material examined : 3 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 2 ex., Thanga Loktak Lake in Bishnupur Dist., 20.II.1993, S.K. Saha Colln.; 1 ex., Thinghat in Churachandpur Dist., 22.II.1993, S. K. Saha Colln., 2 ex., Thanion in Churachandpur Dist., 23.II.1993, S.K. Saha Colln.; 1 ex., Robei in Imphal Dist., 28.II.1993, S. K. Saha Colln. 1 ex., Pangmol in Senapati Dist., 1.III.1993, S. K. Saha Colln.; 1 ex., Phubala Loktak Lake in Bishnupur Dist., 18.II.1993, S. K. Saha Colln.; 1 ex., Behiang in Churachandpur Dist., 24.II.1993, S.K. Saha Colln.

Distribution : India : Manipur; West Bengal; Bihar; Assam.

Elsewhere : Sri Lanka, Indo-China, Formosa, Sunda Island, Nepal, Indonesia, F.M.S., Tonkin, China.

Remarks : This species is recorded here for the first time from Manipur.

16. ***Helochares crenatus*** Regimbart

1903. *Helochares crenatus* Regimbart, *Ann. Soc. ent. Fr.*, **72 :** 54.

1924. *Helochares crenatus* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 193.

Material examined : 5 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 2 ex., Thanga Loktak Lake in Bishnupur Dist., 20.II.1993, S.K. Saha Colln.; 3 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 1 ex., Pangmol in Senapati Dist., 1.III.1993, S.K. Saha Colln.

Distribution : India : West Bengal, Pondicherry, Orissa, Manipur.

Elsewhere : Indo-China, Sunda Island, Philippines, Indonesia, F.M.S., China, Cambodia, Tonkin.

Remarks : This species is recorded here for the first time from Manipur.

17. ***Helochares taprobanicus*** Sharp

1890. *Helochares taprobanicus* Sharp, *Trans. Ent. Soc. Lond.*, P. 351.

1924. *Helochares taprobanicus* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 199.

Material examined : 2 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.

Distribution : India : Manipur.

Elsewhere : Sri Lanka, Myanmar, Indochina.

Remarks : This species is recorded here for the first time from India : Manipur.

Genus 10. ***Enochrus*** Thoms, 1859

1859. *Enochrus* Thoms, *Skand. Col.*, **1 :** 18.

1924. *Enochrus* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 200-219.

18. ***Enochrus esuriens*** (Walker)

1858. *Philiphydrus esuriens* Walker, *Ann. Mag. nat. Hist.* (3), **2 :** 209.

1924. *Enochrus esuriens* : Knisch., *Col. Cat.*, **14** (Pars. 79) : 208.

Material examined : 41 ex., Phubala Loktak Lake in Bishnupur Dist., 18.II.1993, S.K. Saha Colln.; 54 ex., Sendra Loktak Lake in Bishnupur Dist.; 19.II.1993, S.K. Saha Colln.; 2 ex., Thanga Loktak Lake in Bishnupur Dist., 20.II.1993, S.K. Saha Colln.; 8 ex., Keibul Lamjo National Park in Bishnupur Dist., 21.II.1993, S.K. Saha Colln.; 6 ex., Imphal, 27.II.1993, S.K. Saha Colln.; 1 ex., Thanion churachandpur dist, 23.ii. 1993, S.K. Saha colln; 6 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 19 ex., Robei in Imphal Dist., 28.II.1993, S.K. Saha Colln.; 28 ex., Pangmol in Senapati Dist., 1.III.1993, S.K.

Saha Colln.; 4 ex., Loktak Lake area; Moirang, 10.XII.1992, P.H. Roy Colln.; 7 ex., Sendra (Loktak Lake), 10.IV.1992, S. K. Saha & Party; 6 ex., Behiang in Churachandpur dist., 24.II.1993, S.K. Saha Colln.; 1 ex., Sapermaina in Senapati dist., 2.III.1993, S.K. Saha Colln.

Distribution : India : West Bengal; Manipur; Nicobar Is.

Elsewhere : Sri Lanka, Indochina, Sunda Is., Australia, Philippines, Indonesia, F.M.S., Siam, Annam, Tonkin, China, Vietnam.

Remarks : This species is recorded here for the first time from India : Manipur.

19. ***Enochrus rubrocinctus*** (Regimbart)

1903. *Philhydrus rubrocinctus* Regimbart, *Ann. Soc. ent. Fr.*, **72** : 56.

1924. *Enochrus rubrocinctus*, Knisch., *Col. Cat.*, **14** (Pars. 79) : 214.

1995. *Enochrus rubrocinctus*, Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 143-168.

Material examined : 1 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 3 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 6 ex., Robei in Imphal Dist., 28.II.1993, S.K. Saha Colln.; 2 ex., Pangmol in Senapati Dist., 1.III.1993, S.K. Saha Colln.

Distribution : India : West Bengal; Manipur.

Elsewhere : South Asia, Indonesia, Cochin China, Indo-China, Burma.

Remarks : This species is recorded here for the first time from India : Manipur.

Tribe II. **Hydrophilini**

Genus 11. ***Sternolophus*** Solier, 1834

1834. *Sternolophus* Solier, *Ann. Soc. ent. Fr.*, **3** : 302, 310.

1924. *Sternolophus* : Solier, Knisch., *Col. Cat.*, **14** (Pars. 79) : 226-228.

20. ***Sternolophus rufipes*** (Fabricius)

1792. *Hydrophilus rufipes* Fabricius, *Entom. Syst.*, **1** : 183.

1840. *Sternolophus rufipes*, Laporte, *Castelanu Hist. Nat. Ins.*, **1** : 54.

1995. *Sternolophus rufipes* Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 159.

Material examined : 1 ex., Keithenmurbi, 14.I.1976, Dr. A.K. Ghosh Colln.; 1 ex., Kongpokpi I.B., 16.I.1976, Dr. A.K. Ghosh Colln.; 1 ex., Bishenpur, 29.V.1992, R. Mathew Colln.; 1 ex., Bishenpur, 31.VI.1992, R. Mathew Colln.; 2 ex., Loktak Lake area (Moirang) in Bishnupur Dist. 10.XII.1992, P.H. Roy Colln.; 1 ex., Cheklabhai forest in Churachandpur Dist., 17.VI.1993, R.S. Barman Colln.; 2 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln., 6 ex., Manipur, alt. 1050 m., 20.I.1977, S.G. Palit Colln.; 1 ex., Thanion in Churachandpur Dist., 23.II.1993; S.K. Saha Colln.; 2 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 34 ex., Pangmol in Senapati Dist., 1.III.1993, S. K. Saha Colln., 8 ex., Buomba in Churachandpur Dist., 11.IV.1992, S.K. Saha and Party Colln.

Distribution : India : Manipur; West Bengal; Bihar; Maharashtra; Punjab; Kashmir; South India.

Elsewhere : Sri Lanka, Trop. Asia, Sunda Is. Myanmar, Philippines, Japan, Indonesia, Formosa, F.M.S., Indo-China, China.

Remarks : This species is recorded here for the first time from Manipur.

Genus 12. ***Hydrophilus*** Muller, 1764

1764. *Hydrophilus* Muller, *Fauna Ins. Fridrichsdal*, P. 16.

1980. *Hydrophilus* Smetna, *Mem.ent.Soc.Canada*, **111** : 10-11.

1995. *Hydrophilus* Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 159-161.

21. ***Hydrophilus olivaceus*** (Fabricius)

1781. *Hydrous olivaceus* Fabricius, *Spec. Ins.*, **1** : 289.

1995. *Hydrophilus olivaceus* Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 160.

Material examined : 1 ex., Ukhrul, 8.III.1993,

A.K. Karmakar Colln.; 2 ex., Potsengban, 20.XII.1920.

Distribution : India : West Bengal; Manipur; North India; Maharashtra.

Elsewhere : Tonkin.

Remarks : This species is recorded here for the first time from Manipur.

22. *Hydrophilus indicus* (Bedel)

1892. *Hydrous indicus* Bedel, *Rev.d'Ent.*, **10** : 310, 316.

1893. *Hydrophilus* indicus, Kuwert, *Deut. Ent. Zeit.*, P. 88.

1995. *Hydrophilus indicus*, Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 160.

Material examined : 1 ex., Potsengban, North of Loktak Lake, 20.XII.1920; 1 ex., Sendra (Loktak Lake), 10.IV.1992, S.K. Saha and Party.

Distribution : India : West Bengal; Manipur.

Remarks : This species is recorded here for the first time from Manipur.

23. *Hydrophilus temnopteroides* (d'Orchymont)

1913. *Hudrous temnopteroides* d'Orchymont, *Ann. Soc. Ent. Belg.*, **57** : 319.

1924. *Hydrous temnopteroides*, Knisch, *Col. Cat.*, **14** : (Pars 79) : 257.

Material examined : 1 ex., Sikmai turail, 14.II.1920, S.L. Hora Colln.

Distribution : India : West Bengal; Bihar; Manipur.

Remarks : This species is recorded here for the first time from Manipur.

Tribe III. **Amphiopini**

Genus 13. *Amphiops* Erichson, 1843

1843. *Amphiops* Erichson, *Archiv, Naturg.*, **9** (1) : 229.

1924. *Amphiops* Erichson, Knisch., *Col. Cat.*, **14** (Pars. 79) : 259-260.

24. *Amphiops simplex* Sharp

1890. *Amphiops simplex* Sharp, *Trans. Ent. Soc. Lond.*, P. 354.

1924. *Amphiops simplex*, Knisch., *Col. Cat.*, **14** (Pars. 79) : 260.

1995. *Amphiops simplex*, Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 161-162.

Material examined : 3 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 13 ex., Thanga Loktak Lake in Bishnupur Dist., 20.II.1993, S.K. Saha Colln.; 1 ex., Keibul Lamjo National Park in Bishnupur Dist., 21.II.1993, S.K. Saha Colln.; 1 ex., Robei in Imphal Dist., 28.II.1993, S.K. Saha Colln.

Distribution : India : West Bengal; Manipur.

Elsewhere : Sri Lanka.

Remarks : This species is recorded here for the first time from Manipur.

25. *Amphiops pedestris* Sharp

1890. *Amphiops pedestris* Sharp, *Trans. Ent. Soc. London*, P. 354.

1924. *Amphiops pedestris* Knisch., *Col. Cat.*, **14** (Pars. 79) : 260.

1995. *Amphiops pedestris* Biswas and Mukhopadhyay, *Zool. Surv. India*, State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 161.

Material examined : 1 ex., Langgunpal, 12.II.1993. A. Bhattacherjee Colln.

Distribution : India : West Bengal; Bihar; Manipur; Pandicherry, Tamil Nadu.

Elsewhere : Sri Lanka, Indo-China, Saigon, Indonesia, S. Asia.

Remarks : This species is recorded here for the first time from Manipur.

Tribe IV. **Berosini**

Genus 14. *Berosus* Leach, 1817

1817. *Berosus* Leach, *Zool. Misc.*, **3** : 92.

1924. *Berosus* Leach; Knisch., *Col. Cat.*, **14** (Pars. 79) : 261-276.

26. *Berosus fairmairei* Zaitzev

1908. *Berosus fairmairei* Zaitzev, *Horae Soc. Ent. Ross*, **38** : 355.

1995. *Berosus fairmairei,* Biswas and Mukhopadhyay, *Zool Surv. India,* State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 162-163.

Material examined : 4 ex., Thinghat in Churachandpur Dist., 22.II.1993, S.K. Saha Colln.; 4 ex., Thanion in Churachandpur Dist. 23.II.1993, S.K. Saha Colln.; 1 ex., Behiang in Churachandpur Dist., 24.II.1993, S.K. Saha Colln.; 8 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln.; 1 ex., Pangmol in Senapati Dist., 1.III.1993, S. K. Saha Colln.

Distribution : India : Manipur; West Bengal; Bihar; Rajasthan; Delhi; Kerala, Andaman Is.

Elsewhere : Indo-China, Formosa, Indonesia, Tonkin, Laos, Annam, Siam, F.M.S., Philippines, Nepal, Pakistan, Bangladesh, Myanmar, China, Hongkong, Japan, Taiwan, Thailand, Malaysia.

Remarks : This species is recorded here for the first time from Manipur.

27. ***Berosus indicus*** Motschulsky

1861. *Berosus indicus* Mots., *Bull. Soc. Imp. Nat. Moscou.,* **34** : 110.

1995. *Berosus indicus,* Biswas and Mukhopadhyay, *Zool. Surv. India,* State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 163.

Material examined : 1 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 1 ex., Thanga Loktak Lake in Bishnupur Dist., 20.II.1993, S. K. Saha Colln.; 3 ex., Thinghat in Churachandpur Dist. 22.II.1993, S.K. Saha Colln.; 2 ex., Thanion in Churachandpur Dist., 23.II.1993, S.K. Saha Colln.; 1 ex., Behiang in Churachandpur Dist., 24.II.1993, S.K. Saha Colln.; 1 ex., Sangoimang in Imphal Dist., 27.II.1993, S.K. Saha Colln; 1 ex., Imphal, 27.II.1993, S.K. Saha Colln.; 1 ex., Robei in Imphal Dist., 28.II.1993, S.K. Saha Colln.; 2 ex., Buomba in Churachandpur Dist., 11.IV.1992, S.K. Saha and Party.

Distribution : India : Manipur; West Bengal; Bihar; Punjab; Rajasthan; Uttar Pradesh; Karnataka; Goa; Kerala; Pondicherry; Tamil Nadu.

Elsewhere : Pakistan, Nepal, Bangladesh, Sri Lanka, Myanmar, S. Asia, Sunda Is., China, Formosa, Indo-China, Philippines, Indonesia, F.M.S., Cambodia, Laos, Annam, Tonkin, Siam.

Remarks : This species is recorded here for the first time from Manipur.

28. ***Berosus pulchellus*** M'Leay

1825. *Berosus pulchellus* M'Leay, *Annul. Jav.,* P. 35.

1995. *Berosus pulchellus,* Biswas and Mukhopadhyay, *Zool. Surv. India,* State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 163.

Material examined : 4 ex., Thanion in Churachandpur Dist., 23.II.1993, S.K. Saha Colln.; 2 ex., Behiang in Churachandpur Dist., 24.II.1993, S.K. Saha Colln.

Distribution : India : West Bengal; Bihar; Manipur; Maharashtra; Delhi; Uttar Pradesh; Haryana; Karnataka; Kerala; Tamil Nadu; Pondicherry.

Elsewhere : Nepal, Bangladesh, China, Myanmar, Thailand, Indonesia, Australia, Philippines, Sri Lanka, Indo-China, Annam, Formosa, Tonkin, Iran, Laos, Vietnam, Japan, Hongkong, Taiwan, Malaysia.

Remarks : This species is recorded here for the first time from Manipur.

Genus 15. ***Regimbartia*** Zaitz, 1908

1908. *Regimbartia* Zaitz., *Horae Soc. Ent. Ross,* **38** : 362 (Catal.).

1924. *Regimbartia* Zaitz. : Knisch, *Col. Cat.,* **14** (Pars 79) : 276-277.

29. ***Regimbartia attenuata*** F.

1801. *Regimbartia attenuata* F., *Syst. Eleuth.,* **1** : 235 *(Hydrophilus).*

1995. *Regimbartia attenuata* Biswas and Mukhopadhyay, *Zool. Surv. India,* State Fauna Series **3** : Fauna of West Bengal, Part 6 (A) : 163.

Material examined : 1 ex., Loktak Lake, 21.V.1981, C. Radhakrishnan Colln.; 1 ex., Phubala, Loktak Lake in Bishnupur Dist., 18.II.1993, S.K. Saha Colln.; 1 ex., Sendra Loktak Lake in Bishnupur Dist., 19.II.1993, S.K. Saha Colln.; 3 ex., Thinghat in Churachandpur Dist.,

22.II.1993, S.K. Saha Colln.; 5 ex., Thanion in Churachandpur Dist., 23.II.1993, S.K. Saha Colln.; 6 ex., Behiang in Churachandpur Dist., 24.II.1993, S.K. Saha Colln.; 6 ex., Sangoimang in Imphal dist, 27.ii.1993 S.K. Saha Colln; 6ex., Imphal, 27.II.1993, S. K. Saha Colln.; 1 ex., Robei in Imphal Dist., 28.II.1993, S. K. Saha Colln.; 1 ex., Pangmol in Senapati Dist., 1.III.1993, S. K. Saha Colln.; 3 ex., Langgunpal, 12.II.1993, A. Bhattacharjee Colln.; 2 ex., Churachandpur, 16.VI.1993, R.S. Burman Colln.

Distribution : India : Manipur; West Bengal; Bihar.

Elsewhere : Sri Lanka, South Asia, Philippines, Sunda Is., Australia, Japan, Formosa, Indonesia, Cambodia, Cochin, China, Indo-China, Annam.

SUMMARY

The present paper deals with 30 species under 15 genera belonging to four subfamilies viz. Hydraeninae, Hydrochinae, Sphaeridiinae and Hydrophilinae. Of these, two species viz., *Pachysternum coomani* d'orchymont and *Helochares taprobanicus* are recorded for the first time from India and 24 species under 13 genera have been added to the list of previously recorded species from the State. No keys has been provided here as keys to subfamilies, tribes and genera have already been provided in the fauna of West Bengal, Meghalaya, Tripura and Sikkim. Distributional data of each species has been given from the published records and actual study of the specimens. Selected synonyms, collection data of each species have also given.

ACKNOWLEDGEMENT

Authors are highly indebted to Dr. J.R.B. Alfred, Director, Zoological Survey of India for giving laboratory facilities. Thanks are also due to Dr. G.K. Srivastava, Additional Director (Retd.) and Dr. S.K. Mitra, Joint Director (Retd.) for valuable suggestions and encouragement to complete the work.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 459-483, 2004

INSECTA : DIPTERA

M. DATTA and P. PARUI

Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

Manipur (Map 1) with an area of 22,327 sq. km. is a small state, lying within 23°50'–25°41' N latitudes and 93°2'–94°47'E longitudes in the north-eastern edge of India, and is bounded by Nagaland in the north, Assam in the west, Mizoram in the south-west and the international border with Myanmar in the east and south-east. The state, almost twice the size of Tripura (*cf.* Datta and Parui, 2000), is essentially a land of hills and mountains with a beautiful valley, the Imphal Valley at the centre. The valley with a large floating lake, the Loktak Lake at the height of 750–950m, is shut on every side by the tracts of hills and mountains rising even up to 3,960 m on the north and north-east. The hills beyond the north as in the south show gradual decline in altitude westward, sinking into the flat plains of the Assam Valley. There are some short and narrow rivers like the Imphal, the Tuivai, the Thoubal, the Laniye and the Nambul, of which the rivers Imphal, Thoubal and Nambul flow through the Imphal valley making it fertile. The state like Tripura, experiences a hot and humid climate. The rainfall is plenty, and occurs mostly during the rainy season, from July to September. This heavy rainfall causes dense forests to grow in many areas of the state. Alongside deep forests, the rich assemblage of orchids in the mountain terrains and varieties of crops in the valley assure a fauna of diverse nature under the influence of its tropical to sub-alpine climate. Therefore, the state is likely to have a fauna nearly as good as the state of Meghalaya (*cf.* Datta and Parui, 1998) or any other neighbouring state has.

Unfortunately, the Diptera fauna known in the state is very inadequate, probably due to its disadvantageous situation for systematic exploration (*vide* Datta and Mukherjee, 2003). The first record of collecting Diptera from Manipur is credited to the goodwill venture of Rev. W. Pettigrew who, being stationed at Ukhrul (alt. 1950m), collected a number of various Diptera at his own effort during August, 1908 and deposited them in the Indian Museum, Calcutta. These were subsequently studied by different pioneer-workers, of which F.V. Theobald (1910) described a species of mosquito named *Culex pettigrewi,* a junior synonym of *Culex (Culex) theileri* Theobald, 1903. To add to it, almost simultaneously Brunetti (1912) described a species of the Stratiomyidae and Ricardo (1913) three species of the Tabanidae from the same collection.

Besides Rev. W. Pettigrew, other earlier collectors like P. J. Barraud (in 1922), I. M. Puri (in 1932) and F. Schmid (in 1960) are noteworthy for their collections of the Culicidae, Simuliidae, Tipulidae, Tabanidae, etc. which are deposited in the Indian Museum, Calcutta, the National Institute of Communicable Diseases, New Delhi, the Natural History Museum, London and the Entomology Research Institute, Ottawa (Canada). Indeed, Schmid's great collections of Diptera are now housed in several museums and institutes of America and Europe.

It is admittedly true to the fact that no worker from this institute could pay a visit to the state during those earlier days and, therefore, the institute was utterly deficient in the material from

the state till 1974. In 1975, however, P.T. Cherian, M.S. Shishodia and M. Datta each as a separate unit collected a good number of Diptera from several areas of the state. Furthermore, in a recent drive, some collecting trips were organized by this institute for surveying the faunal resources of Manipur in order to reveal the fauna of the state. Those trips that brought the dipterous material for this study are given here, indicating their leadership and the time of the survey : A. K. Hazra (April, 1992), D.K. Mandal (April, 1992), A.R. Lahiri (December, 1992–January, 1993) and B. Mitra (May, 1993). In addition, a few other specimens of earlier collections are incorporated in this study.

This report is based on the material belonging to the families : Bibionidae, Mycetophilidae, Stratiomyidae, Tabanidae, Asilidae, Diopsidae, Sepsidae, Calliphoridae and Sarcophagidae. The families, such as, Syrphidae, Muscidae and Tachinidae are, however, dealt with separately by different authors.

Indeed, the species, sometimes with the genus too, recorded for the first time from Manipur are marked with an asterisk.

MATERIALS AND METHODS

The reader is referred to Datta, Parui and Mukherjee (1997), Datta (1998), and Datta and Parui (1998) for an overview of the general methods of collecting dipterous specimens from their habitats and of preserving them perfectly for taxonomic studies. Since only adults are treated here, any method applicable to them would be unsuitable for immatures.

MORPHOLOGY AND TERMINOLOGY

An account of morphology and terminology of Diptera in general by Datta *et. al.* (1997) and thereafter a review of the morphological features of value with the terminological usage for certain families by Datta (1998), and Datta and Parui (1998) will equally hold good in the fauna of Manipur. Indeed, the Mycetophilidae and the Asilidae that remained out of the purview in previous occasions, are discussed here in favour of the significant features used in the description and key to the various taxa of these families.

The Mycetophilidae are readily recognizable by their legs with the elongate coxae and tibial spurs, wings devoid of the discal cell and abdomen with its basal constriction as well as their primitiveness with ocelli at the vertex of the head. The most important characters of the family lie in their wings, supplemented mainly by tinctorial features of both thorax and abdomen in general, and occasionally by features of head-parts for classifying different taxa. Eyes in both sexes are dichoptic and ocelli in-between them above may be 2 or 3 in number, Antennae are generally long, with 12-16 segments of which flagellar segments are usually cylindrical. The colour of the antennae may have specific value. Besides, the 3-4 segmented palpi and the proboscis may be taxonomically important in certain genera. The mesonotum of thorax is either striped or unstriped. The pleura may also have specific importance. The wing may vary from being hyaline to fully infuscated. The extent of infuscation offers specific diagnosis in several instances. The destination of the costal and the subcostal veins is used as an important tool in classification. The presence or absence of the humeral and the subcostal veins may be diagnostic. The vein R_{2+3} is lacking in the family. All the other veins, especially R_{4+5} and M_{1+2} that follow, are invaluable in the mycetophilid taxonomy in respect of origin, division and union or extension and distinction of veins or disappearce and prominence of sister veinlets. The posterior cross-vein (m-cu) may be present but the marginal cross-vein is always absent. Besides apical spurs, tibiae are often with 2 or 3 rows of bristles that carry taxonomic value. The abdomen is composed of 7 or 8 segments, and may be banded dorsally. The shape and size of gonocoxites, gonostyles and aedeagus in the male genitalia always provides specific distinction.

The Asilidae are large bristly flies, with a short thorax bearing exceedingly developed legs beset with strong bristles, and often with a stout

and tapered abdomen. The head with the dichoptic eyes in both sexes is characteristically excavated at the vertex. The face at the lower end has a well-developed tubercle with long and stout bristles called mystax. Antennae are 3-segmented, with 1 or 2 microsegments, and may have an apical spine or a bristle-like style or arista, with or without hairs. The ocellarium may bear bristles like those of the frons that have taxonomic value. The palpus varies in number from 1 to 3, and their dimension, especially of the segment 3, when present, may be highly characteristic. Indeed, the palpi are of great value in higher classification of asilids. Likewise, the proboscis as regards its length, direction and apical shape may be accountable.

The thoracic sclerites are generally beset with distinct macrochaetae of taxonomic value alongside mesonotal extension to pronotum. The wing may not have an alula or an ambient vein. The vein R_{4+5} may not have a spur vein. The posterior cells may be reduced to 4 or even 3 instead of 5, and all may not be open. The marginal as well as the anal cells may either be open or closed. The legs may be provided with pulvilli and empodium. Their shape and size, and that of the claws also may be regarded as significant. The hind femur may be thickened, bearing 1 or more tubercles and occasionally a basal spur. Likewise, the fore tibial and tarsal apices may bear a tubercle or a bristle or a spine.

The abdomen is generally of 8 segments in both sexes despite certain other segments in the formation of the terminalia or the ovipositor. The tergal component of the segment 9 is known as the epandrium and the sternal component as the hypandrium that may be of various stages of development or even lacking. The epandrium is furnished apically with superior forceps externally and proctiger or cerci internally. There is a paired lateral organ called gonopod (or inferior forceps) enclosed by them. Besides, there may be a few distal processes as styli or surstyli or claspers. All these accessories, if present, are kept confined to the penis sheath and the latter in turn encompasses the aedeagus. The female terminalia are as a rule very simple, and remain useless for diagnosis of most asilids.

Key to the families*

1. Adult antennae with more than 5 segments (generally 8–16) that never fused into a solid structure 2

— Adult antennae either with fewer than 5 segments (generally 3) or with segments of flagellum fused into a solid structure, usually surmounted by a style or an arista 3

2. Antennae inserted below level of eyes and segments generally cylindrical and closely apposed ; fore femur often enlarged ..... BIBIONIDAE

— Antennae inserted on a level with middle of eyes, segments generally filiform and distinctly parted ; coxae often greatly enlarged ..... MYCETOPHILIDAE

3. Adult head without a frontal lunule or a ptilinum 4

— Adult head with a distinct frontal lunule and ptilinum 7

4. Wings with a spurious vein between veins R and M ; antennal arista usually dorsal ..... SYRPHIDAE*

— Wings without any spurious vein ; antennal arista, if present, invariably terminal 5

5. Files without bristles ; arolium pad-like, nearly or quite as large as two pulvilli 6

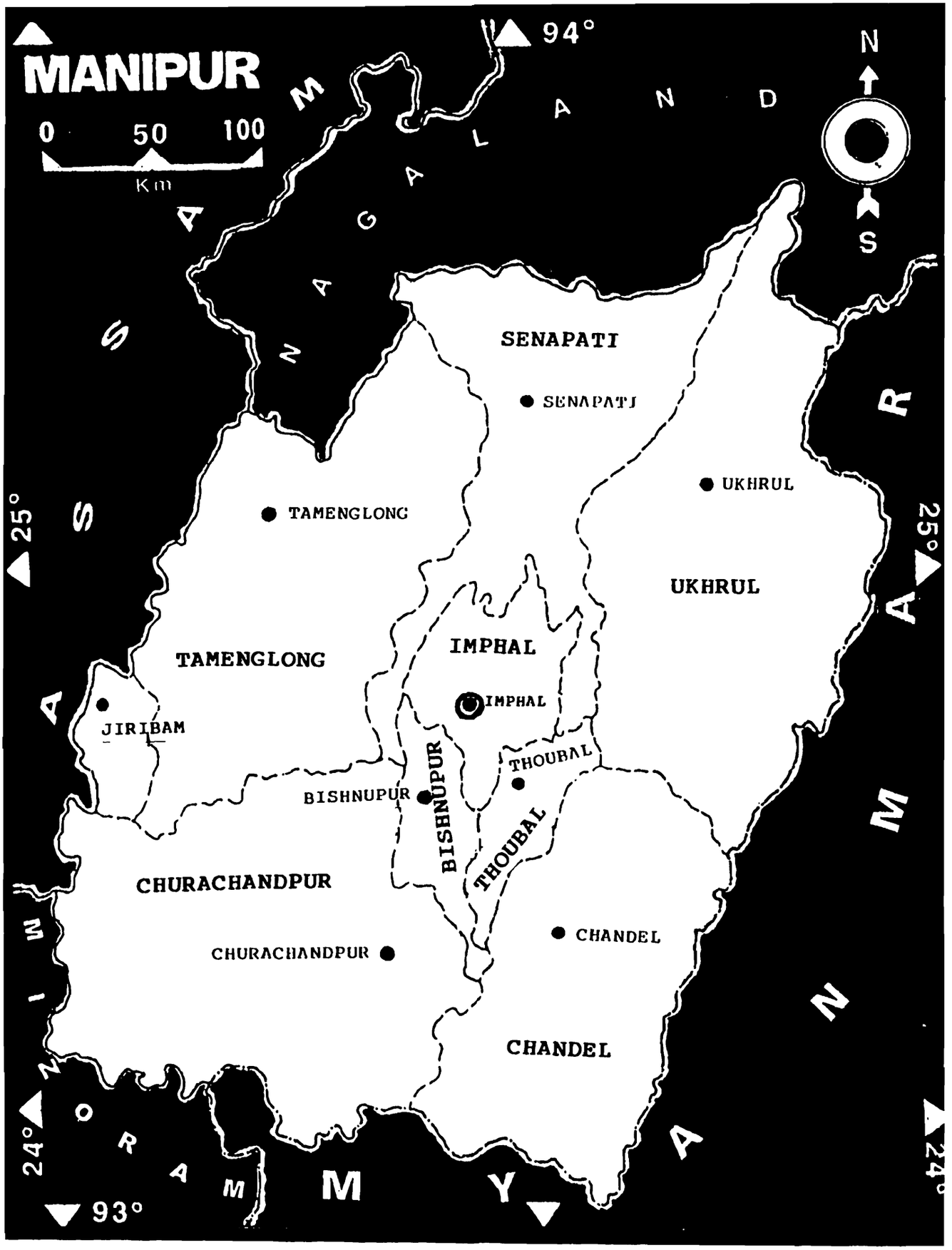
— Files with strong bristles, arolium replaced at least by a rudimentary hair-like empodium .. ASILIDAE

6. Wings with costa ending at or near wing tip, squamae small ; tibiae without spurs ..... STRATIOMYIDAE

— Wings with costa continuing well past wing tip, often around posterior margin ; mid-tibiae invariably with spurs ..... TABANIDAE

7. Antennal segment 2 above without distinct external groove ; theca not developed at the base of proboscis; squamae small or vestigial 8

*Families with an asterisk are treated separately by various authors.



Map 1 : Manipur showing its location, districts and district headquarters.

— Antennal segment 2 above with a distinct external groove ; theca developed at the base of proboscis ; squamae well-developed 9

8. Eyes and antennae carried out on a short or long stalk ; scutellum with two long spines ; bizarre appearance ..... DIOPSIDAE

— Eyes and antennae normally located and not on a stalk ; scutellum without long spines ; ant-like ..... SEPSIDAE

9. Pteropleural and hypopleural bristles present 10

— Pteropleural bristles absent ; hypopleura at most with weak, scattered hairs only but never with strong bristles below spiracle.. MUSCIDAE*

10. Post-scutellum noticeably developed ; sternite more or less hidden by overlapping tergites. ..... TACHINIDAE*

— Post-scutellum not conspicuously developed ; at least basal sternite overlapping tergite.. 11

11. Flies with metallic blue or green body ; antennal arista usually feathered to tip ; thorax nearly always with 2 notopleural bristles ....CALLIPHORIDAE

— Flies with dull black or striped grey and black body ; antennal arista pubescent or feathered usually not much beyond middle ; thorax almost invariably with 3 or 4 notopleural bristles ..... SARCOPHAGIDAE

LIST OF TAXA

Family BIBIONIDAE

Subfamily PLECIINAE

1. *Penthetria indica* (Brunetti)

*2. *P. japonica* Wiedemann

*3. *Plecia mallochi* Hardy

*4. *P. tergorata* Rondani

Family MYCETOPHILIDAE

Subfamily SCIOPHILINAE

5. *Leia insignis* Brunetti

6. *L. winthemi* Lehmann

Subfamily MYCETOPHILINAE

7. *Mycetophila lineola* Meigen

Family STRATIOMYIDAE

Subfamily SARGINAE

*8. *Ptecticus aurifer* (Walker)

9. *P. cyaneus* Brunetti

*10. *Sargus metallinus* Fabricius

Subfamily HERMETIINAE

*11. *Eudmeta marginata* (Fabricius)

*12. *Hermetia illucens* (Linnaeus)

Subfamily PACHYGASTERINAE

*13. *Ptilocera fastuosa* Gerstaecker

Family TABANIDAE

Subfamily CHRYSOPSINAE

*14. *Chrysops dispar* (Fabricius)

15. *C. pettigrewi* Ricardo

Subfamily TABANINAE

Tribe **Tabanini**

16. *Tabanus (Tabanus) altermaculatus* Ricardo

*17. *T. (T.) birmanicus* (Bigot)

18. *T. (T.) manipurensis* Ricardo

*19. *T. (T.) melanognathus* (Bigot)

20. *T. (T) pullomaculatus* Philip

*21. *T. (T) rubidus* Wiedemann

22. *T. (T). striatus* Fabricus

Tribe **Haematopotini**

23. *Haematopota amala* Stone & Philip

*24. *H. annandalei* Ricardo

25. *Hi bicolor* Stone & Philip

26. *H. hardyi* Stone & Philip

27. *H. philipi* Chvàla

Family ASILIDAE

Subfamily DASYPOGONINAE

28. *Stenopogon manipurensis* Joseph & Parui

Subfamily ASILINAE

*29. *Clephydroneura sundaica* (Jaennicke)

30. *Machimus cheriani* Joseph & Parui

Family DIOPSIDAE

Subfamily DIOPSINAE

*31. *Teleopsis quadriguttata* (Walker)

Family SEPSIDAE

Subfamily SEPSINAE

*32. *Decachaetophora aeneipes* (de Meijere)

*33. *Dicranosepsis bicolor* (Wiedemann)

*34. *Meroplius fasciculatus* (Brunetti)

*35. *Sepsis coprophila* de Meijere

*36. *S. indica* Wiedemann

Family CALLIPHORIDAE

Subfamily CALLIPHORINAE

*37. *Bengalia surcoufi* Senior-White

*38. *Hemipyrellia ligurriens* (Wiedemann)

*39. *H. pulchra* (Wiedemann)

Subfamily CHRYSOMYIINAE

40. *Chrysomya megacephala* (Fabricius)

Subfamily RHINIINAE

41. *Chlororhinia exempta* (Walker)

Family SARCOPHAGIDAE

Subfamily SARCOPHAGINAE

42. *Bercaea cruentata* (Meigen)

43. *Boettcherisca peregrina* (Rob.-Desv.)

44. *Harpagophalla kempi* (Senior-White)

45. *Parasarcophaga (Curranea) scopariiformis* (Senior-White)

46. *P. (Liopygia) ruficornis* (Fabricius)

47. *P. (Liosarcophaga) brevicornis* (Ho)

48. *P. (L.) dux* (Thomson)

49. *P. (L.) jaipurensis* Nandi

50. *P. (Pandelleisca) assamensis* Nandi & Roy

51. *P. (Parasarcophaga) albiceps* (Meigen)

52. *P. (P.) macroauriculata* (Ho)

53. *P. (P.) misera* (Walker)

54. *P. (P.) sericea* (Walker)

55. *Pierretia calcifera* (Böettcher)

56. *Robineauella coei* Rohdendorf

57. *Rosellea khasiensis* (Senior-White)

58. *Seniorwhitea reciproca* (Walker)

59. *Thyrsocnema lushainensis* Nandi

SYSTEMATIC ACCOUNT

Family BIBIONIDAE

Contribution on the fauna of Manipur : Brunetti, 1911.

A total of 4 species under 2 genera of the subfamily Pleciinae are hitherto known in Manipur vis-à-vis 38 species and 1 subspecies under 4 genera of 2 subfamilies in India.

Subfamily PLECIINAE

Diagnosis : Bibionid flies with robust antennae of which segment 3 not elongate ; eyes in males joined on frons ; wing with forked radial sector ; legs devoid of spurs of spines.

Key to the genera
(*vide* Datta & Parui, 1998)

Genus ***Pemhetria*** Meigen

1803. *Penthetria* Meigen, *Magazin InsektKde*, 2 : 264
Type-species : *Penthetria holosericea* Meigen.

Key to the species
(*vide* Datta & Parui, 1998)

1. ***Penthetria indica*** (Brunetti)

1911. *Plecia indica* Brunetti, *Rec. Indian Mus.*, **4** : 271.

Distribution : Manipur (Ukhrul dist.), and Himachal Pradesh, Meghalaya, Uttar Pradesh and West Bengal ; Nepal and Pakistan.

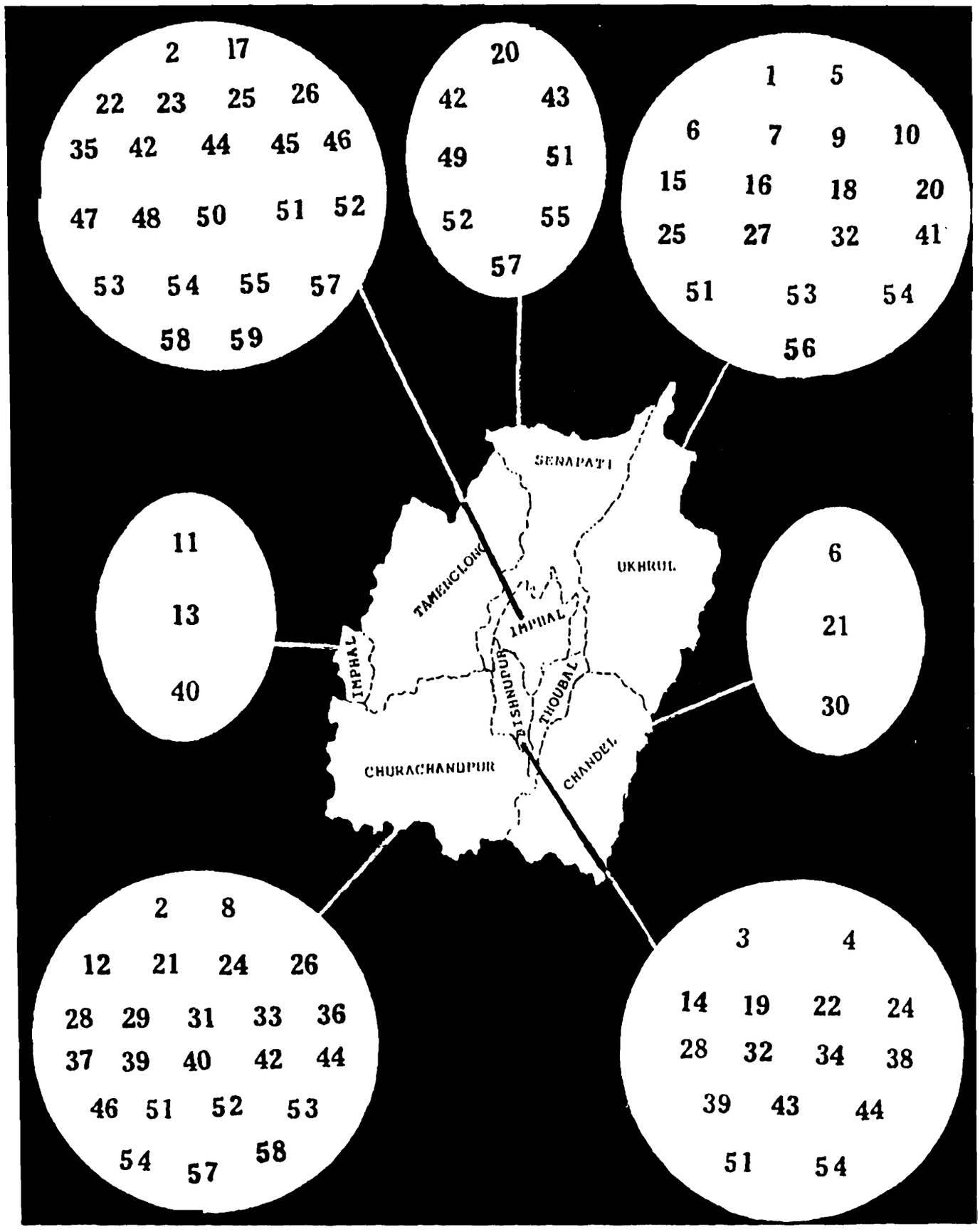
*2. ***Penthetria japonica*** Wiedemann

1830. *Penthetria japonica* Wiedemann, *Aussereurop. zweifl. Insekt.*, **2** : 618.

1912. *Pleciomyia melanaspis* Wiedemann (*nec*) : Brunetti, *Fauna Br. India, Dipt. Nematocera ;* 161.

Material examined : 1 ♂, Churachandpur dist., Tuitapi, 20.xii.1992, Coll. J.R.Singh ; 1 ♂, Imphal dist., Imphal, Hanuman mandir area, 29.xii.1992,

The distribution of the species recorded in Manipur is designed in Map 2.



Map 2 : Species of Diptera (as per text-numbers) recorded in districts of Manipur.

Coll. R. S. Mridha ; 2♂♂, Churachandpur dist., Sielmat, 15.v.1993, Coll. B. Mitra.

Distribution : Manipur (Imphal and Churachandpur dists.), and Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Sikkim, Tripura, Uttar Pradesh and West Bengal; China, Myanmar, Nepal and Taiwan; Japan and Siberia.

Genus ***Plecia*** Wiedemann

1828. *Plecia* Wiedemann, *Aussereurop, zweifl, Insekt.*, **1** : 72. Type-species : *Hirtea fulvicollis* Fabricius.

Key to the species

1. Thorax all rufous ; claspers in male genitalia blunt and broadly rounded at apices .... *mallochi* Hardy

— Thorax excepting scutum and scutellum, brown to black ; claspers in male genitalia bilobed at apices ..... *tergorata* Rondani

*3. ***Plecia mallochi*** Hardy

1948. *Plecia mallochi* Hardy, *J. Kansas ent. Soc.*, **21** : 36 (nov. nom. for *confusa* Malloch).

1958. *Plecia dispersa* Hardy, *Pacif. Sci.*, **12** : 196.

Material examined : 1♂, Bishnupur dist., Lonkoipoty, 800m, 7.iv.1992, Coll. D. K. Mondal.

Distribution : Manipur (Bishnupur dist.), and Andaman Is., Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Nicobar Is., Tamil Nadu and Uttar Pradesh ; Nepal, Pakistan and Sri Lanka.

*4. ***Plecia tergorata*** Rondani

1875. *Plecia tergorata* Rondani ; *Annali Mus. civ. Stor. nat. Giacomo Doria*, **8** : 462.

Material examined : 4♂♂, 1♀, Bishnupur dist., Moirang, 10.xii.1992, Coll. P. H. Roy.

Distribution : Manipur (Bishnupur dist.), and Arunachal Pradesh, Assam, Kerala, Meghalaya, Uttar Pradesh and West Bengal ; E Malaysia, Jawa, Kalimantan, Myanmar and Sumatera.

Remarks : The male genitalia of he specimens dealt with, show that the species does occur at least in the north-eastern India (*cf.* Hardy, 1958).

Family MYCETOPHILIDAE

Contribution on the fauna of Manipur : Brunetti, 1912.

A total of 3 species under 2 genera of 2 subfamilies are hitherto known is Manipur vis-à-vis 87 species and 1 subspecies under 22 genera of 3 subfamilies in India.

Key to the subfamilies

1. Wing-vein R_{3+4} forked ..... SCIOPHILINAE

— Wing-vein R_{3+4} unforked .... MYCETOPHILINAE

Subfamily SCIOPHILINAE

Genus ***Leia*** Meigen

1818. *Leia* Meigen, 1818, *Syst. Beschr. europ. zweifl Insekt.*, **1** : 253. Type-species : *Leia fascipennis* Meigen.

Diagnosis : Wing with short subcostal vein, ending at one-third of wing-costa ; vein Cu forked before forking of vein M ; antennae projecting forward.

Key to the species

1. Thorax with 3 black stripes ; wing with 3 black spots ..... *winthemii* Lehmann

— Thorax unstriped and entirely shining black except anterior margin ; wing with a very narrow arcuate black streak subapically..... ..... *insignis* Brunetti

5. ***Leia insignis*** Brunetti

1912. *Leia insignis* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 101.

Distribution : Manipur (Ukhrul dist.).

6. ***Leia winthemi*** Lehmann

1822. *Leia winthemi* Lehmann *Obsns, zool. hamb.* : 39.

Material examined : 2♂♂, 3♀♀, Chandel dist., Moreh, 25.xii.1992, Coll. A. R. Lahiri.

Distribution : Manipur (Ukhrul and Chandel dists.), and Himachal Pradesh, Uttar Pradesh and West Bengal ; Jawa, Sumatera ; Europe, Japan and Siberia ; North America.

Subfamily MYCETOPHILINAE

Genus ***Mycetophila*** Meigen

1803. *Mycetophila* Meigen, *Magazin InsektKde,* **2** : 263. Type-species : *Tipula agarici* Villers.

Diagnosis : Wing with very short subcostal vein, ending free of costa ; veins M and Cu forked approximately at about same level ; antennae arcuate.

7. ***Mycetophila lineola*** Meigen

1818. *Mycetophila lineola* Meigen, *Syst. Beschr. europ. zweifl. Insekt.* **1** : 262.

1912. *Mycetophila binotata* Brunetti, *Fauna Br. India, Dipt. Nematocera* : 118.

Diagnosis : Head bright brownish yellow, with short black hairs on upper part ; thorax concolorous, with minute golden yellow pubescence and scattered black bristles ; humeri with a fan-shaped row of 5 bristles underside and scutellum beset with 4 strong bristles posteriorly ; wings yellowish with a brown infuscation in form of an oval spot at tip of basal cell ; legs predominantly yellowish, with slightly darker tibiae and blackish tarsi ; abdomen black.

Distribution : Manipur (Ukhrul dist.), and Himachal Pradesh and West Bengal ; E Malaysia, Jawa and Kalimantan ; Europe and E Africa.

Family STRATIOMYIDAE

Contribution on the fauna of Manipur : Brunetti, 1912.

A total of 6 species under 5 genera of 3 subfamilies are hitherto known in Manipur vis-à-vis 73 species under 34 genera of 6 subfamilies in India.

Key to the subfamilies
(*vide* Datta & Parui, *in press*)

Subfamily SARGINAE

Key to the genera
(*vide* Datta & Parui,1998)

Genus ***Ptecticus*** Loew

1855. *Ptecticus* Loew, *Verh. zool.-bot. Ges. Wien,* **5** : 142. Type-species : *Sargas testaceus* F.

Key to the species

1. Wing with orange-yellow basal half and dark brown distal half ; abdominal tergites 1–4 bright orange and remainder black .... *aurifer* (Walker)

— Wing entirely greyish ; abdomen entirely shining violet ..... *cyaneus* Brunetti

*8. ***Ptecticus aurifer*** (Walker)

1854. *Sargus aurifer* Walker, *List Dipt. Colln Br. Mus.,* **5** : 96.

Material examined : 1 ♀, Churachandpur dist., Sielmat, 17.v.1993, Coll. M. Sil.

Distribution : Manipur (Churachandpur dist.), and Arunachal Pradesh, Assam, Meghalaya, Sikkim, Uttar Pradesh and West Bengal ; China, E Malaysia, Kalimantan, Malay and Taiwan.

9. ***Ptecticus cyaneus*** Brunetti

1912. *Ptecticus cyaneus* Brunetti, *Rec. Indian Mus.,* **7** : 453.

Distribution : Manipur (Ukhrul dist).

Genus ***Sargus*** Fabricius

1798. *Sargus* Fabricius, *Suppl. ent. Syst.* : 549, 566. Type-species : *Musca cupraria* L.

*10. ***Sargus metallinus*** Fabricius

1805. *Sargus metallinus* Fabricius, *Syst. Antliat.* : 258.

Material examined : 1 ♀, Churachandpur dist., Sielmat, 15.v.1993, Coll. M. Sil.

Diagnosis : *Vide* Datta & Parui *(in press).*

Distribution : Manipur (Churachandpur dist.), and Andaman Is., Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Sikkim, Uttar Pradesh and West Bengal ; China, Indonesia, Malaysia, Myanmar, Nepal and Sri Lanka ; Australian region.

Subfamily HERMETIINAE

Key to the genera

1. Eyes finely pubescent ; antennal flagellum very

elongate, with a club-shaped densely pubescent style ; abdomen equilateral, considerable longer than thorax ..... *Hermetia* Latr.

— Eyes very large and bare ; antennal flagellum only longer than head, with a very short style, if at all present ; abdomen elliptical, barely longer than thorax..... *Eudmeta* Wied.

Genus ***Eudmeta*** Wiedemann

1830. *Eudmeta* Wiedemann, *Aussereurop. zweifl, Insekt.*, **2** : 43. Type-species : *Hermetia marginata* Fabricius.

*11. ***Eudmeta marginata*** (Fabricius)

1805. *Hermetia marginata* (Fabricius), *Syst. Antliat* : 63.

Material examined : 1 ♀, Imphal dist. (Jiribam), Harinagar, 10.v.1993, Coll. B. Mitra.

Diagnosis : Female frons moderately narrow ($^1/_7$ or $^1/_8$ of head) ; antennal flagellum with 8 flagellomeres ; thorax dull black, with a small yellow callus on humerus, joined by an elongate stripe above suture ; a similar callus on posterior corner, located vertically ; scutellum black, with a moderate, round yellow spot apically ; sternpleuron with an oval and wing-base with a subtriangular spot in front, usually coloured yellowish or orange ; abdomen dark bluish black, appearing orange-yellow laterally.

Distribution : Manipur (Imphal dist.), and West Bengal ; Jawa, Kalimantan, Malaysia, Myanmar and Sumatera.

Genus ***Hermetia*** Latreille

1804. *Hermetia* Latreille, *Nouv. Dict. Hist. nat.*, **24** (*Tab. Méth. Ins.*) : 192. Type-species : *Musca illucens* (Linnaeus).

*12. ***Hermetia illucens*** (Linnaeus)

1758. *Musca illucens* Linnaeus, *Syst. Nat. Ed.*, **10** : 589.

Material examined : Churachandpur dist., Sielmat, 15.v.1993, Coll. M. Sil.

Diagnosis : *vide* Datta & Parui (*in press*)

Distribution : Manipur (Churachandpur dist.), and Sikkim and Tamil Nadu ; Malaysia, Philippines, Sri Lanka and Sumatera ; nearly cosmopolitan.

Subfamily PACHYGASTERINAE

Genus ***Ptilocera*** Wiedemann

1820. *Ptilocera* Wiedemann, *Nova Dipt. Gen.* : 7. Type-species : *Stratiomys quadridentata* F.

Diagnosis : *Vide* Datta & Parui (2000).

Distribution : Manipur (Imphal dist.), and Arunachal Pradesh, Karnataka, Kerala, Meghalaya, Nicobar Is., Tripura and West Bengal ; Jawa, Malay, Myanmar, Philippines, Sri Lanka, Sulawesi and Thailand.

Family TABANIDAE

Contributions on the fauna of Manipur : Ricardo 1911, 1913 ; Philip, 1970 ; Stone & Philip, 1974.

A total of 14 species under 3 genera of 2 sub-families are hitherto known in Manipur vis-à-vis 197 species and 4 subspecies under 12 genera belonging to 3 sub-families in India.

Key to the subfamilies
(*vide* Datta, 1998)

Subfamily CHRYSOPSINAE

Tribe **Chrysopsini**

Diagnosis : *Vide* Datta & Parui, (2000).

Genus ***Chrysops*** Meigen

1803. *Chrysops* Meigen, *Magazin InsektKde*, **2** : 267. Type-species : *Tabanus caecutiens* L.

Diagnosis : *Vide* Datta & Parui, (2000).

Key to the species

1. Wing-band with a large hyaline area on posterior cell 5 up to hind margin ; abdomen mainly yellow to orange, with an inverted black V-marking on tergum 2 or often extending to 3 or even to 4 ..... *dispar* Fabricius

— Wing-band virtually without hyaline area posteriorly but wing with an apical spot ;

abdomen extensively yellow to orange on basal 2 segments and gradually darkening from 3 onwards ..... *pettigrewi* Ricardo

*14. ***Chrysops dispar*** (Fabricius)

1798. *Tabanus dispar* Fabricius, *Ent. Syst. Suppl.* : 567.

Material examined: 1 ♀, Bishnupur dist., Moirang, 22.v.1993, Coll. B. Mitra.

Distribution : Manipur (Bishnupur dist.), and Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Meghalaya, Orissa, Sikkim, Tripura and West Bengal ; Bangladesh, China, Jawa, Kalimantan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Sumatera, Taiwan, Thailand and Vietnam.

15. ***Chrysops pettigrewi*** Ricardo

1913. *Chrysops pettigrewi* Ricardo, *Ann., Mag. nat. Hist.*, (8) **11** : 542.

Distribution : Manipur (Ukhrul dist.), and Sikkim ; China.

Remarks : Sikkim as falling in its distributional range in India was left out due to oversight (*cf.* Datta & Parui, *in press).*

Subfamily TABANINAE

Key to the tribes
(vide Datta, 1998)

Tribe **Tabanini**

Genus ***Tabanus*** Linnaeus

1758. *Tabanus* Linnaeus, *Syst. Nat., Ed.*, **10** : 601. Type-species : *Tabanus bovinus* Linnaeus.

Diagnosis : *Vide* Datta (1998).

Subgenus ***Tabanus*** Linnaeus

Diagnosis : Vide Datta (1998).

Key of the species

1. Thorax reddish brown; wing with a transverse pattern of deep infuscation in middle ; legs excepting tarsi reddish brown ; abdominal dorsum entirely shining brown .... *melanognathus* (Bigot)

— Thorax blackish brown to black; wing at most with a brown tint over anterior border but never with a transverse infuscation in middle ; legs predominantly blackish; abdominal dorsum reddish, with black end or entirely blackish 2

2. Tibiae nearly all whitish, in strong contrast to body ; abdominal tergites often showing an inconspicuous median stripe or triangles of pale hairs ..... *birmanicus* (Bigot)

— Tibiae coloured otherwise ; abdominal tergites either with distinct spots only or with stripes only or with both 3

3. Antennal plate with well-developed dorso-basal tooth ; abdomen dorsally with distinct median spots on tergites 2-4 4

— Antennal plate with very small dorso-basal tooth; abdomen dorsally with distinct median and lateral stripes or with a median stripe and lateral spots 6

4. Antennal tooth robust and rounded but not forward-projecting ; abdominal spots white-haired ..... *manipurensis* Ricardo

— Antennal tooth prolonged and forward projecting ; abdominal spots black 5

5. Femora grey and tibiae reddish ; venter evenly grey, with pale incisures on sternites .... *altermaculatus* Ricardo

— Femora and tibiae dark red ; venter brownish, with dark red incisures up to stermine 4 .... *pullomaculatus* Philip

6. Median pale tomentose stripe present on tergites 1-6, sometimes as a series of confluent triangles ; lateral pale spots present on tergites 2-5 diagonally ..... *rubidus* Wiedemann

— Median strongly white tomentose and white-haired stripe present from base of tergite 3 to somewhere on tergite 6 ; lateral white tomentose and white-haired stripe present from tergite 1 to somewhere on tergite 4 .... *striatus* Fabricius

16. ***Tabanus (Tabanus) altermaculatus*** Ricardo

1913. *Tabanus altermaculatus* Ricardo, *Ann. Mag. nat. Hist.* (8) **11** : 544 (As subspecies of *T. fuscomaculatus* Ricardo, 1911).

Distribution : Manipur (Ukhrul dist.).

*17. ***Tabanus (Tabanus) birmanicus*** (Bigot)

1992. *Atylotus birmanicus* Bigot, *Mém. Soc. zool. Fr.*, **5** : 653.

Material examined : 1♂, Imphal dist., Lamsang, 18 km N of Imphal, 25.v.1993, Coll. B. Mitra.

Distribution : Manipur (Imphal dist.), and Meghalaya and Mizoram ; ? China, Malay, Myanmar, ? Taiwan, Thailand and Vietnam.

18. ***Tabanus (Tabanus) manipurensis*** Ricardo

1913. *Tabanus manipurensis* Ricardo, *Ann. Mag. nat. Hist.* (8) **11** : 544.

Distribution : Manipur (Ukhrul dist.).

Remarks : As per notes by Burton (1978 : 64) regarding the type-designation of this species, we have thoroughly examined the collection of the Indian Museum (now at the Zoological Survey of India, Calcutta) where there are three female specimens with the data as "Ukhrul, Manipur, 6400 feet, Rev. W. Pettigrew, Lat. 25°N, long. 94°–95°E" Of them, one specimen bearing the Regd. No. 7070/16 designated *Paratype* is located in the Type Collection and the other two bearing the same Regd. No. 7072/16 without designation are in the General Collection. However, the authority of the *Paratype* designation is uncertain.

*19. ***Tabanus (Tabanus) melanognathus*** (Bigot)

1890. *Atylotus melanognathus* Bigot, *Nouv. Arch. Mus. Hist. nat. Paris* (3) **2** : 204.

Material examined : 1♀ , Bishnupur dist., Loktak Lake area, 24.v.1993, Coll. B. Mitra.

Distribution : Manipur (Bishnupur dist.); Cambodia, Laos, Thailand and Vietnam.

Remarks : The identity of the only female specimen is confirmed from the comparative notes by Burton (1978 : 155). The range of distribution to Thailand and Laos questioned by him seems valid and most likely the species may eventually be found in Myanmar too. Furthermore, the physiography of the type-locality of the related species *nonoptatus* Ricardo, 1911, is far different from that of the locality at which *melanognathus* has been discovered. Therefore, the distributional range from Bihar to Manipur and even further down to Cambodia and S Vietnam is quite unthinkable.

20. ***Tabanus (Tabanus) pullomaculatus*** Philip

1970. *Tabanus pullomaculatus* Philip, *H. D. Srivastava Commen. Vol., Ind. Vet. Res. Inst. Izatnagar* : 449.

Distribution : Manipur (Senapati and Ukhrul dists.), and Himachal Pradesh and Sikkim.

Remarks : Burton (1978 : 153) has already clarified that *Tabanus fuscomaculatus* Ricardo, 1911, and *T. altermaculatus* Ricardo, 1911 (treated here above) are quite distinct as good species. However, an allied species to the latter, *T. pullomaculatus* Philip described from the same range of the physiographic area, is so close to each other that their separate identities are doubtful because the minor tinctorial characters (as in the key) are subjected to variations in the same species while comparing in a large accumulation of specimens.

*21. ***Tabanus (Tabanus) ribidus*** Wiedemann

1821. *Tabanus rubidus* Wiedemann, *Dipt. exot.*, **1** : 69.

Material examined : 1♀, Chandel dist., Moreh, 2.ii.1975, Coll. P.T. Cherian ; 1♀, Churachandpur dist., Churachandpur, 21.ix.1975, Coll. M.S. Shishodia.

Distribution : Manipur (Chandel and Churachandpur dist.), and Arunachal Pradesh, Assam, Bihar, Delhi, Haryana, Jammu & Kashmir, Kerala, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal ; Bangladesh, Cambodia, China, Jawa, Laos, Malay, Myanmar, Nepal, Nias Is., Pakistan, Singapore, Sri Lanka, Sumatera, Thailand and Vietnam.

22. ***Tabanus (Tabanus) striatus*** Fabricius

1787. *Tabanus striatus* Fabricius, *Mantissa Insect.*, **2** : 356.

Material examined : 1♀, Bishnupur dist., Phubala, 23.v.1993, Coll. B. Mitra.

Distribution : Manipur (Imphal and Bishnupur dists.), and Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal ; Bangladesh, Bhutan, Cambodia, China, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

Tribe **Haematopotini**

Genus ***Haematopota*** Meigen

1803. *Haematopota* Meigen, *Magazin InsektKde*, **2** : 67. Type-species : *Tabanus pluvialis* Linnaeus.

Diagnosis : *Vide* Datta (1998).

Key to the species

1. Antennal scape swollen, and much broader and longer than flagellum ; notum with broad pale band over subscutellar suture ; abdominal dorsum predominantly black .... *annandalei* Ricardo

— Antennal scape slender, at most swollen distally giving cone-like configuration, and much shorter than flagellum ; notum without any band over subscutellar suture ; abdominal dorsum coloured otherwise 2

2. Antennal scape and flagellum almost equally slender ; abdominal dorsum dark brown 3

— Antennal scape slightly swollen distally and flagellum swollen proximally, gradually tapering to style ; abdominal dorsum brown to yellowish grey 4

3. Scape yellowish brown ; callus dark brown, narrowly transverse ; subcallar area without interantennal spot ; subapical band of wing broad and complete ; posterior cells with pale triangles ; abdomen devoid of dorsal triangles ..... *amala* Stone & Philip.

— Scape reddish brown ; callus black, more than thrice as wide as high ; subcallar area with triangular interantennal spot ; subapical band of wing slender, curved and extended anteriorly ; posterior cells lacking pale spots ; abdomen with distinct mid-dorsal row of broad yellowish triangles ..... *philipi* Chvàla

4. Scape yellowish brown ; callus shiny yellow brown, gradually sinking sides of upper margin ; subcallar area with large interantennal black spot ; subapical band of wing extending just beyond vein R_4 ; posterior cells lacking pale spots ; abdomen with 2 rows of large brown spots on tergites 2–6, forming broad median pale stripe and narrow lateral stripes ..... *bicolor* Stone & Philip

— Scape yellowish orange ; callus yellow to yellowish brown, upper and lower margins nearly parallel-sided ; subcallar area with blackish tint ; subapical band of wing curved, broken but crossing wing ; posterior cells mostly with pale marginal spots ; abdominal dorsum with inconspicuous median stripe and sublateral spots on posterior tergites .... *hardyi* Stone & Philip

23. ***Haematopota amala*** Stone & Philip

1974. *Haematopota amala* Stone and Philip, *U.S.Dept. Agr. Tech. Bull.*, **1489** : 44.

Distribution : Manipur (Imphal dist.).

*24. ***Haematopota annandalei*** Ricardo

1911. *Haematopota annandalei* Ricardo, *Rec. Indian Mus.*, **4** : 335.

Material examined : 1♀, Bishnupur dist., Sendra, 21.v.1993, Coll. B. Mitra ; 1♀, Churachandpur dist., Sielmat, 15.v.1993, Coll. S. K. Chakraborti.

Distribution : Manipur (Bishnupur and Churachandpur dists.) and Arunachal Pradesh, Maharashtra, Meghalaya, Sikkim and West Bengal ; China and Myanmar.

25. ***Haematopota bicolor*** Stone & Philip

1974. *Haematopota bicolor* Stone and Philip, *U.S. Dept. Agr. Tech. Bull.*, **1489** : 57.

Distribution : Manipur (Imphal and Ukhrul dists.) and Assam ; Nepal.

26. ***Haematopota hardyi*** Stone & Philip

1974. *Haematopota hardyi* Stone and Philip, *U. S. Dept. Agr. Tech. Bull.*, **1489** : 106.

Distribution : Manipur (Imphal and Churachandpur dists.), and Assam and West Bengal.

27. ***Haematopota philipi*** Chvàla

1969. *Haematopota philipi* Chvàla, *Acta ent. bohemoslov.* **66** : 49.

Material examined : 1 ♀, Ukhrul dist., Ukhrul, Wino Bazar, 9.iv.1992, Coll. A.K. Hazra.

Distribution : Manipur (Ukhrul dist.) ; Nepal.

Family ASILIDAE

Contribution on the fauna of Manipur : Joseph and Parui, 1976.

A total of 3 species under 3 genera of 2 subfamilies are hitherto known in Manipur vis-à-vis 495 species under 59 genera belonging to 4 subfamilies in India.

Key to the subfamilies

1. Palpus 1-segmented ; antennal segment 3 long and slender, with a short bristle ; wing with closed marginal cell ..... ASILINAE

— Palpus 2-segmented ; antennal segment 3 spindle-shaped, with one or more microsegments apically....DASYPOGONINAE

Subfamily DASYPOGONINAE

Genus *Stenopogon* Loew

1847. *Stenopogon* Loew, *Linn. Ent.*, **2** : 453. Type-species : *Dasypogon sabaudus* F.

Diagnosis : Astennal segment 3 usually as long as segments 1 and 2 together and with 2 microsegments ; scutellum microscopically pubescent ; sternopleuron with a distinct patch of fine hairs ; metanotal callosity with micropubescence only ; male with epandrium widely divided from base, hypandrium forming a broad basal plate to triangular process ; female with 7 pairs of curved, blunt spines on acanthophorites.

28. ***Stenopogon manipurensis*** Joseph & Parui

1976. *Stenopogon manipurensis* Joseph and Parui, *Ent. Scand.*, **7** : 107.

Material examined : 1 ♀, Churachandpur dist., Lahngjo, 18.v.1993, Coll. B. Mitra.

Diagnosis : Head black, white tomentose ; mystax straw-yellow, with a few dark brown hairs on epistome laterally ; thorax black, yellow pollinose ; humeri reddish, with black bristles ; scutellum with black bristles marginally ; sternopleuron with thin yellow hairs ; leg yellow to black, fore and mid femora black, yellowish distally, hind femur entirely black ; tibia yellow ; wing pale yellow ; posterior cell 1 closed ; abdomen black, with black hairs ; male genitalia with long black hairs intermixed with profuse short yellow hairs.

Distribution : Manipur (Bishnupur and Churachandpur dists.).

Remarks : The species was originally described from two male specimens (holotype and a paratype). This female specimen referred to as belonging to this species is not designated "allotype" because of falling short of its condition.

Subfamily ASILINAE

Key to the genera

1. Facial tubercle poorly developed ; wing with R_1 almost fused with costa ; posterior cell 4 bulged forward causing discal cell strongly constricted ; abdominal sternite 8 very short or concealed ..... ***Clephydroneura*** Becker

— Facial tubercle highly developed along entire face ; wing with R_1 well-separated from costa ; posterior cell 4 neither bulged nor discal cell constricted ; abdominal sternite 8 lappet round apically ..... ***Machimus*** Loew

Genus ***Clephydroneura*** Becker

1925. *Clephydroneura* Becker, *Ent. Mitt.*, **14** : 68. Type-species : *Asilus xanthopus* Wiedemann.

*29. ***Clephydroneura sundaica*** (Jaennicke)

1867. *Asilus sundaica* Jaennicke, *Abh. senckenb. naturf. Ges. Wien*, **6** : 363.

Material examined : 2♂♂, 1♀, Churachandpur dist., Churachandpur, 21.ix.1975, Coll. M. S. Shishodia.

Diagnosis : Mesonotum yellow, with 2 widely separated black stripes spreading out behind humeri into a pair of lateral black spots ; leg yellow, with femur blackish apically ; wing with well-infuscated posterior cell 5 ; male genitalia distinctive.

Distribution : Manipur (Churachandpur dist.) and Assam ; Jawa, Malay, Myanmar and Thailand.

Genus ***Machimus*** Loew

1849. *Machimus* Loew, *Linn. Ent.*, **4** : 1. Type-species : *Asilus chrystis* Meigen.

30. ***Machimus cheriani*** Joseph & Parui

1986. *Machimus cheriani* Joseph and Parui, *Rec. zool. Surv. India, Occ. pap. no.* **96** : 15.

Diagnosis : Mystax black, with pale yellow bristles below ; antennal scape and pedicel yellowish brown, remainder dark brown ; scutum with distinct median stripe ; scutellar disc mostly with black hairs, marginally with 4 black bristles ; leg more or less uniformly yellowish brown ; wing medially hyaline ; remainder infuscated ; male genitalia yellowish brown.

Distribution : Manipur (Chandel dist.).

Family DIOPSIDAE

Only one species is known in Manipur vis-à-vis 9 species under 5 genera belonging to the subfamily Diopsinae in India.

Subfamily DIOPSINAE
(*vide* Datta, 1998)

Genus ***Teleopsis*** Rondani

1875. *Teleopsis* Rondani, *Annali Mus. civ Stov. nat. Giacome Doria*, **7** : 442. Type-species : *Diopsis sykesii* Westwood.

Diagnosis : Eye-stalks long and slender ; inner orbital bristle strong and located on a distinct base ; peristomal teeth present ; thorax with a well-developed supra-alar spine on either side ; apical bristle on scutellar spine shorter than or equal in size to spine ; wing devoid of alula, vein $Cu_2 + 2A$ lacking ; fore femur without spiny bristles alongside small teeth.

*31. ***Teleopsis quadriguttata*** (Walker)

1856. *Diopsis quadriguttata* Walkar, *J. Proc. Linn. Soc. Lond., zool.* **1** : 37.

Material examined : 4♂♂, 1♀, Churachandpur dist., Churachandpur, 21.xii.1992, Coll. A. R. Lahiri.

Diagnosis : *Vide* Datta and Parui (1998).

Distribution : Manipur (Churachandpur dist.), and Arunachal Pradesh, Assam, Meghalaya, Uttar Pradesh and West Bengal ; China, E Malaysia, Kalimantan, Malay, Myanmar and Taiwan.

Family SEPSIDAE

A total of 5 species under 4 genera of the subfamily Sepsinae are known in Manipur vis-à-vis 21 species under 8 genera of 2 subfamilies in India.

Subfamily SEPSINAE

Diagnosis : *Vide* Datta and Parui (1998).

Key to the genera and species

1. Humeral setae present 2

— Humeral setae absent ..... ***Decachaetophora aeneipes*** (de Meijere)

2. Fronto-orbital setae distinct ; fore femur in males with 2 stout spines and in females with a seta ventrally towards distal half ..... ***Meroplius fasciculatus*** (Brunetti)

— Fronto-orbital setae rudimentary or absent ; fore femur in males with 1 or 2 ventral emarginations bearing a number of spines

arranged irregularly in middle or somewhat away, and in females neither with emargination nor with distinctive spine nor seta ventrally 3

3. Male fore femur with a single short emargination in middle ; abdomen in boith sexes without distinct macrochaetae ; male epandrial process bifurcate apically .... ***Dicranosepsis bicolor*** (Wiedemann)

— Male fore femur with well-developed emargination/s beyond middle ; abdomen in males, and often is females also, with distinct macrochaetae ; male epandrial process not bifurcate apically ..... ***Sepsis*** Fallén 4

4. Pteropleuron pruinose ; male fore femur with 2 high emarginations ventrally ; male fore tibia without distinctive setae ventrally in middle ; male surstylus short and small .... *indica* Wiedemann

— Pteropleuron shiny ; male fore femur with a low emargination ; male fore tibia with a few distinctive setae ventrally in middle ; male surstylus long and stout .... *coprophila* de Meijere

Genus ***Decachaetophora*** Duda

1926. *Decachaetophora* Duda, *Annln naturh. Mus. Wien,* **39** (1925) : 27. Type-species : *Sepsis aeneipes* de Meijere.

*32. ***Decachaetophora aeneipes*** de Meijere

1913. *Sepsis aeneipes* de Meijere, *Annls hist.-nat. Mus. natn. hung.,* **11** : 119.

Material examined : 2♂♂, 3♀♀, Ukhrul dist., Wino Bazar, 9.iv.1992, Coll. A.K. Hazra ; 2♂♂, Bishnupur dist., Moirang, 22.v.1993, Coll. B. Mitra.

Diagnosis (additional characters) : *Vide* Datta & Parui *(in press)*.

Distribution : Manipur (Ukhrul and Bishnupur dists.), and Assam, Himachal Pradesh, Meghalaya, Punjab, Sikkim, Tripura, Uttar Pradesh and West Bengal ; China, Nepal, Pakistan, Sri Lanka and Taiwan ; Japan and Nearctic region.

Genus ***Dicranosepsis*** Duda

1926. *Dicranosepsis* Duda, *Annln naturh. Mus. Wien,* **39** (1925) : 43 (As subgenus of *Sepsis* Fallén), Type-species : *Sepsis bicolor* Wiedemann.

*33. ***Dicranosepsis bicolor*** (Wiedemann)

1830. *Sepsis bicolor* Wiedemann, *Aussereurop zweifl. Insekt.,* **2** : 468.

Material examined : 1♂, Churachandpur dist., Tuibuanga, 19.v.1993, Col. B. Mitra.

Diagnosis (additional characters) : *Vide* Datta & Parui *(in press)*.

Distribution : Manipur (Churachandpur dist.), and Andhra Pradesh, Arunachal Pradesh, Assam, Maharashtra, Meghalaya, Punjab, Sikkim, Tripura, Uttar Pradesh and West Bengal ; other parts of the Oriental region ; Japan and Australian region.

Genus ***Meroplius*** Rondani

1874. *Meroplius* Rondani, *Boll. Soc. ent. Ital.,* **6** : 175. Type-species : *Nemopoda stercoraria* Robineau-Desvoidy.

*34. ***Meroplius fasciculatus*** (Brunetti)

1910. *Sepsis fasciculata* Brunetti, *Rec. Indian Mus.,* 3(1909) : 365.

Material examined : 1♂, 3♀♀, Bishnupur dist., Moriang, 22.v.1993, Coll. B. Mitra.

Diagnosis : (additional characters) : Wing distinctly with brownish tint ; mid and hind legs predominantly black excepting basal yellow parts ; fore femur in males with distal spine angularly bent outward ; sternite 4 with a pair of prominent hair-tufts ; surstylus slender but widened apically, with a sharp antero-ventral process.

Distribution : Manipur (Bishnupur dist.), and Karnataka, Kerala, Madhya Pradesh and West Bengal ; Bangladesh, China, E Malaysia, Jawa, Kalimantan, Nepal, Philippines, Sri Lanka, Taiwan and Thailand ; New Guinea.

Genus ***Sepsis*** Fallén

1810. *Sepsis* Fallén *Sp. Ent. nov. Dipt.* : **17** : 68. Type-species : *Musca cynipsea* Linnaeus.

*35. ***Sepsis coprophila*** de Meijere

1906. *Sepsis coprophila* de meijere, *Annls hist.-nat. Mus. natn. hung.*, **4** : 176.

Material examined : 1♂, 2♀♀, Imphal dist., Imphal, 29.xii.1992, Coll. A. R. Lahiri & J. R. Singh.

Distribution : Manipur (Imphal dist.), and Assam, Kerala, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh and West Bengal ; China, E Malaysia, Jawa, Kalimantan, Lesser Sunda Is., Malay, Philippines, Ryukyu Is., Singapore, Sri Lanka, Sumatera and Taiwan ; Australian region and Japan.

*36. ***Sepsis indica*** Wiedemann

1824. *Sepsis indica* Wiedemann, *Analecta Ent.* : 57.

Material examined : 2♂♂, 3♀♀, Churachandpur dist., Tuibuanga, 19.v.1993, Coll. B. Mitra.

Distribution : Manipur (Churachandpur dist.), and Assam, Bihar, Karnataka, Kerala, Maharashtra, Orissa, Sikkim, Tamil Nadu and West Bengal ; Bangladesh, China, Jawa, Kalimantan, Lesser Sunda Is., Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Sulawesi, Sumatera, Taiwan and Vietnam ; Australian and Palaearctic (Japan, Russia and S Korea) regions.

Family CALLIPHORIDAE

Contribution on the fauna of Manipur : Senior-White, Aubertin & Smart, 1940.

A total of 5 species under 4 genera of 3 subfamilies are hitherto known in Manipur vis-à-vis 97 species and 1 subspecies under 26 genera of 4 subfamilies in India.

Key to the subfamilies

(*vide* Datta & Parui, *in press*)

Subfamily CALLIPHORINAE

Key to the genera

1. Flies brownish or textaceous ; dichoptic in both sexes ; parafrontalia entirely haired ; presutural acrostichal bristles absent ; sternopleural bristle 1+1 ; supraspiracular convexity bare or pubescent ; hind tibia fringed or unfringed ..... ***Bengalia*** Rob.-Desv.

— Flies metallic green or blue ; eyes in males holoptic but dichoptic in females ; parafrontalia with dense tomentum ; presutural acrostichal bristles present ; sternopleural bristles 2+1 ; supraspiracular convexity with long erect hairs ; legs unfringed ..... ***Hemipyrellia*** Townsend

Genus ***Bengalia*** Robineau-Desvoidy

1830. *Bengalia* Robineau-Desvoidy, *Mém prés. div. Sav. Acad. Sci. Inst. Fr.* : 425. Type-species : *Bengalia labiata* Rob.-Desv.

*37. ***Bengalia surcoufi*** Senior-White

1923. *Bengalia surcoufi* Senio-White, *Spolia zeylan.*, **12** : 306.

Material examined : 1♂, 1♀, Churachandpur dist., Tuibuanga, 19.v.1993, Coll. B. Mitra.

Diagnosis : Small species ; subalar knob below base of wing rounded ; mid-femur in males with strong spines ventrally on apical third ; fore tibia in males with about 4 small spines ; mid-tibia in females and sometimes in males also with distinct submedian bristles ventrally ; hind tibia in males not heavily fringed ; abdomen with discal bristles on tergite 4 ; abdomen in males without long bristles ventrally ; accessory forceps in male sternite 5 deeply emarginate.

Distribution : Manipur (Churachandpur dist.), and Assam, Karnataka, Kerala and West Bengal.

Genus ***Hemipyrellia*** Townsend

1918. *Hemipyrellia* Townsend, *Insecutor Inscit. menst.*, **6** : 154. Type-species : *Hemipyrellia curriei* Townsend (= *Lucilia fernandica* Macquart).

Key to the species

1. Antennal segment 3 entirely orange ; female abdomen with very thick dust, especially on tergite 5 ; tergite 3 metallic purplish blue, devoid of marginal bristles ; sternite 2 in males with a group of acessory long hairs posteriorly ..... *pulchra* (Wiedemann)

— Antennal segment 3 entirely dark brown ; female abdomen with thin dust ; tergite 3 metallic green to cupreous green, with marginal bristles ; sternite 2 in males without group of long hairs posteriorly....*ligurriens* (Wiedemann)

*38. ***Hemipyrellia ligurriens*** (Wiedemann)

1830. *Musca ligurriens*Wiedemann, *Aussereurop. zweifl. Insekt.* **2** : 655.

Material examined : 1♂, Bishnupur dist., Bishnupur, 21.v.1993, Coll. M. Sil.

Distribution : Manipur (Bishnupur dis.), and Bihar, Tamil Nadu and West Bengal ; Bangladesh, China, Jawa, Malaysia, Pakistan, Philippines, Sri Lanka, Sulawesi, Sumatera and Thailand ; Bismarck Is., Maluku and New Guinea.

*39. ***Hemipyrellia pulchra*** (Wiedemann)

1830. *Musca pulchra* Wiedemann, *Aussereurop zweifl. Insekt.*, **2** : 406.

Material examined : 1♂, Bishnupur dist., Moirang, 22.v.1993, Coll. B. Mitra ; 1♂, Churachandpur dist., Sielmat, 17.v.1993, Coll. B. Mitra.

Distribution : Manipur (Bishnupur and Churachandpur dists.), and Bihar, Orissa, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal ; ? Jawa and Thailand.

Subfamily CHRYSOMYINAE

Genus ***Chrysomya*** Robineau-Desvoidy

1830. *Chrysomya* Robineau-Desvoidy, *Mém. prés. div. Sav. Acad. Sci. Inst. Fr.* : 444. Type-Species : *Chrysomya regalis* Rob.–Desv. = *Musca marginalis* (Wiedemann).

Diagnosis: *Vide* Datta & Parui (*in press*).

40. ***Chrysomya megacephala*** (Fabricius)

1794. *Musca megacephala* Fabricius, *Syst. Ent.*, **4** : 317.

Material examined : 1♂, Imphal dist., Jiribam, 9.v.1993, Coll. B. Mitra ; 3♂♂, Churachandpur dist., Sielmat, 17.v.1993, Coll. B. Mitra.

Diagnosis : *Vide* Datta & Parui (*in press*).

Distribution : Manipur (Imphal and Churachandpur dists.) and also other states in India and other parts of the Oriental region ; North China and Japan of the Palaearctic region ; Malagasy sub-region of the Ethiopian region.

Subfamily RHINIINAE

Genus ***Chlororhinia*** Townsend

1917. *Chlororhinia* Townsend, *Rec. Indian Mus.*, **13** : 191. Type-species : *Chlororhinia viridis* Townsend.

Diagnosis : *Vide* Datta & Parui (1998).

41. ***Chlororhinia exempta*** (Walker)

1856. *Musca exempta* Walker, *J. Proc. Linn. Soc. Lond., Zool.*, **1** : 128.

1917. *Chlororhinia viridis* Townsend, *Rec., Indian Mus.*, **13** : 191.

Diagnosis : *Vide* Datta & Parui (1998).

Distribution : Manipur (Ukhrul dist.), and Arunachal Pradesh and Meghalaya ; E Malaysia, Kalimantan, Laos, Nepal and Philippines.

Family SARCOPHAGIDAE

Contributions on the fauna of Manipur : Senior-White, Aubertin & Smart, 1940 ; Nandi, 1986-87.

A total of 18 species under 9 genera of the subfamily Sarcophaginae are hitherto known in Manipur vis-à-vis 101 species under 32 genera of 3 subfamilies in India.

Subfamily SARCOPHAGINAE

Diagnosis : *Vide* Datta & Parui (*in press*).

Key to the genera

1. Acrostichal bristles absent.....2

— Acrostichal bristles present 3

2. Apex of paraphalus long and bifurcate, and devoid of any lateral process .... ***Robineauella*** Enderlein

— Apex of paraphallus short and blunt but with a short lateral process..... ..... ***Bercaea*** Robineau-Desvoidy

3. Postsutural dorsocentral bristles numbering never more than 3 ; abdominal sternites 1-4 all with numerous long hairs ..... ***Pierretia*** Robineau-Desvoidy

— Postsutural dorsocentral bristles numbering 4 to 5 ; abdominal sternites 1-4 all never with such long hairs 4

4. Propleuron bare 5

— Propleuron haired 8

5. Sternite 4 with mat of hair 6

— Sternite 4 without any mat of hair 7

6. Phallosme very large ; theca long ; apical plate of paraphalus rounded and entirely membranous ..... ***Seniorwhitea*** Rohdendorf

— Phallosome of normal size ; theca short ; apical plate of paraphallus long and slender, and somewhat sclerotized ..... ***Harpagophalla*** Rohdendorf

7. Sternite 4 sparsely haired ; mid-femur with comb-like postero-ventral bristles apically ; hind tibia usually fringed ; apical part of paraphallus well-distinguishable ..... ***Parasarcophaga*** Johnston & Tiegs

— Sternite 4 conspicuously haired ; mid-femur without comb-like postero-ventral bristles apically ; hind tibia never fringed ; apical plate united to paraphallus itself showing no mark of union ..... ***Thyrsocnema*** Enderlein

8. Sternite 5 with a prominent conical protuberance in middle part ; hind tibia of males fringed ..... ***Rosellea*** Rohdendorf

— Sternite 5 without protuberance in middle part ; hind tibia of males avoid of fringe ..... ***Boettcherisca*** Rohdendorf

Genus ***Bercaea*** Robineau-Desvoidy

1863. *Bercaea* Robineau-Desvoidy, *Hist. nat. Dipt. Paris*, **2** : 549. Type-species : *Musca haemorrhoidalis* Fallén (= *Sarcophaga cruentata* Meigen).

42. ***Bercaea cruentata*** Meigen

1816. *Musca haemorrhoidalis* Fallén, *Vetensk. Acad. Handl.* : 237 (pre-occupied).

1826. *Sarcophaga cruentata* Meigen, *Syst. Beschr. europ. zweifl, Insekt.*, **5** : 28.

Material examined : 2♂♂, Churachandpur dist., Sielmat, 15.v.1993, Coll. S. K. Chakraborti.

Diagnosis : *Vide* Datta & Parui (*in press*).

Distribution : Manipur (Imphal, Senapati and Churachandpur dists.), and Arunachal Pradesh, Bihar, Himachal Pradesh, Meghalaya, Mizoram, Sikkim, Uttar Pradesh and West Bengal ; Nepal and Thailand ; Africa, Americas, Europe, Hawaii, Korea and Seychelles.

Genus ***Boettcherisca*** Rohdendorf

1937. *Boetcherisca* Rohdendorf, *Fauna USSR, Dipt.*, **19**(1) : 270. Type-species : *Myophora peregrina* Robineau-Desvoidy.

43. ***Boettcherisca peregrina*** (Rob.-Desv.)

1830. *Myophora peregrina* Robineau-Desvoidy, *Mém. prés. Acad. Sci. Inst. Fr.*, (2)**2** : 356.

Material examined : 2♂♂, Bishnupur dist., Sendra, 21.v.1993, Coll. B. Mitra.

Diagnosis : *Vide* Datta & Parui (*in press*).

Distribution : Manipur (Bishnupur and Senapati dists.), and widespread in other states in India ; Hainan Is., Indonesia, Malaysia, Myanmar, Nepal, South China, Sri Lanka, Taiwan and Thailand ; Australia, Fiji, Gilbert Is., Hawaii, Japan, Korea, Mariana Is., New Britain, New Guinea, Ogasawa, Samoi, Seychelles and Society Is.

Genus ***Harpagophalla*** Rohdendorf

1937. *Haragophalla* Rohdendorf, *Fauna USSR, Dipt.*, **19**(1) : 276. Type-species : *Sarcophaga sera* Rohdendorf = *S. kempi* Senior-White.

44. ***Harpagophalla kempi*** (Senior-White)

1924. *Sarcophaga kempi* Senior-White, *Rec. Indian Mus.*, **26** : 247.

Material examined : 1♂, Bishnupur dist., Phubala, 23.v.1993, Coll. B. Mitra.

Diagnosis : *Vide* Datta & Parui (1998, 1999).

Distribution : Manipur (Imphal, Bishnupur and Churachandpur dists.), and Arunachal Pradesh, Assam, Bihar, Kerala, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal ; China, Hainan Is., Jawa, Laos, Myanmar, Sri Lanka and Thailand ; New Guinea.

Genus ***Parasarcophaga*** Johnston & Tiegs

1921. *Parasarcophaga* Johnston and Tiegs, *Proc. R. Soc. Qd,* **33** : 86. Type-species : *Sarcophaga omega* Johnston and Tiegs = S. *knabi* Parker.

Key to the subgenera
(Modified after Tumrasvin & Kano, 1979)

1. Antennae, palpi and genital tergites bright orange ; ventralia reduced to tubercles only. ..... ***Liopygia*** Enderlien

— Antennae, palpi and genital tergites mostly black (if not variable with yellowish antennae and reddish or greyish tergite 2 or the last) ; ventralia developed 2

2. Lateral plate of paraphallus in form of an unpaired pedunculate process .... ***Parasarcophaga*** Johnston & Tiegs

— Lateral plate of paraphallus either short of tuberculate or in form of broad lamellate hook or narrow and slender paired process 3

3. Lateral plate of paraphallus in form of narrow stout process extending forward .... ***Curranea*** Rohdendorf

— Lateral plate of paraphallus lamellate or slender and sharp without stout process, not extending forward 4

4. Anal tergite reddish ; ventralia usually sheet-like, without hook apically .... ***Liosarcophaga*** Enderlein

— Anal tergite blackish ; ventralia usually filamentous, with hooks apically .... ***Pandelleisca*** Rohdendorf

Subgenus ***Curranea*** Rohdendorf

1937. *Curranea* Rohdendorf, *Fauna USSR,* Dipt., **19**(1) : 255, 452. Type-species : *Sarcophaga tibialis* Macquart.

45. ***Parasarcophaga (Curranea) scopariiformis*** (Senior-White)

1927. *Sarcophaga scopariiformis* Senior-White, *Spolia zeylan,* **14** : 82 (as subspecies of *S. dux* Thompson).

1965. *Parasarcophaga (Curranea) scopariiformis* Senior–White : Fan, *Synan, Flies China* : 276.

Diagnosis : *Vide* Datta & Parui (2000).

Distribution : Manipur (Imphal dist.), and Assam, Mizoram, Nagaland, Tripura and West Bengal ; China, Hainan Is., Laos, Sri Lanka, Taiwan and Thailand.

Subgenus ***Liopygia*** Enderlein

1928. *Liopygia* Enderlein, *Arch. Klass. phyl. Ent.* **1**(1) : 41. Type-species : *Musca ruficornis* Fabricius.

46. ***Parasarcophaga (Liopygia) ruficornis*** (F.)

1794. *Musca ruficornis* Fabricius, *Ent. Syst.,* **4** : 314.

Material examined : 1 ♂, Churachandpur dist., Tuibuanga, 19.v.1993, Coll. B. Mitra.

Diagnosis : *Vide* Datta & Parui (1998).

Distribution : Manipur (Imphal and Churachandpur dists.) and Andaman Islands, Andhra Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Hariana, Himachal Pradesh, Meghalaya, Mizoram, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal ; China, Malay, Pakistan, Philippines, Ryukyu Islands, Sri Lanka, Sumatera, Taiwan and Thailand ; Africa, Brazil, Hawaii, Japan, Madagascar, Mariana Islands, Maluku, Samoa and Socotra.

Subgenus ***Liosarcophaga*** Enderlein

1928. *Liosarcophaga* Enderlein, *Arch, Klass. phyl, Ent.,* **1**(1) : 18 ; Rohdendorf, 1937, *Fauna USSR., Dipt.,* **19**(1) ; 205. Type-species : *Cynomyia madeirensis* Schiner.

Key to the species

1. Hind femur fringed 2

— Hind femur not fringed ..... ***jaipurensis*** Nandi

2. Hind tibia double-fringed ; apex of paraphallus pointed, wit a subapical process having bifurcated tip ..... *dux* (Thomson)

— Hind tibia with a single fringe ; apical process of paraphallus finger-like with bifurcated tip ..... *brevicornis* (Ho)

47. *Parasarcophaga (Liosarcophaga) brevicornis* (Ho)

1934. *Sarcophaga brevicornis* Ho, *Bull. Fan. Mem. Inst. Biol,* **5** : 23.

Distribution : Manipur (Imphal dist.) and Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Meghalaya, Mizoram, Nagaland, Orissa, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Hainan Island, Kalimantan, Malaysia, Ryukyu Islands, South China, Sri Lanka, Taiwan and Thiland; Korea, Japan and North China.

48. *Parasarcophaga (Liosarcophaga) dux* (Thomson)

1868. *Sarcophaga dux* Thomson, *K. svenska Fregatten Eugenies Resa, Dipt.,* **2** : 534.

Distribution : Manipur (Imphal dist.), and most other parts of India, Bangladesh, China, Hainan Is., E Malaysia, Jawa, Kalimantan, Ryukyu Islands, Sri Lanka and Taiwan ; Australia, Hawii, Japan, Korea and New Guinea.

49. *Parasarcophaga (Liosarcophaga) jaipurensis* Nandi

1990. *Parasarcophaga (Liosarcophaga) jaipurensis* Nandi, *J. Beng. nat. Hist. Soc. (n. s.)* **9** : 50.

Distribution : Manipur (Senapati dist.), and Haryana, Himachal Pradesh and Rajasthan.

Subgenus ***Pandelleisca*** Rohdendorf

1937. *Pandelleisca* Rohdendorf, *Fauna USSR, Dipt.,* **19**(1) : 238. Type-species : *Sarcophaga similis* Meade.

50. *Parasarcophaga (Pandelleisca) assamensis* Nandi & Ray

1982. *Parasarcophaga (Pandelleisca) assamensis* Nandi and Ray, *Rec. zool. Surv. India,* **80** : 120.

Diagnosis : Frontal vitta black, parafrontal and parafacial black, with brown-pollinose ; antennal arista plumose up to basal two-thirds ; scutum with 3 black longitudinal stripes, prostigmatic and propleural bristles well-developed ; wing hyaline with brownish veins, sector iii of costa a little longer than v., squama whitish ; legs black, fore femur with a fringe of bristles ; hind femur with 2 fringes and tibia with a single fringe ; abdominal sternite 5 V-shaped, with terminal short hairs ; lateral plate of paraphallus short, slightly sclerotized and hook-like apically.

Distribution : Manipur (Imphal dist.), and Assam.

Subgenus ***Parasarcophaga*** Johnston & Tiegs

Key to the species

(vide Datta & Parui, *in press)*

51. *Parasarcophaga (Parasarcophaga) albiceps* (Meigen)

1826. *Sarcophaga albiceps* Meigen, *Syst. Beschr. europ. zweifl. Insekt.,* **5** : 22.

Material examined: 1♂, Bishnupur dist., Moirang, 22.v.1993, Coll. M. Sil ; 1♂ Churachandpur dist., Lahngjo, 18.v.1993, Coll. B. Mitra.

Distribution : Manipur (Imphal, Senapati, Ukhrul, Bishnupur and Churachandpur dists.), and also common in other parts of India ; China, Kalimantan, Malaysia, Nepal, Philippines, Ryukyu Islands, Taiwan and Thailand ; Bismark Achipelao, Europe, Hawaii, Israel, Japan, Korea, New Britain, New Guinea, Solomon Island and Turkey.

52. *Parasarcophaga (Parasarcophaga) macroauriculata* (Ho)

1932. *Sarcophaga macroauriculata* Ho, *Bull. Fan. meml. Inst. Biol.,* **3** : 347.

Distribution : Manipur (Imphal, Senapati and Churachandpur dists.), and Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal ; China.

53. *Parasarcophaga (Parasarcophaga) misera* (Walker)

1849. *Sarcophaga misera* Walker, *List Dipt. Br. Mus.,* **4** : 829.

1913. *Sarcophaga orchidea* Böettcher, *Annls hist.-nat. Mus. natn. hung.*, **11** : 375.

Material examined : 1♂, Ukhrul dist., Hundung, 8.iv.1992, Coll. A. K. Sanyal.

Distribution : Manipur (Imphal, Ukhrul and Churachandpur dists.) and widely occurring in other parts of India ; Bangladesh, China, Malaysia, Hainan Is., Jawa, Kalimantan, Myanmar, Nepal, Philippines, Ryukyu Islands, Sri Lanka, Sulawesi, Sumatera, Taiwan and Thailand ; Afghanistan, Korea and Japan ; widespread in the Pacific Islands to New Guinea and Australia.

54. *Parasarcophaga (Parasarcophaga) sericea* (Walker)

1852. *Sarcophaga sericea* Walker, *Insecta saundersiana*, **4** : 326.

1917. *Sarcophaga knabi* Parker, *Proc U.S. natn. Mus.*, **54** : 66.

Material examined : 2♂♂, Bishnupur dist., Sendra, 21.v.1993, Coll. B. Mitra ; 1♂, Moirang, 22.v.1993, Coll. M. Sil.

Distribution : Manipur (Imphal, Bishnupur, Ukhrul and Churachandpur dists.), and other parts of India ; Bangladesh, China, Hainan Island, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan and Thailand ; Australia, Caroline Is., Korea, Mariana Is., Marshall Is., New Guinea, Society Island and the erstwhile U.S.S.R.

Genus *Pierretia* Robineau- Desvoidy

1863. *Pierretia* Robineau-Desvoidy, *Hist. nat. Dipt., Paris*, **2** : 422. Type-species : *Pierretia praecox* Rob-Desv. = *Sarcophaga nigriventris* Meigen.

55. *Pierretia calicifera* (Böettcher)

1912. *Sarcophaga calicifera* Böettcher, *Ent. Mitt.*, **1** : 169.

Diagnosis : Antennal arista plumose ; scutum with 3 black longitudinal stripes, posterior dorsocentral bristles 3, wing-vein R_1 with black setae, R_{4+5} with setae located dorsally extending more than half from basal node to cross-vein r-m, segment iii of costa much shorter than v ; mid femur with some weak bristles but no basal fringe, mid tibia bare, hind femur with a complete and an incomplete row of bristles, hind tibia with about 6 long hairs apically ; abdominal segment 2 with marginal bristles.

Distribution : Manipur (Imphal and Senapati dists.), and Bihar, Haryana, Himachal Pradesh, Nagaland, Tamil Nadu and West Bengal ; China, Philippines, Ryukyu Islands, Sri Lanka, Taiwan, Thailand ; Japan ; Nigeria, Uganda and Zaire.

Genus *Robineauella* Enderlein

1928. *Robineauella* Enderlein *Arch. Klass. phyl. Ent.*, **1**(1) : 23 (as subgenus of *Parasarcophaga* Johnston & Tiegs). Type-species : *Sarcophaga scoparia* Pandellé.

56. *Robineauella coei* Rohdendorf

1966. *Robineauella (Jantiella) coei* Rohdendorf, *Bull. Br. Mus. nat. Hist. (Ent.)*, **17** (10) : 458.

Diagnosis : *Vide* Datta & Parui (*in press*).

Distribution : Manipur (Ukhrul dist.), and Arunachal Pradesh, Mizoram, Nagaland, Sikkim and West Bengal ; Nepal.

Genus *Rosellea* Rohdendorf

1937. *Rosellea* Rohdendorf, *Fauna USSR, Dipt.*, **19**(1) : 242 (as subgenus of *Parasarcophaga* Johnston & Tiegs). Type-species : *Sarcophaga aratrix* Pandellé.

57. *Rosellea khasiensis* (Senior-White)

1924. *Sarcophaga khasiensis* Senior-White, *Rec. Indian Mus.*, **26** : 246.

Diagnosis : *Vide* Datta & Parui *(in press)*.

Distribution : Manipur (Imphal, Senapati and Churachandpur dists.), and Assam, Kashmir, Meghalaya, Nagaland and Sikkim ; China, Nepal and Thailand.

Genus *Seniorwhitea* Rohdendorf

1937. *Seniorwhitea* Rohdendorf, *Fauna USSR, Dipt.*, **19** (1) : 297. Type-species : *Sarcophaga orientaloides* Senior-White = *Sarcophaga krameri* Böettcher = *Sarcophaga reciproca* Walker.

58. *Seniorwhitea reciproca* (Walker)

1856. *Sarcophaga reciproca* Walker, *J. Proc. Linn. Soc. Lond., Zool.*, **1** : 22.

1912. *Sarcophaga krameri* Böettcher, *Ent. Mitt.*, **1** : 165.

Material examined: 2♂♂, Churachandpur dist., Tuibuanga, 18.v.1993, Coll. B. Mitra.

Diagnosis : *Vide* Datta & Parui (*in press*).

Distribution : Manipur (Imphal and Churachandpur dists.), and nearly everywhere in India ; China, Hainan Island, Laos, Malay, Myanmar, Nepal, Singapore, Sri Lanka, Taiwan and Thailand ; Hawaii.

Genus ***Thyrsocnema*** Enderlein

1928. *Thyrsocnema* Enderlein, *Arch. Klass. phyl. Ent.* **1**(1) : 42. Type-species : *Sarcophaga striata* Enderlein = *Sarcophaga incisilobata* Pandellé.

59. ***Thyrsocnema lushainensis*** Nandi

1992. *Thyrsocnema (Pseudothyrsocnema) lushainensis* Nandi, *J. Beng. nat. Hist. Soc.* (n. s.) **11** : 41.

Diagnosis : Head with black parafrontal and parafacial, golden pollinose and black-haired ; antennal arista plumose more than half at base ; scutum grey, with 3 black longitudinal stripes ; postsutural acrostichal bristle 4 ; wing with bare vein R_1, costal segment iii shorter than v ; fore femur with prominent bristles, fore and hind tibiae each with a row of bristles, mid tibia free from bristles ; abdominal tergites 2–4 with a pair of lateral marginal bristles ; sternite 5 V-shaped ; lateral plate of paraphallus longer than style, apical plate curved and hooked anteriorly but without bifid process terminally, ventralia slightly sclerotized, well-developed, with 2 pairs of lateral lobes.

Distribution : Manipur (Imphal dist.), and Mizoram.

GENERAL REMARKS

Manipur (*vide* Map 1) consists of 8 districts ; Senapati, Ukhrul, Chandel, Churachandpur, Bishnupur, Thoubal, Imphal and Tamenglong,of which Senapati lying adjacent to Nagaland, and Ukhrul to the country of Myanmar exhibit much greater elevation than the other parts of the state in notable contrast. The physiographical feature of the state together with adjoining Assam, Nagaland and Mizoram is as much alike as with Myanmar and therefore, the fauna of the entire area is likely to be similar in nature.

Notwithstanding our best effort to give a comprehensive picture of the Manipur fauna, we are at stake to do it with fewer than one-third of the families of Diptera known in India (*vide* Appendix) or even more with impoverished representatives of each family (except perhaps the Sarchophagidae) so far revealed in the state. With this immature state of knowledge, any comment can never be rewarded in the long run. However, interest in these families except the Mycetophilidae can be disseminated into two other neighbouring states in order to achieve some idea about the essence of the fauna in Manipur (cf. Datta & Parui, 1998 ; 2000).

SUMMARY

The paper deals with nine families of Diptera, *viz.* Bibionidae, Mycetophilidae, Stratiomyidae, Tabanidae, Asilidae, Diopsidae, Sepsidae, Calliphoridae and Sarcophagidae comprising 59 species under 33 genera, of which the Diopsidae and the Sepsidae with 1 and 5 species respectively in addition to 17 species of other families are known for the first time alongside a forefront history of collection and description of species from Manipur.

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We express our sincere thanks to Dr. J. R. B. Alfred, Director and Dr. S. K. Mitra, Scientist 'SF' (Retd.) of the Entomology Division, Zoological Survey of India, Calcutta, for their co-operation and encouragement in the work. We specially thank Master Sankha, son of the senior author for his help in designing the maps provided.

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APPENDIX : Diptera fauna known from Manipur (up to 1998)

SUBORDER/ Family (no./name)	Subfamily (no.)	Genus (no.)	Species (no.)	Subspecies (no.)
3/23	(33)+	(103)+	(279)+	(4)
NEMATOCERA	(11)	(47)	(186)	(3)
Tipulidae	3	26	129	–
Phlebotomidae	–	1	3	–
Culicidae	3	8	35	3
Thaumaleidae	–	1	1	–
Simuliidae	1	1	3	–
Anisopodidae	1	1	1	–
Bibionidae	1	2	4	–
Mycetophilidae	2	2	3	–
Sciaridae	–	5	7	–
BRACHYCERA	(7)	(11)	(23)	(–)
Stratiomyidae	3	5	6	–
Tabanidae	2	3	14	–
Asilidae	2	3	3	–
CYCLORRHAPHA	(15)+	(45)+	(70)+	(1)
Syrphidae	2	16	21	1
Diopsidae	1	1	1	–
Tephritidae	2	2	2	–
Sepsidae	1	4	5	–
Agromyzidae	1	1	1	–
Chloropidae	1	2	3	–
Drosophilidae	1	1	9	–
*Muscidae	–	–	–	–
Calliphoridae	3	4	5	–
Sarcophagidae	1	9	18	–
Tachinidae	2	5	5	–

* To be accounted by B. Mitra dealing with the Muscidae

Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 485-501, 2004

INSECTA : DIPTERA : SYRPHIDAE

M. DATTA and M. MUKHERJEE
Zoological Survey of India, 'M' Block, New Alipore, Kolkata–700 053

INTRODUCTION

Flies that visit flowers are not all referable to flower flies but those that do it usually by hovering for some time with a shrill hum are regarded as the flower flies or Syrphidae. Where there are flowers, there are the Syrphidae, exclusively feeding on flowers and playing a vital role in pollination so much as or even more than the act of bees, wasps, bugs, thrips, beetles, etc. Manipur (Map 0) shows no exception in the physiography of the north-east India. The state in the shadows of hills and mountains adorned by diverse orchids, grows a variety of crops in the Imphal Valley drained by rivers. Therefore, it is likely to uphold a fauna nearly as good as Meghalaya does (*cf.* Datta, 1998b).

Our knowledge on the Manipuri Syrphidae as the other groups of insects is quite deficient because of negligence of extensive exploration. The probable reasons behind it considered to be the following : (i) Manipur is located in an underdeveloped hilly terrain in the extreme edge of the country on the east ; (ii) there is an utter communication gap between the state and the centres of collection agencies in the country ; (iii) the frequent eruption of ethnic struggle prevents collectors from venturing. The history of collection is, therefore, very brief and simple. Indeed, there were personalities like C.S. Guthrie (in 1842), J. McClelland (in 1844), Lt. Col. H. H. Godwin–Austen (in 1873 & 1875), A.O. Hume (in 1881), I.M. Puri (in 1932), etc. who appeared as collectors in Manipur but Rev. W. Pettigrew stationed at Ukhrul (alt. 1950 m) was the first to collect syrphid specimens during August, 1908. The first and the only species described from the state was *Xanthogramma citrinum* (now recognized as *Citrogramma citrinum*) by Brunetti (1923) upon speciments, partly collected by Rev. Pettigrew. After a long lapse of over half a century, M. Datta, while posted at Shillong, collected a large number of speciments from certain areas, now under the jurisdiction of the districts : Imphal, Tamenglong, Bishnupur, Thoubal, Chandel and Churachandpur during March, 1975, but unfortunately those speciments could not be available for inclusion in this study. Thereafter, T.K. Singh of Manipur University came into view in 1990 as a collector of some Syrphidae from Manipur.

Although no second species was later described, some 5 species were recorded after a long time (*vide* Ghosh, 1974 ; Raychaudhuri, Dutta, Agarwala, Raychaudhuri And Raha, 1978). In addition, some 4 species were subsequently known to occur (*vide* Report to T.K. Singh dated July 13, 1990).

Recently, some collecting trips (*vide* Datta and Parui, 2003) were conducted by this institute nearly throughout Manipur for the purpose of addition and revaluation of the faunal components in aid of our comprehensive knowledge. Those trips that brought the syrphid material for this study were led by the following personalities : A.K. Hazra (March, 1992), A.K. Sanyal (March, 1992), A.R. Lahiri (December, 1992 January, 1993), D.K. Mandal (March, 1993), K.K. Ray (March-April, 1993) and B. Mitra (May, 1993).

Since there was no earlier material from Manipur in the National Zoological Collection held by this institute, the identified material of the other north-eastern states was taken into consideration for comparison. However, as a result of these contributions (till December, 1998), 22 species under 16 genera are hitherto known from the state vis-à-vis 264 species and 5 subspecies under 62 genera belonging to 2 subfamilies in India.

The species marked with a couple of asterisks and the species together with the genus marked with a single asterisk are recorded for the first time from Manipur.

MATERIALS AND METHODS

Adult syrphid flies can effectively be collected by employing methods for tabanids prescribed by Datta (1998a). Methods involve sweeping by the insect-net (*vide* Datta, 1998b) or trapping by the Malaise trap in places of their common occurrence. Indeed, the best time of collecting these flies begins sometime after sunrise when their activities increase till midday. The flies are then killed in the killing jar containing Chloroform and Benzene (*vide* Datta, Parui and Mukherjee, 1997). The killed specimens require to be taken out of the net immediately and are advised to mount on pins afresh as far as practicable for every convenience. Finally, each specimen must be accompanied by collection-data and be kept in the box for future studies (*cf.* Datta *et al., op. cit.*)

MORPHOLOGY AND TERMINOLOGY

All important features of the genera except *Mesembrius* dealt with here were discussed by Datta (1998b ; *in press*). However, the genus *Mesembrius* Rondani can be defined by the combination of the following characteristics : syrphids with bare eyes (as in *Catacores, Phytomia,* etc.), bare antennal arista (as in *Mallota, Eristalinus,* etc.), tuberculate face (as in other Eristalini) and pilose at least laterally (as in *Mallota, Phytomia, Eristalis, Eristalinus,* etc.), oral margin notched medially (as in other Eristalini), thoracic bristles lacking (as in other Eristalini), scutellum without emarginate rim (as in most Eristalini), subscutellar fringe lacking (as in *Eristalinus,* etc.), meso-anepisternum anteriorly bare (as in other Eristalini), metathoracic spiracular pile patch often present (as in *Phytomia*), pilose metasternum (as in other Eristalini), wing-vein R_{4+5} strongly dipped into first posterior cell (R_5) (as in other Eristalini), marginal cell (R_1) open at wing-margin (as in *Catacores* and *Mallota*), anterior cross-vein (r-m) distinctly at or beyond middle of discal cell (as in most Eristalini), apical cross-vein (apex of M_{1+2}) directed outward (as in other Eristalini), and hind femur with a basal setal patch and ventral spines (as in other Eristalini).

LIST OF TAXA

Subfamily SYRPHINAE

Tribe **Syrphini**

1. *Allograpta javana* (Wiedemann)

*2. *Asarkina (Asarkina) ericetorum* (F.)

\+ *Betasyrphus serarius* (Wiedemann)

3. *Citrogramma citrinum* (Brunetti)

*4. *Dideopsis aegrotus* (F.)

5. *Episyrphus balteatus* (De Geer)

6. *Ischiodon scutellaris* (F.)

\+ *Metasyrphus (Metasyrphus) confrater* (Wiedemann)

*7. *Sphaerophoria indiana* Bigot

\+ *Syrphus fulvifacies* Brunetti

Tribe **Melanostomatini**

*8. *Melanostoma orientale* (Wiedemann)

*9. *M. univittata* (Wiedemann)

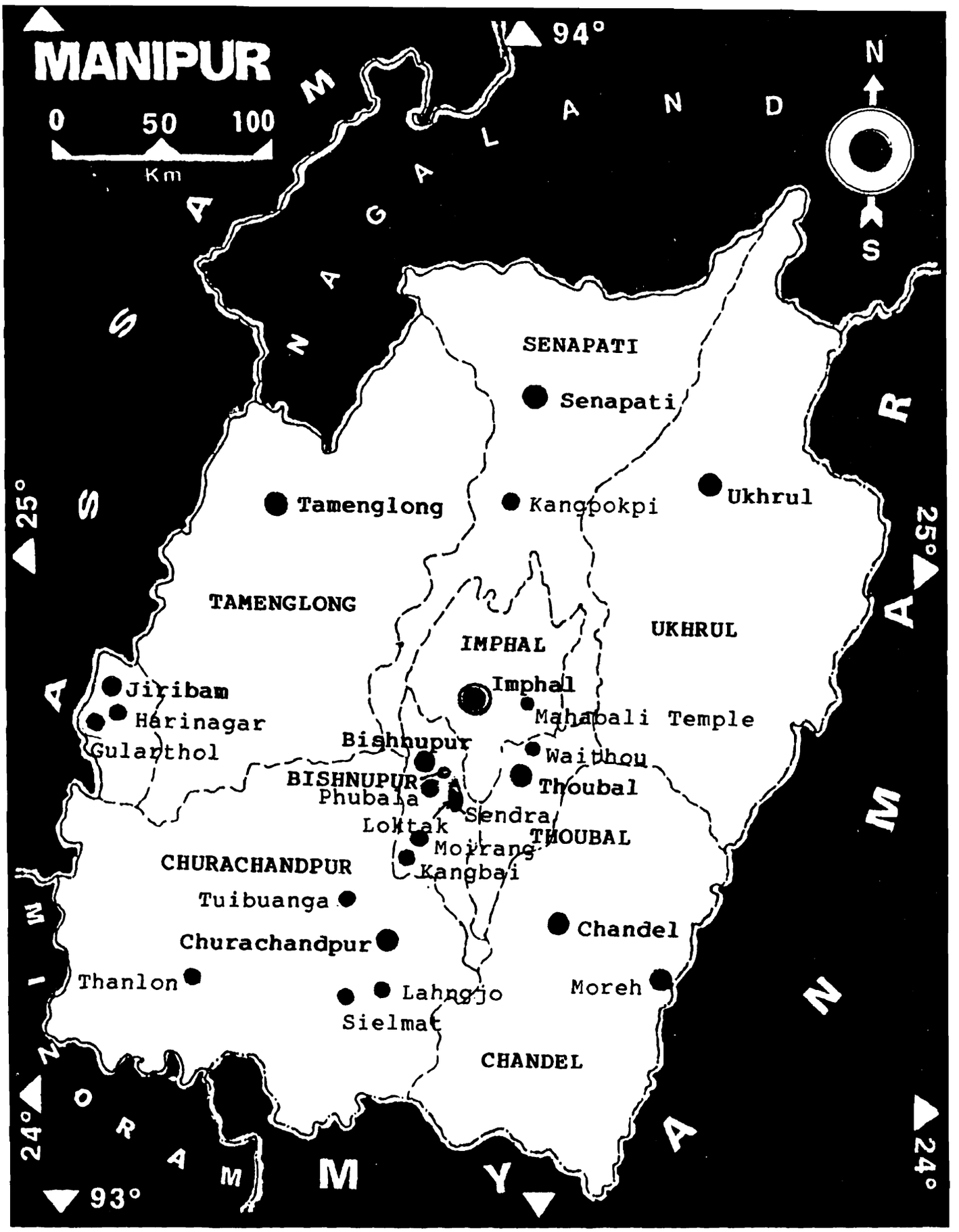
Tribe **Paragini**

10. *Paragus (Paragus) serratus* (F.)

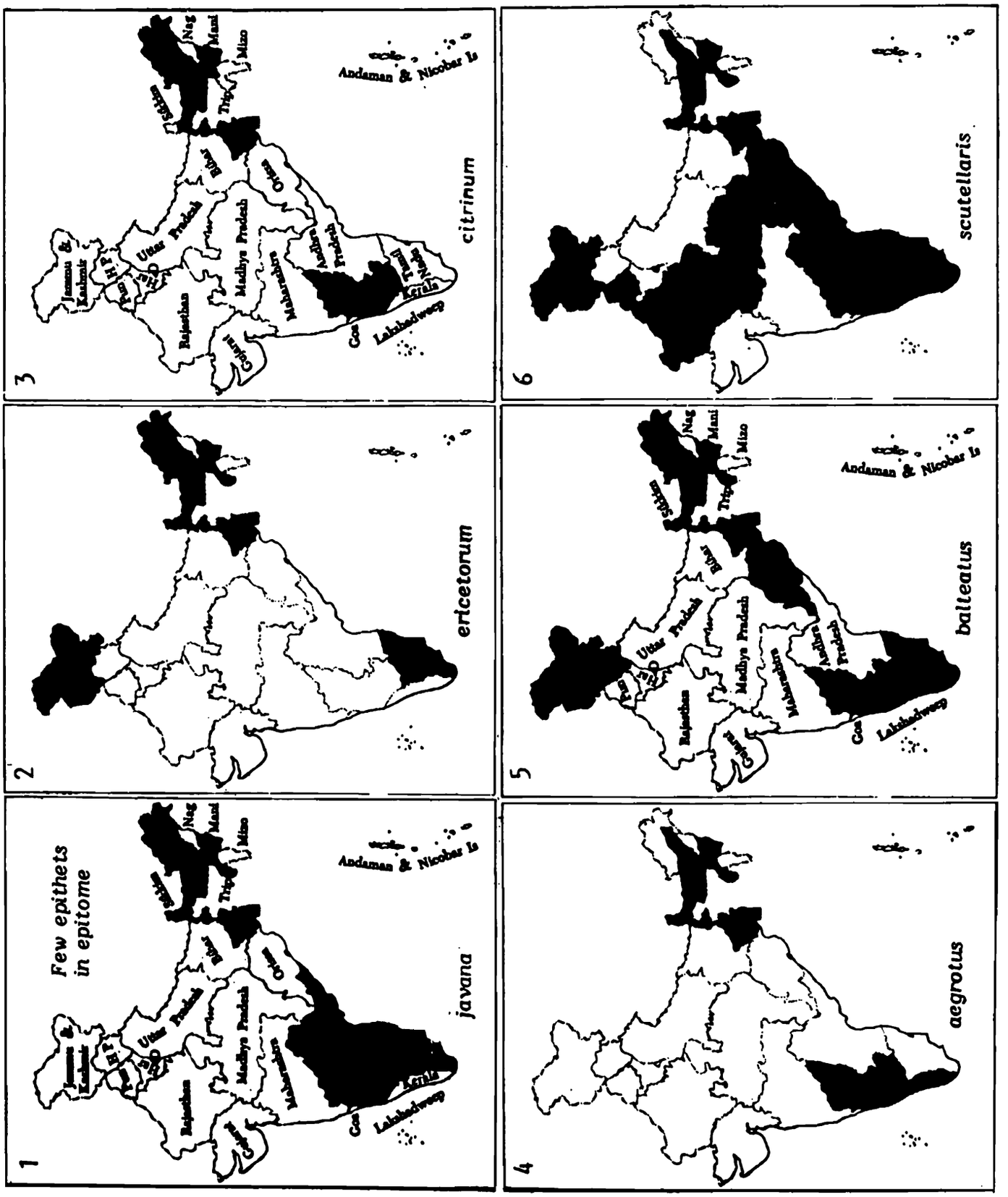
**11. *P. (Pandasyophthalmus) rufiventris* (Brunetti)

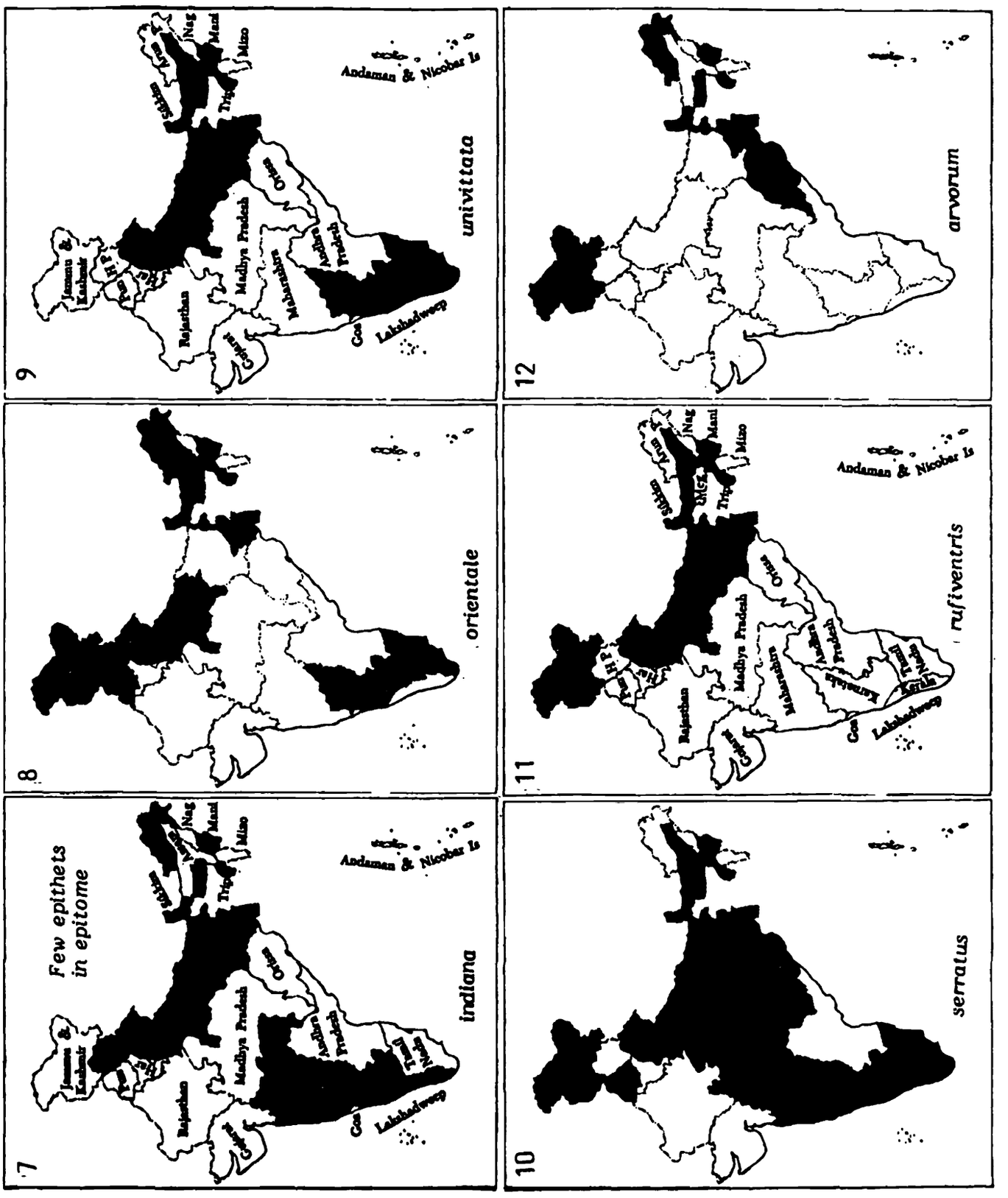
\+ *P. (P.) tibialis* (Fallén)

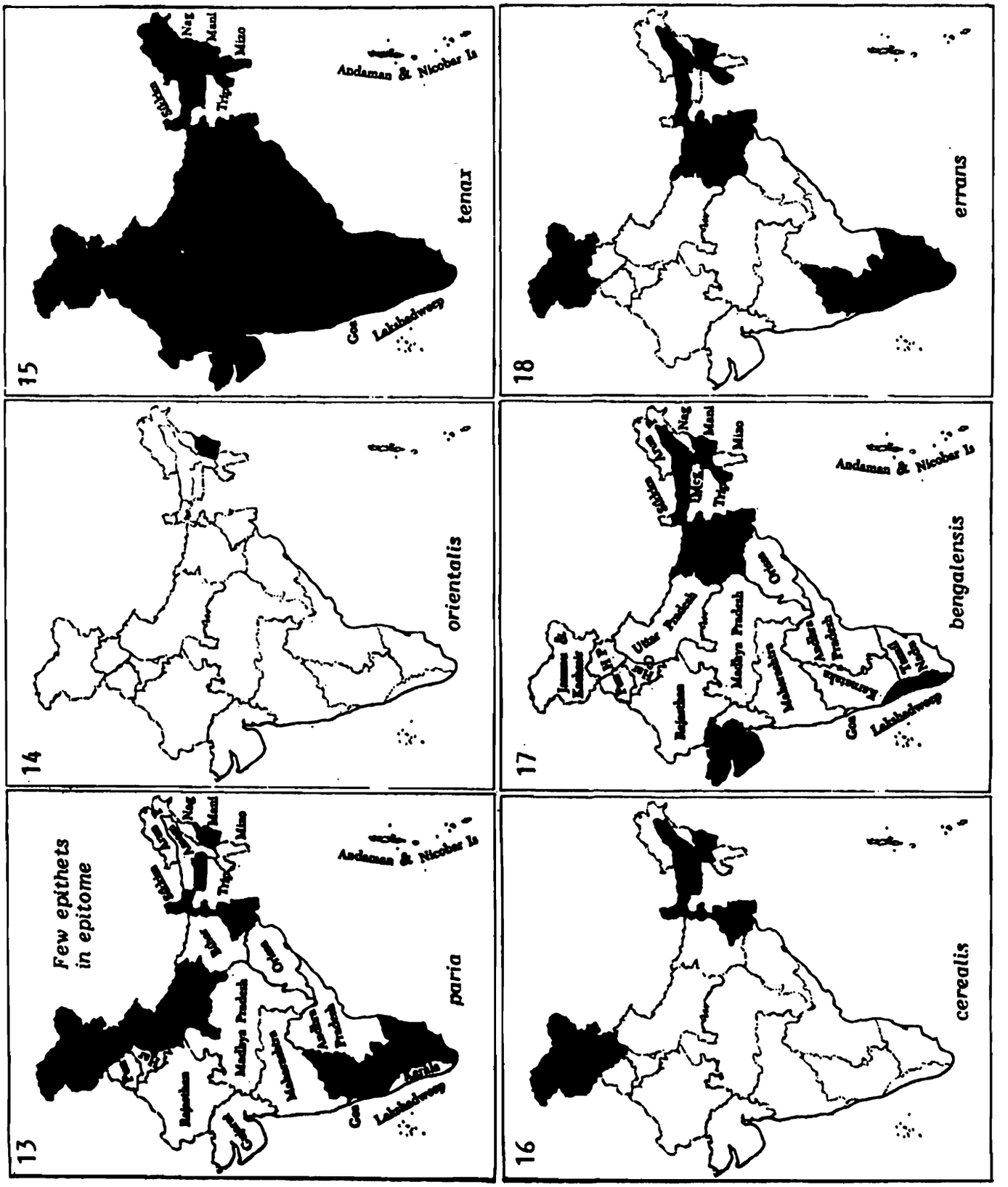
\+ Unnumbered species are entered from the report sent to Dr. T.K. Singh, University of Manipur, Imphal, for whose courtesy's sake we obtained specimens for identification.

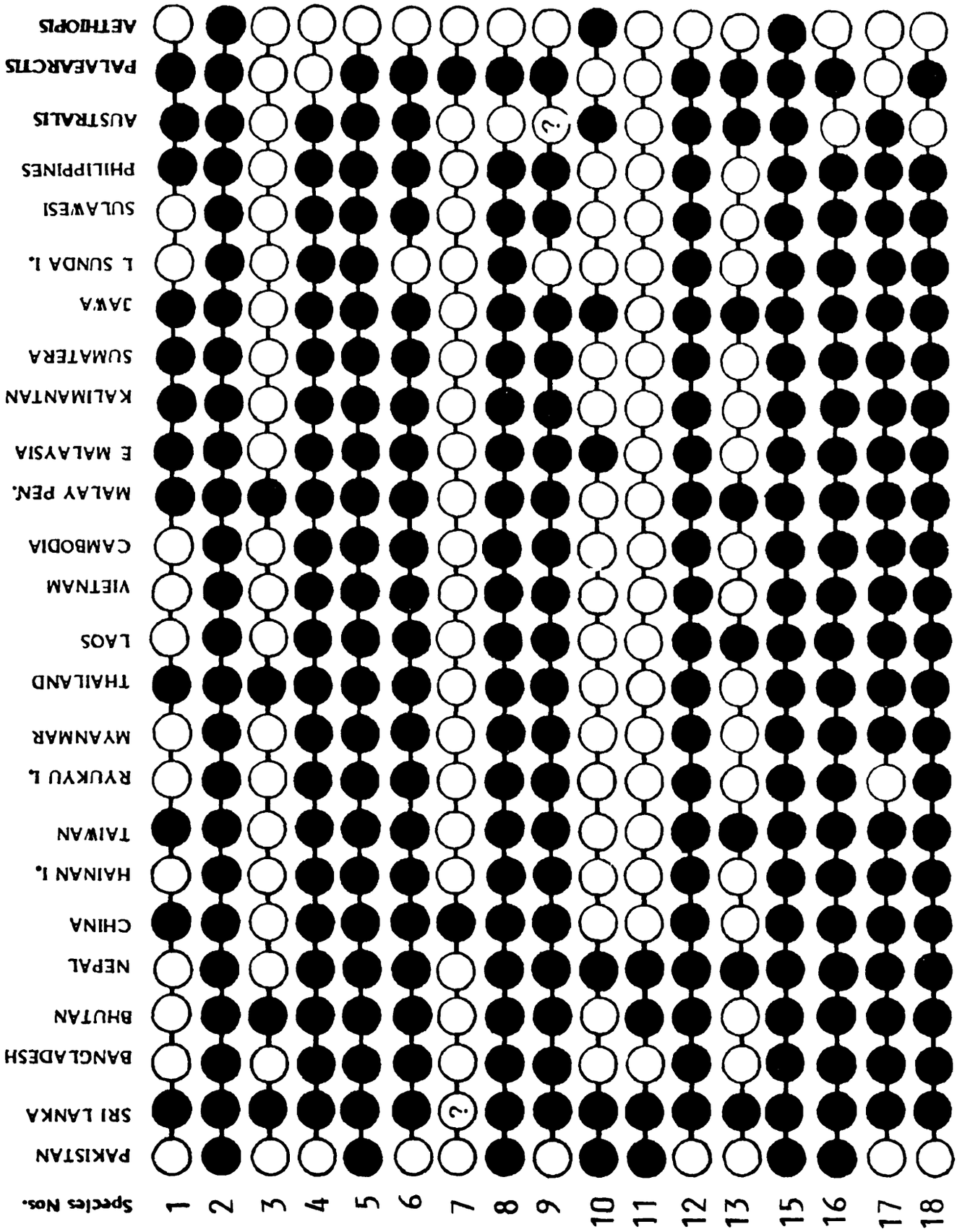


Map 0. Manipur showing its location, districts, district headquarters and recorded places of occurrence of the Syrphidae dealt with.


1
Few epithets in epitome
javana
2
ericetorum
3
citrinum
4
aegrotus
5
balteatus
6
scutellaris
Andaman & Nicobar Is
Nag
Mani
Mizo
Tripura
Sikkim
Bihar
Orissa
Uttar Pradesh
Jammu & Kashmir
H.P.
Punjab
U.P.
Rajasthan
Madhya Pradesh
Maharashtra
Andhra Pradesh
Tamil Nadu
Kerala
Goa
Lakshadweep


7
Few epithets in epitome
indiana
8
orientale
9
univittata
10
serratus
11
rufiventris
12
arvorum
Andaman & Nicobar Is
Jammu & Kashmir
Rajasthan
Madhya Pradesh
Orissa
Maharashtra
Andhra Pradesh
Tamil Nadu
Goa
Lakshadweep
Mizo


13
Few epithets in epitome
paria
14
orientalis
15
tenar
16
cerealis
17
bengalensis
18
errans
Andaman & Nicobar Is
Lakshadweep
Goa
Orissa
Rajasthan
Madhya Pradesh
Maharashtra
Andhra Pradesh
Kerala
Tamil Nadu
Uttar Pradesh
Jammu & Kashmir
Nagaland
Manipur
Mizoram
Tripura


Species Nos.
PAKISTAN
SRI LANKA
BANGLADESH
BHUTAN
NEPAL
CHINA
HAINAN I.
TAIWAN
RYUKYU I.
MYANMAR
THAILAND
LAOS
VIETNAM
CAMBODIA
MALAY PEN.
E MALAYSIA
KALIMANTAN
SUMATERA
JAWA
L SUNDA I.
SULAWESI
PHILIPPINES
AUSTRALIS
PALAEARCTIS
AETHIOPIS
1
2
3
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17
18

Subfamily MILESINAE

Tribe **Eristalini**

*12. *Eristalinus (Eristalimus) arvorum* (F.)

*13. *E. (Eristalodes) paria* (Bigot)

*14. *E. (E.). quinquelineatus orientalis* (Brunetti)

15. *Eristalis (Eristalis) tenax* (L.)

**16. *E. (Eoseristalis) cerealis* F.

*17. *Mesembrius bengalensis* (Wiedemann)

*18. *Phytomia (Phytomia) errans* (F.)

SYSTEMATIC ACCOUNT

Family SYRPHIDAE

Key to the subfamilies

1. Pronotum bare ; abdomen in males with 5 pregenital segments ..... SYRPHINAE

— Pronotum pilose ; abdomen in males with 4 pregenital segments ..... MILESINAE

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 ; scutellum posteriorly smooth and not denticulate ; abdomen usually slender and equilateral 2

2. 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 2-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 sub-erect hairs, at least postero-dorsally ; metasternum haired ; abdominal tergites double-banded ..... ***Episyrphus*** Matsumura & Adachi

— Mesopleuron at its anterior flat portion with only microscopic pubescence or pollinose ; metasternum haired or bare ; abdominal tergites banded or spotted otherwise 2

2. Wing with distinct transverse brown band at mid-length extending from costa at least across posterior cross-vein ; eyes bare ..... ***Dideopsis*** Matsumura

— Wing without transverse dark band, unmarked except for stigmal darkening or rarely with costal darkening longitudinally and dark spot antero-apically 3

3. Metasternum haired 4

— Metasternum bare 8

4. Face produced rather strongly forward below and oral opening more than 3-4 times as long as broad ; mesonotum anteriorly with a distinct collar of long and dense hairs ..... ***Asarkina*** Macquart

— Face and oral opening as usually shortened ; mesonotum devoid of long collar hairs 5

5. Abdomen distinctly margined from middle of tergite 2 to end of tergite 5 6

— Abdomen unmargined 7

6. Mesonotum shining black ; scutellum entirely dull yellow, translucent ; sub-scutellar fringe lacking ..... ***Metasyrphus*** Matsumura

— Mesonotum with broad entire bright yellow margin ; scutellum yellowish brown with pale margin ; sub-scutellar fringe usually entire and dense ..... ***Citrogramma*** Vockeroth

7. Sub-scutellar fringe entire and moderately dense ; male terminalia inconspicuous ; cerci

set in a deep U-shaped notch of tergite 9 ; tergite 9 much narrower than pre-abdomen .. .. ***Allograpta*** Osten Sacken

— Sub-scutellar fringe absent or nearly so on at least median third and sparse laterally ; male terminalia greatly enlarged, globose ; cerci almost always entirely surrounded by tergite 9 ; tergite 9 as broad as pre-abdomen..... ..... ***Sphaerophoria*** Lep. & Serv.

8. Sternopleuron at its upper margin with distinct yellow spot ; wing with vein R_{4+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

— Sternopleuron without any such spot ; vein R_{4+5} ending at wing-apex ; lower lobe of squama usually with long erect hairs ; hind trochanter in males devoid of any process ventrally 9

9. Eye densely haired, at least as much as anterior half ; wing membrane often with bare areas on basal half ; upper and lower sternopleural hair patches distinctly separate posteriorly ... . ***Betasyrphus*** Matsumura

— Eye bare (with a few exceptions) ; wing membrane entirely trichose ; upper and lower sternopleural hair patches narrowly to broadly joined together posteriorly ..... ***Syrphus*** F.

Genus ***Allograpta*** Osten Sacken

1875. *Allograpta* Osten Sacken, *Bull. Buffalo Soc. nat. Sci.*, **3** : 49. Type-species : *Scaeva obliqua* Say.

1. ***Allograpta javana*** (Wiedemann)

1824. *Syrphus javanus* Wiedemann, *Analecta ent.* : **34.**

Diagnosis : Eye bare ; face with black median stripe in females, sometimes brown in males ; antenna orange, segment 3 as broad as long ; mesonotum shining black, with sharply defined bright yellow lateral margin at least presuturally ; scutellum black-haired ; hind femur more or less blackish on apical third, hind tibia black or blackish brown on basal and apical third, rest of legs yellow ; aedeagal base in male terminalia strongly sclerotized cylinder with round apex, posteriorly beset with small spicules.

Distribution : Manipur (Imphal and Bishnupur dists.), Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Karnataka, Meghalaya, Sikkim, Tamil Nadu, Tripura and West Bengal ; China, E Malaysia, Jawa, Kalimtanan, Malay, Philippines, Sri Lanka, Sumatera, Taiwan and Thailand ; Australia, Fiji, Guadalcanal, Hawaii, Japan, Korea and New Guinea (Map 1 & Diag. 0).

Genus ***Asarkina*** Macquart

1842. *Asarkina* Macquart, *Dipt. exot.*, **2**(2) : 77(137). Type-species : *Scaeva rostrata* Wiedemann.

Subgenus ***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.

*2. ***Asarkina (Asarkina) ericetorum*** (Fabricius)

1781. *Syrphus ericetorum* Fabricius, *Spec. Insect.*, **2** : 425.

Material examined : 1 ♂, Churachandpur dist., Sielmat, *ca.* 800m, 17.v.1993, Coll. A.K. Pandit ; 1 ♂, Lahngio, *ca.* 950m, 18.v.1993, Coll. B. Mitra.

Diagnosis : Male frons bright sulphur yellow with long black erect hairs, 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 antenna ; surstylus broad basally, only slightly narrowed to subtruncate apex (*cf.* Datta and Chakraborti, 1983).

Distribution : Manipur (Churachandpur dist.), Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya, Sikkim, Tamil Nadu, Tripura and West Bengal, and other parts of the Oriental region ; Africa, Australia, Fiji, Maluku, New Guinea and Samoa (Map 2 & Diag. 0).

Genus ***Citrogramma*** Vockeroth

1969. *Citrogramma* Vockeroth, 1969, *Mem. ent. Soc. Can.*, **62** : 92. Type-species : *Syrphus hervebazini* Curran.

3. *Citrogramma citrinum* (Brunetti)

1923. *Xanthogramma citrinum* Brunetti. *Fauna Br. India, Dipt.* **3** : 95.

Diagnosis : Eye bare ; face and frons orange yellow ; antenna brownish orange ; mesonotum shining black with broad entire bright yellow margin ; scutellum bright lemon yellow, dark centrally ; wing membrane entirely trichose ; abdominal tergite 2 with a pair of bright yellow spots, tergites 3 and 4 each with an entire yellow band ; sternite 9 very broadly and deeply emarginate postero-ventrally leaving only a very slender ring in ventral view.

Distribution : Manipur (Ukhrul dist.) Arunachal Pradesh, Assam, Karnataka, Meghalaya and West Bengal ; Bhutan. Malay, Sri Lanka and Thailand (Map 3 & Diag. 0).

Genus *Dideopsis* Matsumura

1917. *Dideopsis* Matsumura, *Ent. Mag. Kyoto,* **2** : 142. Type-species : *Eristalis aegrotus* F.

*4. *Dideopsis aegrotus* (F.)

1805. *Eristalis aegrotus* F., *Syst. Antliat.* : **243.**

Material examined : 1 ♀, Churachandpur dist., Tuibuanga, *ca.* 780 m, 18.v.1993, Coll. M. Sil.

Diagnosis : Eye bare ; frons black with black hairs ; face black with yellow hairs ; a black stripe extending from bases of antennae to central bump ; mesonotum black with brownish hairs except yellowish humerus with yellow hairs, mesonotum with anterior collar of long erect hairs ; vein R_{4+5} indistinctly dipped into cell R_{4+5} ; upper and lower sternopleural hair-patches widely separated throughout ; postero-median apical angle of hind coxa with a strong tuft of hairs ; abdomen oval, with broad yellow bands ; sternite 9 in male terminalia with short but distinct setae laterally ; distal position of aedeagus with broad flattened, apically rounded postero-dorsal process.

Distribution : Manipur (Churachandpur dist.), Assam, Karnataka, Kerala, Meghalaya, Sikkim, Tripura and West Bengal ; Nepal and other parts of the SE Asia ; Australia, Maluku and New Guinea (Map 4 & Diag. 0).

Genus *Episyrphus* Matsumura & Adachi

1717. *Episyrphus* Matsumura and Adachi, *Ent. Mag. Kyoto,* **2** : 134. Type-species : *Musca balteata* De Geer.

5. *Episyrphus balteatus* (De Geer)

1776. *Musca balteata* De Geer, *Mém. pour, serv. Hist. Ins.,* **6** : 116.

Material examined : 1 ♂, Imphal dist., Mahabali temple, *ca.* 790m, 29.iii.1992, Coll. A. K. Sanyal ; 1 ♀, Imphal, 790m, 29.xii.1992, Coll. J. R. Singh ; 5 ♂♂, 1 ♀, Thoubal dist., Waithou, 800m, 26.iii.1993, Coll. K. K. Ray ; 2 ♂♂, Bishnupur dist., Loktak, 775m, 26.iii.1993, Coll. D. K. Mandal ; 1 ♂, 5 ♀♀ Imphal dist., Uchathol nr Gularthol, *ca.* 790m, 9.v.1993, Coll. M. Sil ; 3 ♀♀, Churachandpur dist., Churachand-pur, 875m, 16.v.1993, Coll. M. Sil ; 3 ♀♀, Churachandpur, Zomi Colony, 850m, 16.v.1993, Coll. A. K. Pandit ; 1 ♂, 1 ♀, Sielmat village, 800m, 17.v.1993, Coll. B. Mitra, 1 ♂, 5 ♀♀, Lahngjo, 950m, 18.v.1993, Coll. B. Mitra ; 1 ♂, 1 ♀, Lahngjo, 950m, 18.v.1993, Coll. S. K. Chakraborti, 1 ♂, 2 ♀♀, Tuibuanga, *ca.* 780m, 19.v.1993, Coll. S. K. Chakraborti, 1 ♂, 2 ♀♀, Bishnupur dist., Sendra, *ca.* 800m, 21.v.1993, Coll. M. Sil ; 1 ♀, Moirang, 800m, 22.v.1993, Coll, M. Sil.

Diagnosis : Eye bare ; face orange, with orange hairs ; base of antenna with a black dot above ; mesonotum black, with a narrow median and 2 lateral greyish stripes ; posterior margin of wing with a series of sclerotized dots ; abdomen linear, 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 aedeagus not expanded apically *(cf.* Vockeroth, 1969).

Distribution : Manipur (Imphal, Thoubal, Bishnupur and Churachandpur dists.), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura and West Bengal ; China, Malay and other parts of the Oriental

region ; Australia, Bonin Islands and Palaearctic region (Map 5 & Diag. 0).

Genus ***Ischiodon*** Sack

1913. *Ischiodon* Sack, *Ent. Mitt.*, **2** : 5. Type-species : *Ischiodon trochanterica* Sack (=*Scaeva scutellaris* Fabricius).

6. ***Ischiodon scutellaris*** (Fabricius)

1805. *Scaeva scutellaris Fabricius, Syst. Antliat.* : **252.**

Material examined : 1, Churachandpur dist., Churachandpur, Zomi Colony, 850m, 16.v. 1993, A. K. Pandit.

Diagnosis : Eye bare ; wing with vein R_{4+5} upcurved apically and ending well before 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 (*cf.* Vockeroth, 1969).

Distribution : Manipur (Bishnupur and Churachandpur dists.), Andhra Pradesh, Assam, Delhi, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura and West Bengal ; Jawa, Philippines, Taiwan and other parts of the SE Asia ; Australia, Hawaii, Japan and Micronesia (Map 6 & Diag. 0)

Genus ***Sphaerophoria*** Lep. & Serv.

1828. *Sphaerophoria* Lepeletier and Serville, *Encycl. Méth (Ins.)*, **10** : 513 (as subgenus of *Syrphus* F.). Type-Species : *Musca scripta* L.

*7. ***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 : 3♂♂, Chandel dist., Moreh, *ca.* 1750m, 25.xii.1992, Coll. A.R. Lahiri ; 1♂, Thoubal dist., Waithou, 875m, 26.iii.1993, Coll. K. K. Ray ; 3♂♂, Churachandpur dist., Churachandpur, 860m, 16.v.1993, Coll. M. Sil ; 14♂♂ Tuibuanga, *ca.* 780m, 19.v.1993, Coll. M. Sil & S. K. Chakraborti.

Diagnosis : Face entirely yellow, without median stripe ; frons in females with a broad black median stripe ; mesonotum black, with more or less distinct greyish submedian stripes at least anteriorly ; scutellum bright yellow, subscutellar fringe absent ; leg 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 (*cf.* Bañkowska, 1964).

Distribution : Manipur (Thoubal, Chandel and Churachandpur dists.), Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Tripura, Uttar Pradesh and West Bengal ; China and ? Sri Lanka ; Korea and eastern part of the erstwhile U.S.S.R. (Map. 7 & Diag. 0).

Tribe **Melanostomatini**

Genus ***Melanostoma*** Schiner

1860. *Melanostoma* Schiner, *Wien. ent. Mschr.*, **4** : 213. Type-species : *Musca mellina* L.

Diagnosis : Syrphines with elongate-oblong abdomen and intermediate tergites usually with pairs of bright yellow spots ; male fore tarsus devoid of any dilatation ; surstylus in male terminalia usually not bifid, superior lobe normally triangular.

Key to the species

1. Face with 2 distinct small bumps .... *orientale* (Wiedemann)

— Face nearly flat forming a single angle only on lower end ..... *univittata* (Wiedemann)

*8. ***Melanostoma orientale*** (Wiedemann)

1824. *Syrphus orientalis* Wiedemann, *Analecta ent.*, : **36.**

Material examined : 2♂♂, Churachandpur dist., Lahngjo, 950m, 18.v.1993, Coll. A.K. Pandit ; 1♀, Bishnupur dist., Keibul, 775m, 10.xii.1992, Coll. P. Parui.

Diagnosis : Antenna blackish, segment 3 and occasionally 2 also somewhat brownish orange on inner side ; frons in females with a subtriangular grey or yellow spot on either side

of mid-line ; abdomen shining black, terga 2, 3 and 4 in males with paired orange-yellow spots, terga 2-5 in females with paired spots.

Distribution : Manipur (Bishnupur and Churachandpur dists.), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal ; Bhutan, Nepal, Pakistan, Sri Lanka and other parts of the Oriental region ; Palaearctic region (Map 8 & Diag. 0).

*9. ***Melanostoma univittata*** (Wiedemann)

1824. *Syrphus univittatus* Wiedemann, *Analecta ent.*, : **36.**

Material examined : 1♂, Churachandpur dist., Lahngjo, 950m, 18.v.1993, Coll. S.K. Chakraborti.

Diagnosis : Antenna orange, segment 3 somewhat blackish apically ; frons and face in females with a shining black line on either side ; abdomen somewhat orange in colour, segments 2-4 each with a narrow black hind margin, thickened laterally in females along with a narrow median black stripe up to 5 dorsally, ocassionally also with paired whitish spots on terga 1-3 ; male genitalia as in Datta and Chakraborti (1986a).

Distribution : Manipur (Churachandpur dist.), Assam, Bihar, Karnataka, Kerala, Meghalaya, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal ; E Malaysia, Myanmar, Nepal, Sri Lanka, Sumatera and other parts of the SE Asia ; Australian and Palaearctic regions (Map 9 & Diag. 0).

Tribe **Paragini**

Genus ***Paragus*** Latreille

1804. *Paragus* Latreille, *Nouv, Dist. Hist. nat.*, **24** : 94. Type-species : *Syrphus bicolor* F.

Diagnosis : Head slightly flattened and broader than thorax ; eye pilose ; face produced to a large central bump ; antennal arista bare ; thorax quadrate and arched ; mesonotum stiped ; wing with veins M_{1+2} and M_3+Cu_1 undulating apically and cross-vein r-m distinctly before middle of discal cell ; abdomen as wide as thorax, nearly equilateral ; aedeagus in male terminalia undivided, simple and tubular medially with a complex lateral lobe at base on either side.

Key to the subgenera

1. Eye with bicolourous pile, with alternating vittae of pale and dark hairs ; spurious vein shorter, not extending beyond discal (r-m) cross-vein ..... ***Paragus*** Latreille

— Eye with unicolourous pile ; spurious vein long, extending beyond discal (r-m) cross-vein ..... ***Pandasyophthalmus*** Stuckenburg

Subgenus ***Paragus*** Latreille

10. ***Paragus (Paragus) serratus*** (Fabricius)

1805. *Mulio serratus* Fabricius, *Syst. Antliat.* : 186.

Material examined : 1♂, 1♀, Chandel dist., Moreh, 1750m, 25. xii. 1992, Coll. R.S. Mridha ; 1♂, Imphal dist., Harinagar, *ca.* 700m, 10.v.1993, Coll. M. Sil ; 2♂♂, Churachandpur dist., Tuibuanga, *ca.* 780m, 19.vi.1993, Coll. B. Mitra.

Diagnosis : Eye with 3 longitudinal vittae of white hairs ; scutellum conspicuously serrate on posterior margin ; abdominal colouration variable, and mainly yellow with brown markings on tergites, punctate ; male genitalia as in Datta and Chakraborti (1983).

Distribution : Manipur (Imphal, Chandel, Bishnupur and Churachandpur dists.), Assam, Bihar, Delhi, Goa, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal ; Jakarta, Jawa, E Malaysia, Nepal, Pakistan and Sri Lanka ; Africa and Papua (Map 10 & Diag. 0).

Subgenus ***Pandasyophthalmus*** Stuckenberg

1954. *Pandasyophthalmus* Stuckenberg, *Revue Zool, Bot. aftr.*, **49.** : 100. Type-species : *Paragus longiventris* Loew.

11. ***Paragus (Pandasyophthalmus) rufiventris* Brunetti

1913. *Paragus rufiventris* 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.

Material examined : 1♂, Churachandpur dist., Tuibuanga, *ca*, 780m, 19.v.1993, Coll. B. Mitra.

Diagnosis : Face with a distinct median black stripe from below antennae to oral opening ; scutellum entirely black ; abdomen bluish black anteriorly and bright reddish brown posteriorly ; male terminalia with long and slender surstylus gradually tapering apically ; superior lobe robust, even longer than tergite 9 and surstylus together (*cf.* Datta and Chakraborti, 1983).

Distribution : Manipur (Churachandpur dist.,), Assam, Bihar, Jammu & Kashmir, Sikkim, Tripura, Uttar Pradesh and West Bengal ; Bhutan, Nepal, Pakistan and Sri Lanka (Map 11 & Diag.0).

Subfamily MILESINAE

Tribe **Eristalini**

Diagnosis : Face usually with a tubercle, densely pilose laterally ; oral margin notched anteriorly ; antenna short, segment 3 usually small and orbicular, with a basal arista, rarely haired at base ; meso-anepisternum anteriorly bare ; meso-katepisternum (meropleuron) usually pilose at its upper edge ; metathoracic spiracular pile patch in reduced form only in certain genera ; scutellum rarely with apical emarginate rim ; wing-vein R_{4+5} usually with a strong loop in apical cell (R_5) ; marginal Cell (R_1) closed ; anterior cross-vein (r-m) almost always at or beyond middle of discal cell ; apical cell (R_5) and discal cell (1st M_2) usually devoid of appendices ; hind femur with basal setae and usually also with ventral spines.

Key to the genera
(Modified after Thompson, 1972)

1. Wing with open marginal cell (R_1) .... ***Mesembrius*** Rondani

— Wing with closed marginal cell (R_1) 2

2. Eye bare ; wing with normal submarginal cell (R_3) due to normal length of anterior cross-vein (r-m) ; metathoracic spiracular pile-patch present ..... ***Phytomia*** Guérin-Méneville

— Eye at least partially pilose ; if bare, then, submarginal cell narrowed basally due to longer anterior cross-vein, metathoracic spiracular pile-patch usually absent 3

3. 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, Nuovi Annali Sci. nat. Bologna*, **2**(2) : 453. Type-species : *Musca sepulchralis* L.

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

*13. ***Eristalimis (Eristalinus) arvorum*** (F)

1787. *Syrphus arvorum* Fabricius, *Mantissa Insect.*, **2** : 335.

Material examined : 1♂, Bishnupur dist., Kangbai, 875m, 20.v.1993, Coll. M. Sil ; 1♂ Churachandpur dist., Sielmat, 800m, 15.v.1993, Coll. B. Mitra.

Diagnosis : Eye brown-haired on upper half, with small dark spots ; antenna yellowish, arista practically bare, with a few hairs only at base ; mesonotum yellowish, with 4 conspicuous shining

black stripes ; scutellum reddish yellow, subscutellar fringe absent ; femur normally orange or brownish orange, tarsi of similar colour, at most a little darker apically ; abdomen yellowish, with black spots on tergites 2 (occasionally) and 3, with curved bright yellow spots on tergite 4 ; superior lobe in male terminalia long, flask-like in basal two-thirds and cylindrical apically (*cf.* Nayar, 1968 ; Datta and Chakraborti, 1983).

Distribution : Manipur (Bishnupur and Churachandpur dists.), Andaman Is., Arunachal Pradesh, Jammu & Kashmir, Meghalaya, Orissa, Sikkim, Tripura and West Bengal ; China and other parts of the SE Asia ; Australia, Hawaii, Japan and Micronesia (Map 12 & Diag. 0).

Subgenus ***Eristalodes*** Mik

1897. *Eristalodes* Mik, *Wien. ent. Ztg.*, **16** : 114. Type-species : *Eristalis taeniops* Wiedemann.

Key to the species or subspecies*

1. Eye with 6 narrow, approximately parallel, longitudinal dark stripes and with dense dark brown hairs on upper and frontal areas ; frons and face together appearing flask-shaped, with narrower top towards vertex, gradually broadening towards bottom, face with grey tomentum and white haris ; abdomen gradually narrowed down to apex ..... *paria* (Bigot)

— Eye with 5 sharply defined longitudinal dark stripes, gradually closer towards extremities, and entirely with sparse dark brown hairs ; frons and face together appearing like a wide dumb-bell, face with whitish tomentum and long white hairs ; abdomen nearly equilateral before apex .... *quinquelineatus orientalis* (Brunetti)

*13. ***Eristalinus (Eristalodes) paria*** (Bigot)

1880. *Eristalomyia paria* Bigot. *Annls. Soc. Ent. Fr.*, (5) **10** : 218.

Material examined : 1♀, Imphal dist., Mahabali temple, *ca.* 790m, 29.iii.1992, Coll. A.K. Hazra.

Distribution : Manipur (Imphal dist.), Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Jawa, Laos, Malay, Nepal, Sri Lanka and Taiwan; Japan and Maluku (Map 13 & Diag. 0).

*14. ***Eristalinus (Eristalodes) quinquelineatus orientalis*** (Brunett)

1923. *Eristalis quinquelineatus* var. *orientalis* Brunetti, *Fauna Br. India*, Dipt., **3** : 183.

Material examined : 1♀, Churachandpur dist., Sielmat, 800m, 17.v.1993, Coll. B. Mitra.

Distribution : Manipur (Churachandpur dist.) (Map 14).

Remark : The distribution of the subspecies is kept restricted to Manipur only till comparison with the male sexes of the two taxa in question.

Genus ***Eristalis*** Latreille

1804. *Eristalis* Latreille, *Nouv. Dict. Hist. nat.*, **24** : 194. Type-species : *Musca tenax* L.

Key to the subgenera

1. 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

15. ***Eristalis (Eristalis) tenax*** (L.)

1758. *Musca tenax* Linnaeus, *Syst. Nat. Ed.*, **10** : 591.

Material examined : 1♂, Bishnupur dist., Loktak, 775m, 26.iii.1993, Coll. D. K. Mandal ; 2♂♂, Senapati dist., Kangpokpi, 1230m, 28.iii. 1993, Coll. K. K. Ray ; 1♀, Churachandpur dist., Sielmat, 800m, 17.v.1993, Coll. M. Sil, 1♂, 3♀♀, Lahngjo, 950m, 18.v.1993, Coll. M. Sil ; 1♂, 1♀, Lahngjo, 950m, 18.v.1993, Coll. S.K.

* *Eristalinus quinquelineatus orientalis* (Brunetti) was treated as a junior synonym of *Eristalinus paria* (Bigot) by Knutson, Thompson and Vockeroth (1975). Presently, we are in possession of female sexes that show a number of differences by which these two taxa are restored to their status of distinction, pending confirmation from male sexes.

Chakraborti ; 2♂♂, 2♀♀, Tuibuanga, *ca.* 780m, 19.v.1993, Coll. M. Sil.

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 ; abdominal colouration bright reddish yellow to black ; male genitalia as in Nayar (1968).

Distribution : Manipur (Senapati, Bishnupur and Churachandpur dists.) ; nearly cosmopolitan (Map 15 & Diag. 0).

Subgenus ***Eoseristalis*** Kanervo

1938. *Eoseristalis* Kanervo, *Annls. Univ. fenn, abo.* (A), **6** : 12. Type-species : *Eristalis cerealis* F.

16. ***Eristalis (Eoseristalis) cerealis* F.

1805. *Eristalis cerealis* Fabricius, *Syst. Antliat.* : 232.

1849. *Eristalis solitus* Walker, *List Dipt. Colln Br. Mus.*, **3** : 619.

Material examined : 1♂, Churachandpur dist., Thanlon, *ca.* 850m, 15.iii.1993, Coll. D.K. Mandal ; 1♂, Sielmat, 800m, 17.v.1993, Coll. B. Mitra ; 1♂, 1♀, Lahngjo, 950m, 18.v.1993, Coll. M. Sil ; 1♂, 2♀♀, Tuibuanga, *ca.* 780m, 19.v.1993, Coll. B. Mitra.

Diagnosis : Eye with long, dense, dark brown hairs on upper half and with off-white hairs amidst small brown spots on lower half ; antenna nearly black, arista plumose on basal half ; mesonotum shining blackish brown, with a broad cross-band of greyish hairs along suture ; scutellum brownish yellow, with long, dense hairs ; femora black, with yellowish tips, tibiae yellowish approximately on basal halves ; abdominal tergite 3 in males with a triangular or oblong spot medially on anterior margin, in females spot broader and irregular in shape but always on anterior margin ; male genitalia as in Datta and Chakraborti (1983).

Distribution : Manipur (Churachandpur Dist.), Assam, Himachal Pradesh, Jammu and Kashmir, Meghalaya, Sikkim and West Bengal ; China, Myanmar and other parts of the Oriental region ; Japan, Korea and Sakhalin (Map 16 & Diag. 0).

Genus ***Mesembrius*** Rondani

1857. *Mesembrius* Rondani, *Dipterol. ital. Prodr.*, **2** : 50. Type-species : *Helophilus peregrinus Loew.*

*17. ***Mesembrius bengalensis*** (Wiedemann)

1819. *Eristalis bengalensis* Wiedemann, *Zool. Mag.*, **1** : 16.

Material examined : 2♂♂, 1♂, Imphal dist. Mahabali temple, *ca.* 790m, 29.iii.1992, Coll. A.K. Sanyal ; 1♂, Churachandpur dist., Lahngjo, 950m, 18.v.1993, Coll. M. Sil.

Diagnosis : Eye sparsely haired ; antennal arista bare ; mesonotum bright yellow with 3 longitudinal black stripes, median wider than submedian stripes ; scutellum translucent yellow, with dark base ; mid-femur in males with a tooth below near base and abruptly narrowed at tip ; abdominal tergite 4 with an inverted, widely open V-mark ; male genitalia as in Datta and Chakraborti (1986 b).

Distribution : Manipur (Imphal and Churachandpur dists.), Assam, Bihar, Gujarat, Kerala, Tripura and West Bengal, and other parts of the SE Asia to New Guinea and Northern Australia (Map 17 & Diag. 0).

Genus ***Phytomia*** Guérin-Méneville

1834. *Phytomia* Guérin-Méneville, *in* Belanger, *Voyage Ind.-Orient.*, **7** : 509. Type-species : *Eristalis chrysopygus* Wiedemann.

Subgenus ***Phytomia*** Guérin-Méneville

Diagnosis : Scutellum devoid of apical rim ; hind femur unarmed in that subapical tooth on front side lacking.

*18. ***Phytomia (Phytomia) errans*** (F.)

1787. *Syrphus errans* Fabricius, *Mantissa Insect.* **2** : 337.

Material examined : 3♂♂, 2♀♀, Churachandpur dist., Tuibuanga, *ca.* 780m, 19.v.1993, Coll. M. Sil.

Diagnosis : Face orange yellow, with yellowish hairs ; antenna entirely orange, arista bare ; mesonotum somewhat blackish, pale along suture, with 2 short, inconspicuously broad median

stripes ; hind femur nearly brownish orange on basal half, devoid of stiff bristly hairs ; abdomen brownish orange, tergites 2, 3 and 4 each with a large blackish brown triangular spot towards posterior margin ; male genitalia as in Datta and Chakraborti (1986b).

Distribution : Manipur (Churachandpur dist.), Assam, Bihar, Karnataka, Jammu & Kashmir, Kerala, Tamil Nadu, Tripura and West Bengal, and other parts of the SE Asia ; Japan (Map 18 & Diag. 0).

GENERAL ANNOTATION

Manipur comprises 8 districts (Map 0) : Senapati, Tamenglong, Imphal, Bishnupur, Thoubal, Churachandpur, Chandel and Ukhrul, surrounded by the states of Nagaland, Assam and Mizoram on the north, west and south-west respectively, and the country of Myanmar on the east and south-east of the state. The Imphal valley as a central part located upon the whole at the height of 750-950 m, is confined in tracts of hills and mountains rising even up to 3,960 m on the north and north-east. Therefore, the state enjoys tropical to sub-alpine climate sustaining abundance of various beautiful orchids alongside vegetation, mostly of tropical nature. All these conditions certainly call for a perfect fauna of flower flies. But, presently with only 21 species and a subspecies under 16 genera known as against the entire fauna in India, no discussion is destined to become useful, quite so when the Myanmarese fauna lying close to this Manipuri, is fairly known. Indeed, the fauna accounts for only about 8% of the species India holds, and all but the subspecies in *Eristalinus* do occur in one or other states of the north-east India (*cf.* Brunetti, 1923 ; Knutson, Thompson and Vockeroth, 1975 ; Datta, 1998b ; Datta, Parui and Mukherjee, 2000). This figure re-calls Tripura (*vide* Datta *et al., op. cit.)*, a neighbouring state where the fauna has been likewise considered deficiently known. However, the distributional pattern shown by the species (as per serial no.) is depicted in the appendant maps 1-18 & diagram 0 for visual reading.

To be brief on the content of the state, the fauna of the Syrphidae so far known, comprises 21 species with a subspecies belonging to 16 genera, of which only 2 species are confined to the Oriental region, whereas others (excepting the subspecies) extend their range of distribution beyond the Orient.

SUMMARY

The paper incorporates 17 species plus 1 subspecies under 13 genera with systematic key and characterization. The fauna contains 7 genera and 12 species as new to Manipur.

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 503-508, 2004

INSECTA : DIPTERA : MUSCIDAE

BULGANIN MITRA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The family Muscidae, commonly known as "House fly" of the super family Muscoidea under the suborder Cyclorrhapha is one of the most diversified and economically important group of the Calyptrate Diptera. These are widespread, common and often pestiferous files.

The family Muscidae (258 species) is the fifth largest family belonging to the order Diptera in India. Of this, the subfamily Phaoniinae has been so far recorded by 99 species, followed by Muscinae (78 species), Limnophorinae (35 species), Mydaeinae (20 species), Coenosiinae (14 species) and Stomoxyinae (12 species). Out of the total Diptera fauna (6093 species) so far recorded in India, muscid fauna comprises only 4.23 percent, whereas India has only 6.7 percent of total species of muscid fauna recorded so far in the world (3800 species, Skidmore, 1985).

The Indian region is recognized as one of the major centres for biodiversity in the world and the two megadiversity centres in India, Western Ghat (37.98 percent) and North East India (34.49 percent) shared the bulk of the muscid fauna. Though 89 species belonging to 28 genera under 6 subfamilies are reported from North East India, nothing has been reported from Manipur so far.

The present communication is based on the collections of the scientists of the Zoological Survey of India, Calcutta. The collections were made by M. Sil (1993), B. Mitra (1993), A. K. Pandit (1993) and S. K. Chakraborty (1993).

This is the first record comprising 10 species belonging to 5 genera under 4 subfamilies from the State of Manipur. The classification, taxonomical keys of subfamilies, genera, etc. have been followed after Pont (1977), Vockeroth (1972) and Shinonaga and Singh (1994). General Morphology has been dealt in detail by the author in Fauna of Tripura (Mitra, 2000).

LIST OF SPECIES

Subfamily MUSCINAE

1. *Musca (Byomya) sorbens* Wiedemann
2. *Musca (Musca) domestica* Linnaeus
3. *Orthellia gavisa* (Walker)
4. *Orthellia indica* (Robineau-Desvoidy)
5. *Orthellia lauta* (Wiedemann)
6. *Orthellia viridis* (Wiedemann)

B. Subfamily PHAONIINAE

7. *Atherigona (Atherigona) reversura* Villeneuve

C. Subfamily LIMNOPHORINAE

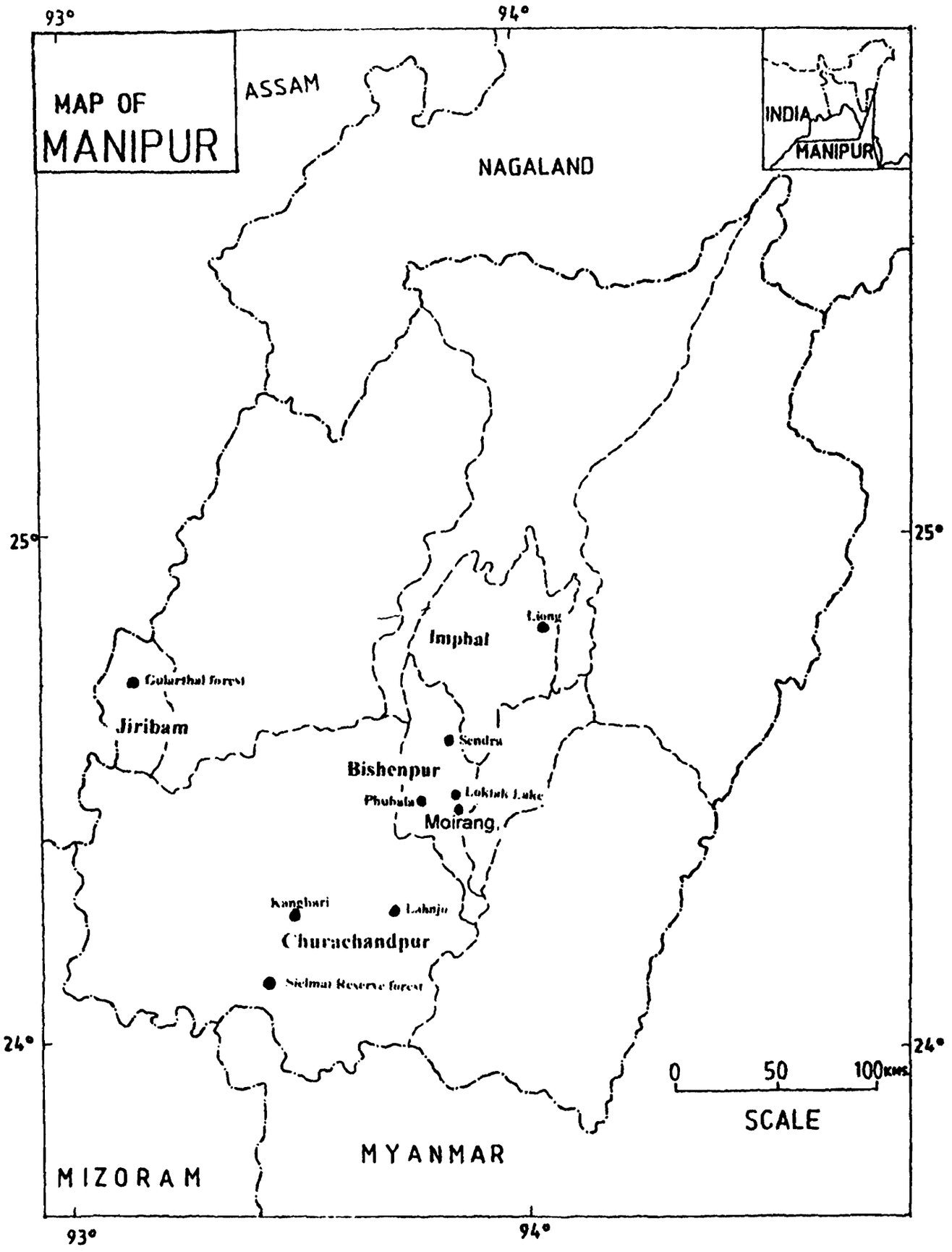
8. *Lispe leucospila* (Wiedemann)
9. *Lispe orientallis* (Wiedemann)

D. Subfamily STOMOXYINAE

10. *Stomoxys calcitrans* (Linnaeus)

MATERIAL AND METHOD

Material & method of collection are also dealt in "Fauna of Tripura" by B. Mitra (2000).



Map 1 : Showing the different collection localities in the state of Manipur

SYSTEMATIC ACCOUNT

Key to the subfamilies

1. Proboscis elongate strongly sclerotized, adapted for piercing, tapering from a broad base to a slender apex and with atrophied labella; pteropleuron haired; vein M_{1+2} gradually curved forward apically from about middle of last section ..... STOMOXYINAE

   Proboscis moderately weakly sclerotized, not distinctly tapering to apex and with well developed and often fleshy labella; pteropleuron haired or bare; vein M_{1+2} variable, often straight or sharply curved forward near middle of last section 2

2. Pteropleuron at least with a few fine hairs... 3

   Pteropleuron bare .... PHAONIINAE *(Atherigona)*

3. Pteropleuron with strong hairs along upper margin, below base of wing often with distinct hairs on lower half also; parafacial bare .... MUSCINAE.

   Pteropleuron with only a row or tuft of a few fine rather short hairs on posterior part of lower half above posterior sternopleural bristle, parafacial usually with fine short hairs throughout its length..... LIMNOPHORINAE

Subfamily MUSCINAE

Key to the genera

1. Suprasquamal ridge with black setulose hairs on posterior part; bend of vein M_{1+2} angular or in a gentle curve .... ***Orthellia*** Robineau-Desvoidy.

   Suprasquamal ridge bares; bend of vein M_{1+2} subangular ..... ***Musca*** Linnaeus.

Genus ***Musca*** Linnaeus

1758. *Musca* Linnaeus, *Syst. Nat. Ed.* **10** : 589.

Type-species *domestica* Linnaeus

Key to the subgenera

1. Propleural depression hairy...***Musca*** Linnaeus

   Propleural depression bare ....***Byomya*** Robineau-Desvoidy

Subgenus ***Byomya*** Robineau-Desvoidy

1830. *Byomya* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.*, **2** : 392. Type species : *violacea* Robineau-Desvoidy.

1. ***Musca (Byomya) sorbens*** Wiedemann

1830. *Musca sorbens* Wiedemann, *Aussereurop zweifl, Insekt.*, 2 : 418.

Material examined : 10♂ 3♀ Moirang, Bishenpur, 22 V. 1993, coll. B. Mitra.

Diagnosis : Thorax shining black, with a broad glossy black vitta on either side, more or less bifurcated anteriorly, especially in females; 1 acr, 2+4–6 dc, anterior post dc often small in males if more than 4.

Distribution : Manipur, Arunachal Pradesh, Andhra Pradesh, Assam, Bihar, Goa, Tamil Nadu, Uttar Pradesh, West Bengal; China, Christmas Island, Cocos Island, Flores Island, Jawa, Lombok, Malaya, Maldive Islands, Myanmar, Nepal, Pakistan, Pelo Endeh, Phillippines, Ryukyu Islands, Simeulue Island, Sumatera, Sumbawa, Sri Lanka, Taiwan, Talaur Island, Thailand; Ethiopian, Hawaii, Micronesia; South Palaearctic.

Subgenus ***Musca*** Linnaeus

1915. *Promusca* Townsend, *J. Wash. Acad. Sci.*, **5** : 434. Type-species : *Musca domestica* Linnaeus

2. ***Musca (Musca) domestica*** Linnaeus

1758. *Musca domestica* Linnaeus, *Syst. Nat. Ed.*, 10 : 589.

Material examined : 4 ♂ 3 ♀ Sendra, Bishenpur, 21. V. 1993, coll. B. Mitra; 1 ♀, Lahnjo, Churachandpur, 18 V 1993, coll. B. Mitra; 10 ♂ Sendra, Bishenpur, 21. V. 1993, coll. M. Sil.

Diagnosis : Four black vittae on thorax, inner pair terminating towards posterior end; propleural depression with fine setulose hairs; suprasquamal ridge without black setulae; all post dc strong; mid tibia without av and ad setae.

Distribution : Manipur, Andhra Pradesh,

Andaman Islands, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Kashmir, Maharastra, Punjab, Sikkim, Tripura; Cosmopolitan.

Genus ***Orthellia*** Robineau-Desvoidy

1863. *Orthellia* Robineau-Desvoidy, *Hist. nat. Dipt. env. Paris,* **2** : 837.

Type-species : *rectinervis* Robineau-Desvoidy

Key to the species

1. Thorax without prst dc; anterior mesopleural absent; prst acr absent; parafrontalia polished, interfrontalia narrower than parafrontalia in female 2

— Thorax with two pairs of conspicuous prst dc; anterior mesopleural distinct; one pair of strong prst acr present or interfrontallia wider than one parafrontalia in female 3

2. Palpi and antennae brownish orange; bend of m vein subangular, discal cell without hairs, m-m closer to bend than r-m, base of wings yellowish; frons wider than eye..... ..... *lauta* (Wiedemann)

— Palpi and antennae fuscous, at least apical third largely hairy; bend of m vein very broadly and evenly rounded, discal cell more or less extensively haired; frons much narrower than eye ..... *gavisa* (Walker).

3. Thorax with a pair of strong prst acr and 3 pairs of post dc; m with deep behind bend, wing with hairs; antennae black to fuscous, parafrontalia shining blue green; interfrontalia narrower than parafrontalia; frons wide..... ..... *viridis* (Wiedemann).

— Thorax without prst acr; interfrontalia wider than a parafrontale, the later more or less dusted..... *indica* (Robineau-Desvoidy).

3. ***Orthellia gavisa*** (Walker)

1859. *Musca (Neomyia) gavisa* Walker, *J. Proc. Linn. Soc. Lond. Zool.,* **4** : 138.

Material examined : 1 ♂, Moirang, 22. V. 1993, coll. M. Sil.

Distribution : Manipur, Assam, Bihar, Himachal Pradesh, Kashmir, Punjab, Sikkim, Uttar Pradesh, West Bengal; Jawa, Nepal, Pakistan, Simeule Island, Sumatera, Tamaon Island.

4. ***Orthellia indica*** (Robineau-Desvoidy)

1830. *Lucillia indica* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.,* **2** : 453.

Material examined : 1 ♀, Sielmat Reserve Forest, Churachandpur, 17. V. 1993, coll. A. K. Pandit; 1 ♀, Lahnjo, Churachandpur, 18. V. 1993. coll. S. K. Chakraborty; 2 ♂♂, Lahnjo, Churachandpur, 18. V. 1993, coll. M. Sil.

Distribution : Manipur, Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal; Jawa, Laos, Malay, Myanmar, Phillippines, Ryukyu Island, Sumatera, Sumbawa, and Thailand.

5. ***Orthellia lauta*** (Wiedemann)

1830. *Musca lauta* Wiedemann, *Aussereurop. zweifl. Insekt.,* 2 : 410.

Material examined : 2 ♀♀ Gularthol forest, Jiribam, 9 v. 1993, coll. S. K. Chakraborty; 6 ♀♀ 5 ♂♂, Liong, Imphal, 14 V. 1993, coll. B. Mitra; 1 ♂, Sielmat Reserve forest, Churachandpur, 17. V. 1993, coll. M. Sil; 1 ♂, Lahnjo, Churachandpur, 18. V. 1993, coll. B. Mitra; 1 ♀ Lahnjo, Churachandpur, 18. V. 1993, coll. S. K. Chakraborty; 2 ♂♂, Sendra, Bishenpur, 21. V. 1993, coll. M. Sil; 2 ♀♀, Moirang, Bishenpur, 22. V. 1993, coll. B. Mitra; 3 ♂♂, Phubala, Bishenpur, 23. V. 1993, coll. B. Mitra.

Distribution : Manipur, Andaman Islands, Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal; China, East Malayesia, Flores Island, Iran, Jawa, Kalimantan, Laos, Lombok, Malay, Myanmar, Nepal, Pakistan, Phillippines, Ryukyu Island, Sumatera, Sumbawa, Sri Lanka, Taiwan and Thailand; Australia.

6. ***Orthellia viridis*** (Wiedemann)

1824. *Idia viridis* Wiedemann, *Analecta Ent.,* : 50

Material examined : 1 ♂, Loktak, Bishenpur, 24. V. 1993, coll M. Sil.

Distribution : Manipur, Himachal Pradesh, Kashmir, Punjab, Sikkim, Tripura, Uttar Pradesh and West Bengal; China, Nepal, Pakistan; Tibet, Hawaii; Holarctic.

B. Subfamily PHAONIINAE

Genus ***Atherigona*** Rondani

Atherigona Rondani, 1865, *Dipterol. ital. Prodr.*, **1** : 97. Type-Species : *Anthomyia varia* Meigen.

Subgenus ***Atherigona*** Rondani

7. ***Atherigona (Atherigona) reversura*** Villeneuve

1936. *Atherigona reversura* Villeneuve, *Ark. Zool.*, **27** A (36) : 11.

Material examined : 2 ♀♀ 1 ♂, Lahnjo, Churachandpur, 18. V. 1993, coll B. Mitra.

Diagnosis : Fore tibia yellow only on basal quarter to fifth, fore femur darken on apical half; tergite 5th always unmarked, hypopygial prominence with two lateral arms situated on a small knob arising from tergite, and not so broadly separated; trifoliates process with stalk of uniform width shoulders well-developed, median piece rather sinuous or angled at apical quarter in lateral view.

Distribution : Manipur, Andhra Pradesh, Assam, Maharashtra, Sikkim, Tripura, Uttar Pradesh and West Bengal; China, Jawa, Kalimantan, Lombok, Myanmar, Malaya, Philippines, Sri Lanka, Sumbawa; Hawaii, Japan.

C. Subfamily LIMNOPHORINAE

Genus ***Lispe*** Latreille

1796. *Lispe* Latreille, Preciscaract. gen Ins., 169. Type species : *Musca tentaculata* (De Geer)

Key to the species

Legs entirely black, femora with long bristle like hairs on av pv surfaces, hind tibia without av & pv seta ..... *Orientalis* Wiedomann

— Small & slender species; abdomen with broad longitudinal stripe on the middle legs orange, tibia yellow, tarsi at least hind tarsi black; one presutural dc,..... *leucospila* (Wiedemann)

8. ***Lispe leucospila*** (Wiedemann)

1830. *Coenosia leucospila* Wiedemann, *Aussereurop. zweifl. Insekt.*, **2** : 441.

Material examined : 2 ♀♀, Loktak, Bishenpur, 24. V. 1993, coll M. Sil.

Distribution : Manipur, Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal; China, Jawa, Malaya, New Guinea, Pakistan, Philippines, Shri Lanka, Sumatera and Taiwan.

9. ***Lispe orientalis*** Wiedemann

1824. *Lispe orientalis* Wiedemann, *Analecta Ent.*, : 51.

Material examined : 1 ♀, Lahnjo, Churachandpur, 18. V. 1993, coll B. Mitra. 15 ♀♀, 4 ♂♂, Loktak Bishenpur, 24. V. 1993, coll M. Sil; 4 ♂♂, Kangbari, Churachandpur, 20. V. 1993, coll. M. Sil.

Distribution : Manipur, Assam, Bihar, Himachal Pradesh, West Bengal; China, Flores Island, Malaya, Myanmar, Pakistan, Shri Lanka, Sumatera, and Taiwan Japan.

D. Subfamily STOMOXYINAE

Genus ***Stomoxys*** Geoffroy

1762. *Stomoxys* Geoffroy, *Hist. abreg. Ins.* Paris., **2** : 449. Type-species : *calcitrans* (Linnaeus).

10. ***Stomoxys calcitrans*** (Linnaeus)

1758. *Conops calcitrans* Linnaeus, *Syst. Nat., Ed.* 10. **1** : 604.

Material examined : 3 ♀♀, 1 ♂, Moirang, Bishenpur, 22. V. 1993, coll. B. Mitra.

Diagnosis : Propleural depression and hypopleuron embossed with erect setulose hairs; apex of proboscis slender; stpl 0+1; arista pectinate dorsally.

Distribution : Manipur, Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Kerela, Maharashtra, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal; Bali, Bangladesh, China, Jawa, Malaya, Myanmar, Nepal, Pakistan, Philippines, Simeule Island, Sri Lanka, Sulawesi, Sumbawa, Taiwan, Thailand, Vietnam; Cosmopolitan.

DISCUSSION

The muscid fauna (10 species) of Manipur is predominatly Oriental in distribution. Of them four species are distributed in the Palaearctic and one species *Orthellia viridis* also occurs in the Holarctic Region. Among the other five species; *Orthellia lauta* is found also in the Australian Region. Other two species, *Musca (Musca) domestica* and *Stomoxys calcitrans* are cosmopolitan in distribution whereas *Orthellia indica* and *Lispe leucospila* are endemic to the Oriental Region.

ACKNOWLEDGEMENT

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Zool. Surv. India
State Fauna Series 10 : Fauna of Manipur, 509-514, 2004

DIPTERA : TACHINIDAE

A. R. LAHIRI
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

No record of occurrence of a tachinid species in Manipur is available in literature, although a number of them have been reported from erstwhile 'Assam' province and neighbouring Bangladesh by Crosskey (1977) and from the adjacent Tripura state by Lahiri (1999, in press).

The present study is based on tachinid material available in the collection of the Zoological Survey of India, Calcutta these include material received by courtsey of R.T.R.S. (Regional Tashar Research Station), Imphal and those collected in course of faunistic survey of the state undertaken under the leadership of Shri B Mitra (May, 1993).

MATERIAL AND METHOD

Adult tachinid flies were collected, pinned and processed by the method prescribed by Datta, Parui and Mukherjee (1977). A brief account of taxonomically important characters of these insects has been provided by Lahiri (1999).

CLASSIFIED LIST OF SPECIES

Subfamily TACHININAE

Tribe **Tachinini**

1. *Cuphocera varia* (Fabricius)

Tribe **Linnaemyini**

2. *Linnaemya felis* Mesnil

Subfamily GONIINAE

Tribe **Exoristini**

3. *Exorista sorbillans* Wiedemann

Tribe **Sturmiini**

4. *Blepharipa zebina manipurensis subsp. nov.*
5. *Palexorista solennis* (Walker)

SYSTEMATIC ACCOUNT

Family TACHINIDAE

Key to the subfamilies

1. Prosternum bare ..... TACHININAE

   Prosternum setulose ..... GONIINAE

Subfamily TACHININAE

Key to the tribes

1. Hind coxa with fine soft hairs on posterodorsal surface ..... **Tachinini**

   Hind coxa without hairs on posterodorsal surface ..... **Linnaemyini**

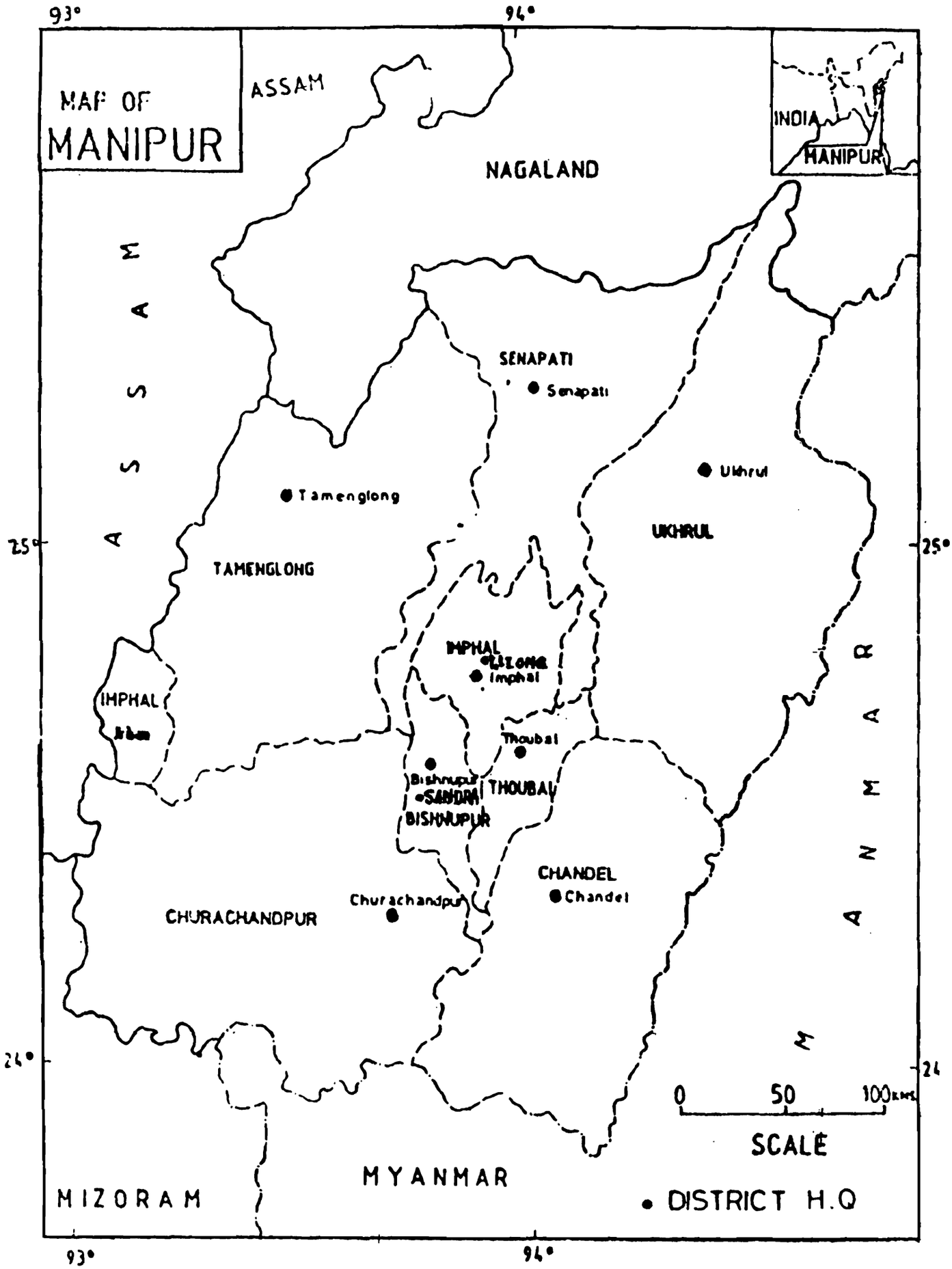
Tribe **Tachinini**

Genus ***Cuphocera*** Macquart

1845. *Cuphocera* Macquart, *Annls. Soc. Ent. Fr. (2),* **3** : 267.

1976. *Cuphocera,* Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.* **28** (Suppl.) : 205.

Diagnostic charecters : Palpi vestigial ; epistome raised ; vibrissae situated a little above epistomal margin ; parafacial armed with two or three strong setae at its lower end. Three *stpl,* three *post ia* and two *sa* setae present, hind coxae haired on posterodorsal surface ; lower calypter large and projecting far beyond upper calypter,


93°
94°
MAP OF
MANIPUR
ASSAM
NAGALAND
INDIA
MANIPUR
ASSAM
SENAPATI
Senapati
Ukhrul
Tamenglong
UKHRUL
25°
TAMENGLONG
IMPHAL
Imphal
IMPHAL
Thoubal
Bishnupur
THOUBAL
BISHNUPUR
CHANDEL
Chandel
Churachandpur
CHURACHANDPUR
MYANMAR
24°
0 50 100kms
SCALE
MIZORAM
MYANMAR
• DISTRICT H.Q
93°
94°

setulae confined on basal node of R_{4+5} ; cell R_5 open ; vein *M* usually without a definite appendix. T_{1+2} without bunch of marginal setae.

Distribution : Australia, China, Europe, New Guinea, Oriental, Philippines.

1. *Cuphocera varia* (Fabricius)

1794. *Musca varia* Fabricius, *Entomologia systematica*, **4** : 327

1976. *Cuphocera varia*, Crosskey, *Bull. Brit Mus. (nat. Hist.) Ent.*, **26** (*Suppl.*) : 205.

Material examined : 1 ex., Imphal district, Lilong (near Imphal), 14.v.1993, coll. *B. Mitra.*

Diagnostic characters : Length 13.00 mm (body), 9.00 mm (wing). Head mostly shiny white but eyes, antennae and interfrons dark, brownish; thorax and abdomen blackish, sides of thorax, base of scutellum and sublateral patches on abdomen pruinosed. Antennae falling 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 *acro*, 4 + 4 *dorso* and 1 + 2 *ia* setae scutellar total 4, subapicals converging, nearly twice as long as apicals which are crossing; about 6 subapical semierect discal scutellar setae. T_{1+2} excavated to hind margin, T_3 and T_4 with a pair of median marginals.

Distribution : India : Manipur (Imphal district), Assam, Kerala, Sikkim, Tamil Nadu, Tripura and West Bengal. Outside India : China, Indonesia, Malaysia, Myanmer, Nepal, New Guinea, Papua, Sri Lanka, Taiwan, Thailand and Queensland.

Tribe **Linnaemyini**

Genus *Linnaemya* Robineau Desvoidy

1830. *Linnaemya* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Sci. Inst. Fr.* **2** : 203.

1976. *Linnaemya*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** (*Suppl.*) : 100.

Diagnostic charecters : Eyes hairy, palpi vestigeal and if present, much shorter than third antennal segment. Hind coxae entirely bare on posterodorsal surface ; 3 *post dc* ; setulae on R_{4+5} confined to basal node or extending half way to *r-m*, bend of vein *M* usually with an M_2 appendix.

2. *Linnaemya felis* Mesnil

1957. *Linnaemya felis* Mesnil, *Mem. Soc. r. ent. Belg.*, **28** : 50.

1976. *Linnaemya felis*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** (*Suppl*). : 204.

Material studied : 1 ex., Churachandpur district, Churachandpur, 18.v.93, coll. *M. Sil.*

Diagnostic charecters : Length : 11.50 mm (body), 10.50 mm (wing). Eyes dark blackish brown, antenna and interfrons palely so ; thorax blackish, sublateral patches of pruinosed white ; scutellum and first two abdominal segments yellow, rest of abdomen black and the black extending middorsally onto nearly base of segment T_3. 2 *prcl* orbitals ; epistome prominent, vibrissae situated a little above epistomal margin ; row of black postocular bristles prominent ; ocellar setae not prominent ; antennae falling short of epistomal margin. 3 humerals situated in a curve with another 3 less prominent ones situated in front of these ; 3+3 *acro*, 3+3 *dorso* and 1+3 *ia* setae, scutellar total 4, apicals crossing, subapicals converging, nearly as long as the apicals ; 2 subapical discal setae ; cell R_5 open; M_2 appendix well developed ; setulae on R_{4+5} extending half way to *r-m.*

Distribution : India : Manipur (Churachandpur district). Outside India : Myanmer.

Subfamily GONIINAE

Key to the tribes

1. Prealar setae short and weak, shorter than the first *post dc* setae and usually also so from the first post ia setae ..... **Exoristini**

   Prelar setae strong, longer than first post dc setae and usually also so than the first post ia setae ..... **Sturmiini**

Tribe **Exoristini**

Genus ***Exiorista*** Meigen

1803. *Exorista* Meigen, *Magazin Insektenk. (Illiger)*, **2** : 280.

1976. *Exirista*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** (Suppl.) : 222.

Diagnostic characters : Facial ridge bare except a few setulae near vibrissae, occipital region flat and without any black setulae ; ocellar setae very strong. Humeral callus usually with four setae ; four *post dc* setae.

Distribution : Old World.

3. ***Exorista sorbillans*** Wiedemann

1830. *Exorista sorbillans* Wiedemann, *Aussereuropaische zweiflugelliege Inseketen*, **2** : 311.

1976. *Exorista sorbillans*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.* **26** *(Suppl.)* : 223.

Material studied : 2 ex., Imphal district, Imphal, 20.X.1991, coll. R.T.R.S. staff.

Diagnostic characters : Length : 13.00 mm (body), 9.00 mm (wing). Generally blackish brown, sides of abdominal segments T_3 and T_4 largely yellow ; face, paraface, parafrons ashy white while thorax and abdomen also variably marked with similar whitish patches. Epistome raised, vibrissae a little above epistomal margin ; one reclinate orbital setae, ocellar setae proclinate ; antennae falling short of epistomal margin. 5 humeral setae of which main 3 are set in a curve ; 3 *stpl*, 3+3 *acro*, 3+4 *dorso* and 1+3 *ia* setae ; scutellar total 5, apical crossing ; subapical much longer, nearly subparallel ; cell R_5 open ; setulae confined to basal node of R_{4+5} ; costal spine not prominent. T_{1+2} excavated to hind margin ; T_3 and T_4 without long marginal setae on apical border.

Distribution : India : Manipur (Imphal district), Assam, Karnatak, Tamil Nadu. Outside India : Malaysia (Malaya), New Guinea.

Tribe **Sturmiini**

Key to the genera

1. Vibrissae situated just above epistomal margin. Small forms (Length body : about 9.50 mm, wing : about 7.50 mm) .... ***Palexorista*** Townsend

   Vibrissae situated well above epistomal margin. Larger forms (Length : Body : about 12.50 mm or more, wing : about 9.50 mm or more) ..... ***Blepharipa*** Rondani

Genus ***Blepharipa*** Rondani

1856. *Blepharipa* Rondani, *Dipterologiae italicae prodromus*, **1** : 71.

1976. *Blepharipa*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** *(Suppl.)* : 235.

Distribution : Molucca, Oriental, Palaearctic, Philippines, Oriental.

4. ***Blepharipa zebina manipurensis*** subsp. nov.

Material studied : Holotype ♂, Imphal district, Imphal, 12-18.vi.1994. coll R.T.R.S. staff (Registration number 8408/H6) ; Allotype ♀, same data as Holotype (Registration number 8409/ H6), Paratype 2♂♂, same data as Holotype (Registration numbers 8410-8411/H6) ; extra limital : Paratype ♂, Tripura (Pulinpara), 10.v 1992, coll. *M. Sil*, identified as *Blepharipa* ? *zebina* Walker (Registration number 8412/H6) ; Paratype ♂, Nagaland (Kohima), 15. iv. 1994, coll. *M. Sil* (Registration number 8413/H6).

Remark : Examples under study from Manipur and other parts of eastern India are hereby described as a distinct subspecies of *Blepharipa zebina* Walker in view of the following differences of characters exhibited by them from published description of the nominate species and its examples present in the collection from Sikkim state :

1. Lower calypter not very closely apposed to (*vs* pressed against) scutellum and base of abdomen.
2. Such disposition of calypter renders base of abdominal segment T_{1+2} exposed and visible (*vs* not visible) in dorsal view.
3. Scutellum extending over basal third (*vs* basal half) of abdominal segment T_{1+2}.

4. Abdomen rather narrow and parallel sided (*vs* relatively broader and more fusiform) ; width of abdomen decidedly less than (*vs* subequal to) length of abdomen.

Distribution : India : Manipur (Imphal district), Nagaland and Tripura.

Genus ***Palexorista*** Townsend

1921. *Palexorista* Townsend, *Insecutor Inscit. Menstr.*, **9** : 134.

1976. *Palexorista*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** *(Suppl.)* 134.

Distribution : Africa, Aru Island, Australia, China, India, Indonesia, Malaya, Micronesia, Nepal, New Britain, New Guinea, Pakistan, Philippines, Sri Lanka, Solomons, Taiwan, Thailand. ? U.S.A.

5. ***Palexorista solennis*** Walker

1858. *Masicera solennis*, Walker, *J. Proc. Linn. Soc. Lond.* **3** : 98.

1976. *Palexorista solennis*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, **26** *(Suppl.)* : 240.

Material studied : 1 ex., Bishnupur district, Sandra, 21.v.1993. coll. *M Sil.* 2 exs. Thango, Bishenpur, 23.v.1993, coll. *M. Sil.*

Diagnostic characters : Length : 9.50 mm (body), 7.50 mm (wing). Head brown, rest of body blackish brown, paraface profrons and parafrons when viewed at certain angle, dorsum of thorax sparingly and basal half of T_3 and T_4 pruinosed white. 4 humerals of which one situated a little ahed of other three, 3+3 *dc*, 3+4 *acro* and *1+3 ia;* 3 *stpl* arranged in a triangle ; 4 scutellar total, subapicals more than twice as long as the crossed apicals, cell R_5 open, setulae confined to basal node of R_{4+5}. T_{3+4} excavated to hind margin.

Distribution : India : Manipur (Bishnupur district), Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Uttar Pradesh. Outside India : Aru Island, Australia, China, Indonesia, Malaysia, Melanesia, Myanmer, Sri Lanka, Thailand, Taiwan, Tongo.

DISCUSSION

Notwithstanding the derth in the number of represented species number, the tachinid fauna of Manipur state incorporates the parasitoid oozy fly *Exorista sorbillans* (Wiedeman) notorious for its destructive role in rearing all silk producing moths Existence of the proposed new subspecies *B. z. manipurensis* in the state is also interesting since the nominate species is widely distributed in many parts of the Indian union and even extends to China and Japan in the east. In considering the commonness of species composition of the state to that of regions outside manipur state, it is noticed that the same is most pronounced to Indo-Chinese and Indo-Malayan countries (4 out of 5 species, i.e. 80%) followed by South India (3 out of 5 species, i.e., 60%). It is however noteworthy that all the five tachinid species known from the state appear to be concentrated in the central basin with the hill tracts around the central basin practically devoid of any representative.

SUMMARY

One new subspecies, viz., *Blepharipa zebina manipurensis* has been described from Manipur state of the Indian union and four other species, viz., *Cuphocera varia* (Fabricius), *Linnaemyia felis* Mesnil, *Palexorista solennis* (Walker) and *Exorista sorbillans* Wiedemann have newly been recorded from the area. Keys for identification, diagnostic characters for various taxa and their outline distribution have been provided in the text.

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INSECTA : LEPIDOPTERA

MRIDULA MAJUMDAR (CHAUDHURY)
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

A consolidated systematic account of butterflies and moths of the five families of lepidoptera, viz., Pieridae, Hesperiidae, Arctiidae, Ctenuchidae and Hypsidae from the state of Manipur has been provided. The study is based on the material brought during 1975-93 by twelve faunistic survey parties of Zoological Survey of India. Altogether 42 species in 26 genera have been recorded new for the state, of which the break-up may be shown as 10 species and subspecies in 5 genea of Pieridae, 4 species and subspecies in 4 genera of Hesperiidae, 8 species in 3 genera of Ctenuchidae, 20 species in 13 genera of Arctiidae and one species in one genus of Hypsidae. Besides, one species of Pieridae, 48 species of Hesperiidae and 5 species of Arctiidae from Manipur have been reviewed from literature *vide* Butler (1885), Cotes & Swinhoe (1887-89), Swinhoe (1903), Roepke (1944), Wynter-Blyth (1957), Barlow (1982), Arora & Chaudhury (1982), Arora (1983) and Arora et al 1992; such species have been appended at the end of the article. The system for different families under study has been followed after Hampson (1892, 1894, 1898, 1900, 1901, 1914), Talbot (1939) and Evans (1949).

SYSTEMATIC ACCOUNT

List of Taxa

Order LEPIDOPTERA
Suborder RHOPALOCERA
Family PIERIDAE
Subfamily PIERINAE
Genus ***Delias*** Hübner

Genus ***Pieris*** Schrank

2. *P. napi* (Linnaeus)
2a. *P. napi ajaka* Moore
2b. *P. napi montana* Verity
3. *P. canidia* (Sparrman)
3a. *P. canidia canis* Evans
4. *P. brassicae* (Linnaeus)
4a. *P. brassicae nepalensis* Doubleday

Genus ***Appias*** Hübner

5. *A. lyncida* (Cramer)
5a. *A. lyncida eleonora* (Boisduval)

Subfamily COLIADINAE

Genus ***Eurema*** Hübner

6. *E. hecabe* (Linnaeus)
6a. *E. hecabe contubernalis* (Moore)
7. *E. laeta* (Boisduval)
7a. *E. laeta laeta* (Boisduval)

Genus ***Catopsilia*** Hübner

8. *C. crocale* (Cramer)
8a. *C. crocale crocale* (Cramer)
9. *C. florella* (Fabricius)
9a. *C. florella gnoma* (Fabricius)

Family HESPERIIDAE
Subfamily HESPERIINAE
Group PLASTINGIA

Genus ***Erionota*** Mabille

10. *E. thrax* (Linnaeus)

Group TARACTOCERA

Genus ***Telicota*** Moore

11. *T. ancilla* Herrich Schäffer

11a. *T. ancilla bambusae* (Moore)

Group GEGENES

Genus ***Parnara*** Moore

12. *P. guttatus* (Bremer & Grey)

Genus ***Polytremis*** Mabille

13. *P. discreta* (Elwes & Edwards)

13a. *P. discreta discreta* (Elwes & Edwards)

Suborder HETEROCERA

Family CTENUCHIDAE

Genus ***Ceryx*** Wallengren

14. *C. imaon* (Cramer)

15. *C. godartii* (Boisduval)

Genus ***Syntomis*** Ochsenheimer

16. *S. sperbius* (Fabricius)

17. *S. passalis* (Fabricius)

18. *S. malaena* (Walker)

19. *S. vitrea* Walker

Genus ***Eressa*** Walker

20. *E. subaurata* (Walker)

21. *E. multigutta* (Walker)

Family ARCTIIDAE

Subfamily LITHOSIINAE

Genus ***Garudinia*** Moore

22. *G. simulana* (Walker)

Genus ***Padenia*** Moore

23. *P. transversa* (Walker)

Genus ***Chrysorabdia*** Butler

24. *C. bivitta* (Walker)

Genus ***Eilema*** Hübner

25. *E. tetragona* (Walker)

Genus ***Teulisna*** Walker

26. *T. plagiata* Walker

Genus ***Agylla*** Walker

27. *A. divisa* (Moore)

28. *A. alboluteola* Rothschild

Genus ***Cyana*** Walker

29. *C. signa* (Walker)

30. *C. catorhoda* Hampson

31. *C. bellissima* (Moore)

32. *C. dudgeoni* Hampson

Genus ***Asura*** Walker

33. *A. dasara* (Moore)

34. *A. undulosa* (Walker)

35. *A. strigipennis* (Herrich-Schaffer)

Genus ***Miltochrista*** Hübner

36. *M. cruciata* (Walker)

37. *M. cuneonotata* (Walker)

Genus ***Oeonistis*** Hübner

38. *O. entella* (Cramer)

Subfamily NYCTEMERIINAE

Genus ***Dilemera*** Hübner

39. *D. arctata* (Walker)

Genus ***Nyctemera*** Hübner

40. *N. adversata* (Schaller)

Subfamily SPILOSOMINAE

Genus ***Phissama*** Moore

41. *P. transiens* (Walker)

Family HYPSIDAE

Genus ***Hypsa*** Hübner

42. *H. heliconia* (Linnaeus)

Key to Suborders of the Order LEPIDOPTERA

Antennae knobbed or hooked; frenulum absent .....*Rhopalocera* (Butterflies)

— Antennae rarely knobbed; frenulum present .....*Heterocera* (Moths)

Suborder RHOPALOCERA

Key to the Families of the Suborder RHOPALOCERA

Forewing vein R_5 stalked; antennae approximate at the base .....PIERIDAE

— Forewing vein R_5 not stalked; antennae wide apart at base and often with hooked club.... .....HESPERIIDAE

Family PIERIDAE

Key to the Subfamilies of the Family PIERIDAE

Palpi always with hair; hindwing with well developed precostal vein curved distal..... .....PIERINAE

— Palpi without hair; hindwing without precostal vein or very short directed basal ....COLIADINAE

Subfamily PIERINAE

Key to the Genera of the Subfamily PIERINAE

1. Forewing with vein R_2; underside of hindwing not marked with yellow or red 2

— Forewing without vein R_2; underside of hindwing marked with yellow or red ....***Delias*** Hübner

2. Forewing vein R_3 emitted from $R_4 + R_5$ very close to apex, stalk long .....*Pieris* Schrank

— Forewing vein R_3 emitted from $R_4 + R_5$ further from apex, stalk short.....***Appias*** Hübner

Genus ***Delias*** Hübner

1819. *Delias* Hübner, *Verz. bek. Schmett.*, (6) : 91.

1. ***Delias pasithoe*** (Linnaeus)

1767. *Papilio pasithoe* Linnaeus, *Syst. Nat. ed. xii*, p. 755.

1988. *Delias pasithoe :* Nandi & Vershney, *Rec. zool. Surv. India*, **85** (1) : 123.

Diagnostic characters : Forewing ground colour black, with submerginal greyish white and distally short-streaked spots and also a round opalescent white discocellular spot; hindwing discal band greyish white, posteriorly merged with large bright yellow inner area and underside dark red subbasal band from costa to inner margin.

Material examined : 1 ex., Manipur, Imphal, 12.xi.1983 (Coll. S.K. Gupta & B.C. Saha); 2 exs., Imphal, Iroisemba, 30.xi.1992 (Coll. P.H.Roy & Party); 1 ex., Churachandpur, Mairang, 7.iv.1992. 3 exs. Bishnupur, 21.ii.1993 (Coll. S.K. Saha & Party); 1 ex., Kongpokpi, 30.iii.1992 (Coll. K.K. Roy & Party).

Distribution : India (Manipur). Nepal to Lower Myanmar; also Thailand and Tonkin.

Status : Not rare.

Genus ***Pieris*** Schrank

1801. *Pieris* Schrank, *Fauna Boica*, : 152.

Key to the Species of the Genus *Pieris* Schrank

1. Hindwing underside with well defined black veins .....*napi* (Linnaeus)

— Hindwing underside with vein not defined with black 2

2. Forewing upperside with black area dentate at inner edge .....*canidia* (Sparrman)

— Forewing upperside with black area not dentate at inner edge .....*brassicae* (Linnaeus)

2. ***Pieris napi*** (Linnaeus)

1758. *Pieris napi* Linnaeus, *Syst. Nat. ed x.*, : 468.

1971. *Pieris napi :* Varshney & Chanda, *Indian Mus. Bull.*, **6** (1) : 48.

Key to the Subspecies of the Species *Pieris napi* (Linnaeus)

Forewing spot in area Cula shorter and spot in 2A forming a bar to inner margin; upperside markings inconspicuously black in male..... .....*P. napi ajaka* Moore

—Forewing spot in area Cula longer and spot in 2A continued in a broad streak along inner margin to base; upperside markings conspicously black in male ....*P. napi montana* Verity

2. ***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.

Material examined : 1 ex., Ukhrul Sheroi Roadside, 14.xii.-1992 (Coll. A.R. Lahiri & Party).

Distribution : India (Manipur, Punjab, Uttar Pradesh). Pakistan.

Status : Common.

2b. ***Pieris napi montana*** Verity

1908. *Pieris melete* var *montana* Verity, *Rhopalocera Palaearctica* : 141, pl. 31, figs. 20-21.

1939. *Pieris napi montana*, Talbot, *Fauna Brit. India, Butterflies*, **1** : 420-421.

Material examined : 3 exs., Songsing, Area Mao, 13.iv.1975 (Coll. M.S. Shishodia & Party), 1 ex., between Ukhral and Thaval River, 12.xii.1992 (Coll. A.R. Lahiri & Party).

Distribution : India (Manipur, Meghalaya, Sikkim to Southern States). Perak.

3. ***Pieris canidia*** (Sparrman)

1768. *Papilio canidia* Sparrman, *Amoen. Acad.*, **1** : 504.

1971. *Pieris canidia;* Varshney & Chanda, *Indian Mus. Bull.*, **6** (1) : 48.

3a. ***Pieris canidia canis*** Evans

1912. *Pieris canidia canis* Evans, *J. Bombay nat. Hist. Soc.* : 559, 976.

1939. *Pieris canidia canis* : Talbot, *Fauna Brit. India, Butterflies*, **1** : 425-426.

Diagnostic characters : Forewing ground colour white, apical black patch entering in area M_2 as a short spur, inner edge of marginal black border dentate and a prominent black spot in area Cula; hindwing with marginal black spot and a costal spot.

Material examined : 2 exs., Jintan, 11.iii.1975 (Coll. P. T. Cherian & Party), 1 ex., Mao North, 14.ix.1975, 5 exs., Horticulture Farm, Ukhrul, 30.ix.1975 (Coll. M.S. Shishodia & Party); 4 exs., Imphathang River nr. Mahaballi Temple, 29.ii.1992, 5 exs., Imphal, Golabothi Basti, 30.iii.1992, 2 exs., Churachandpur, Khowperibung Village, 1.iv.1992, 2 exs., Sunushipha near Loktak Lake, 2.iv.1992, 9 exs., Chajing Village, Kingpopi, Imphal, 6.iv.1992, 2 exs., Wino Bazar, Ukhrul, 9.iv.1992, 3 exs., Green Village, Ukhrul, 9.iv.1992 (Coll. A.K. Hazra & Party); 6 exs., Churachandpur, Singhat, 6.iv.1992, 2 exs., Bishnupur, Mairang, 7.iv.1992, 1 ex., Bishnupur, 8.iv.1992 (Coll. S. K. Saha & Party); 5 exs., Imphal, Chajing, Kangpopi, 25 km. away from Imphal towards Senapati, 6.iv.1992, 1 ex., St. Thomas School Campus, Uttar Humdung, Ukhrul, 8.iv.1992 (Coll. A.K. Sanyal & Party); 3 exs., Churachandpur, near Reserve Forest, 11.xii.1992, 2 exs., Village Area, Churachandpur, 12.xii.1992 (Coll. P.H. Roy & Party), 1 ex., Imphal, Andro, 27.xii.1992, 3 exs., Imphal, Hanuman Mandir, 29.xii.1992 (Coll. R.S. Mirdha & Party); 2 exs., Kongpokri, Senapati, 17.iii.1993, 3 exs., Keibul, Lamiao, National Park, Bishnupur, 23.iii.1993, 1 ex., Bijangreengs, Churachandpur, 26.iii.1993, 3 exs., Mamangeikul, Churachandpur, 27.iii.1993 (Coll. D.K. Mandal & Party); 2 exs., Kharasom, 19.vi.1993, 3 exs., Sikamae Village, Mao, 20.iv.1993 (Coll. R.S. Barman & Party).

Distribution : India (Manipur, Meghalaya, West Bengal, South India and Nilgiris).

Status : Common.

4. ***Pieris brassicae*** (Linnaeus)

1758. *Papilio brassicae* Linnaeus, *Syst. Nat. edx.* : 467.

1971. *Pieris brassicae* : Varshney & Chanda, *Indian Mus. Bull.*, **6** (1) : 48.

4a. ***Pieris brassicae nepalensis*** Doubleday

1864. *Pieris brassicae* var. *nepalensis* Doubleday, Westwood and Hewitson, *Genera of Diurnal Lepidoptera*, **1** : 9, pl. VI.

1939. *Pieris brassicae nepalensis* : Talbot, *Fauna Brit. India, Butterflies*, **1** : 427-428.

Material examined : 2 exs., Awantong, Ukhrul, 6000 ft., 5.iii.1975 (Coll. P.T. Charian & Party); 2 exs., I.B. Compound, 6200 ft. 1.x.1975 (coll. M.S. Shishodia & Party); 1 ex., Kongpokri, Dist. Senapati, 850 m., 10.iv.1992 (Coll. D.K. Mandal & S.K. Ghosh).

Distribution : India (Manipur, Meghalaya, Assam, West Bengal and Plains adjoining the

East Himalayas, including Sikkim. Further extending into Tibet and Yunnan from Baluchistan and Chitral.

Status : Very common.

Genus ***Appias*** Hübner

1819. *Appias* Hübner, *Verz. bek. Schmett.*, : 91.

5. ***Appias lyncida*** (Cramer)

1777. *Papilio lyncida* Cramer, *In* Cramer, *Vitl. Kapellen*, **2** (II) : 52.

1971. *Appias lyncida* : Varshney & Chanda, *Indian Mus. Bull.*, **6** (1) : 45.

5a. ***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.

Diagnostic characters : Male Forewing dorsally white with black dusted costal area, marginal black border dentate and ventrally broad apical black area with a subspecial yellow oval spot in area M_1; Hindwing : dorsally white with marginal black area and ventrally yellow except marginal area.

Material examined : 1 ex., 3 km. Moreh West, Alt. 2000 m., 27.ix.1975 (Coll. M.S. Shishodia), 1 ex., 5 km. West of Kongpokri, Dist. Senapati, 1250 m., 11.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, West Bengal and Sikkim). Also Myanmar, extending to Hainan, Tonkin, Thailand and Annam.

Status : Common.

Subfamily COLIADINAE

Key to the Genera of the Subfamily COLIADINAE

Hindwing precostal vein absent or obsolete; underside of forewing without tuft on inner area ..... ***Eurema*** Hübner

— Hindwing precostal vein thick; underside of forewing with a tuft on inner area ..... ***Catopsilia*** Hübner

Genus ***Eurema*** Hübner

1899. *Eurema* Hübner, *Verz. bek. Schmett.*, (6) : 96.

Key to the Species of the Genus *Eurema* Hübner

Forewing dorsally with black border not extending to vein 1A and ventrally both wings with large discocellular ring spots .... *hecabe* (Linnaeus)

—Forewing dorsally with black border extending to vein 1A and ventrally both wings without discocellular ring spot .... *laeta* (Boisduval)

6. ***Eurema hecabe*** (Linnaeus)

1758. *Papilio hecabe* Linnaeus, *Syst. Nat. edx;* : 470.

1986. *Eurema hecabe :* Ghosh & Chaudhury, *Rec. zool. Surv. India*, **84** (1-4) : 117.

6a. ***Eurema hecabe contubernalis*** (Moore)

1886. *Terias contubernalis* Moore, *Linn. Soc. Lond. Zool.*, p. 46.

1939. *Eurema hecabe contubernalis* : Talbot, *Fauna Brit. India, Butterflies*, **1** : 527-530.

Material examined : 1 ex., Turibari, 5 km. West of Kongpokri, Dist. Senapati, 1250m., 8.xi.1992, 1 ex., Uchathal, 5 km. of Jiribam, dist. Imphal, 1175m, 28.xii.1992 (Coll. A.K. Mandal & Party); 2 exs., Malsa, 25.xii.1992 (Coll. R. S. Mirdha & Party); 1 ex., Churachandpur, Turibag, 25.iii.1993 (Coll. D.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, Assam, West Bengal and Gujarat). Myanmar, Malaya Penisula and Singapore.

Status : Very common.

7. ***Eurema laeta*** (Boisduval)

1836. *Terias laeta* Boisduval, *Spec. Gen. Lep.*, **1** : 673.

1984. *Eurema laeta :* Ghosh & Chaudhury, *Rec. zool. Surv. India*, **84** (1-4) : 117.

7a. ***Eurema laeta laeta*** (Boisduval)

1856. *Terias laeta* Boisduval, *Spec. Gen. Lep.* **1** : 674.

1990. *Eurema laeta laeta* : Ghosh, Mandal & Chaudhury, *Rec. zool, Surv. India*, **86** (1) : 22.

Material examined : 1 ex., Moreh, 2 km. South of P.W.D. I.B., 28.xii.1992 (Coll. J.R. Singh).

Distribution : India (Manipur, Meghalaya, West Bengal, up to Western Himalayas). Also SriLanka.

Status : Very common.

Genus ***Catopsilia*** Hübner

1819. *Catopsilia* Hübner, *Verz. bek. Schmett.*, **7** : 98.

Key to the species of the Genus *Catopsilia* Hübner

Wings ventrally not marked with red brown strigae and hindwing with a large discocellular prominent silver centred spot..... .....*crocale* (Cramer)

—Wings ventrally marked with red brown strigae and hindwing spot.....*florella* (Fabricius)

8. ***Catopsilia crocale*** (Cramer)

1775. *Papilio crocale* Cramer, *Syst. Ent.*, **1** : 87, pl. 55, figs. C&D.

1939. *Catopsilia crocale :* Talbot, *Fauna Brit. India, Butterflies*, **1** : 490-491.

8a. ***Catopsilia crocale crocale*** (Cramer)

1775. *Papilio crocale* Cramer, *Pap. Exot.*, **1** : 87, pl. 55, figs. C&D.

1990. *Catopsilia crocale crocale* : Ghosh, Mandal & Chaudhury, *Rec. zool. Surv. India*, **86** (1) : 20.

Material examined : 1 ex., Churachandpur, Longjenmanbi, 16.vi.1993 (Coll. R.S. Barman & Party).

Distribution : India (Manipur, Meghalaya, West Bengal and Andaman Islands). Extending to South China, Myanmar, Sumatra, Java and Sri Lanka.

Status : Common but rare in Andaman Islands.

9. ***Catopsilia florella*** (Fabricius)

1775. *Papilio florella* Fabricius, *Syst. Nat.* : 479.

1971. *Catopsilia florella* : Varshney & Chanda, *Indian Mus. Bull.*, **6** (1) : 53.

9a. ***Catopsilia florella gnoma*** (Fabricius)

1776. *Papilio gnoma* Fabricius, *Syst. Ent.*, : 828.

1993. *Catopsilia florella gnoma :* Ghosh, Mandal & Chaudhury, *Butterflies and Moths of Indian Tiger Reserves*, edited by Director, Z.S.I., p. 2.

Material examined : 1 ex., Saikat, *ca* 11 km. East of Churachandpur, 19.xii.1992 (Coll. R.S. Mirdha & Party).

Distribution : India (Manipur, West Bengal, N.W. Himalayas, Tamil Nadu and Andaman Islands), Sri Lanka and Myanmar.

Status : Rare in Andaman Islands. Elsewhere common.

Family HESPERIIDAE

Subfamily HESPERIINAE

Key to the groups of the Subfamily HESPERINAE

1. Antennal club not constricted before the apiculus; M2 of forewing straight at origin; M_2 of hindwing well marked ....PLASTINGIA-Group

— Antennal club constricted before the apiculus; M_2 of forewing decurved at origin; M2 of hindwing not traceble 2

2. Apiculus absent or minute; fascies yellowish orange; forewing with dorsal white spots ....TARACTOCERA-Group

— Apiculus present, prominent and right angled; fascies dark brown; forewing with dorsal hyaline spots.....GEGENES-group

***Plastingia*-Group**

Genus ***Erionota*** Mabille

1878. *Erionota* Mabille, *Ann. Soc. Ent. Belg.*, **21** : 34.

10. ***Erionota thrax*** (Linnaeus)

1867. *Papilio thrax* Linnaeus, *Syst. Nat.* **1** : 794.

1949. *Erionota thrax :* Evans, *A catalogue of Hesperiidae from Europe, Asia and Australia, Birt. Mus. Nat. Hist.*, p. 387.

10a. ***Eionota thrax thrax*** (Linnaeus)

1867. *Papilio thrax* Linnaeus, *Syst. Nat,* **1** : 794.

1949. *Erionota thrax thrax* : Evans, *A catalogue of Hesperiidae from Europe, Asia and Australia, Brit. Mus. nat. Hist.*, p. 327.

Diagnostic characters : Antennae with only basal half or two thirds of club white in both sexes; forewing dorsally with 5 mm. long cell spot and ventrally with a pale area over the space between Cu_{1a} and $Cu_{1b,}$ apex acute and termen straight in both sexes and 1A equal to R_S.

Material examined : 1 ex., C.R.P. Campus, nr. Churachandpur, 850m., 20.ix.1975, 1ex., nr. Churachandpur East, 950m., 21.ix.1975 (Coll. M.S.Shishodia & Party); 1 ex., Churachandpur Forest Rest House, 7.xi.1992 (Coll. S.K. Saha).

Distribution : Oriental region including Manipur, Sikkim, Assam and West Bengal.

Taractocera Group

Genus ***Telicota*** Moore

1881. *Telicota* Moore, *Lep. Ceyln.*, **1** : 169.

11. ***Telicota ancilla*** Herrich-Schaffer

1869. *Telicota ancilla* Herrich-Schaffer, *Stutt. Ent. Ztg.* p. 79.

1949. *Telicota ancilla* : Evans, *A Catalogue of Hesperridae from Europe, Asia and Australia, Brit. Mus. nat. Hist.*, p. 397.

11a. ***Telicota ancilla bambusae*** (Moore)

1878. *Pamphila bambusae* Moore, *Proc. Zool. Soc. Lond.*, p. 691.

1949. *Telicota ancilla bambusae :* Evans, *A Catalogue of Hesperiidae from Europe, Asia and Australia, Brit. Mus. nat. Hist.*, p. 397.

Diagnostic characters : Forewing : ventrally black spot at apex not conspicuous, origin of vein Cu_{1a} not nearer to origin of vein Cu_{1b} than to origin of vein M_3 in male.

Material examined : 1 ex., Manipur, Sokamoe village, Mao, 20.vi.1993 (Coll. R.S. Barman & Party).

Distribution : Oriental region including Manipur, Sikkim, Assam, West Bengal, Orissa, South India, Madhya Pradesh and N.W. Himalayas.

Gegenes Group

Key to the Genus of the group *Gegenes*

Antennae shorter than half costa and with more segments of nudum on club than on apiculus ..... ***Parnara*** Moore

— Antennae longer than half costa and equal segments of nudum on apiculus and club.... ..... ***Polytremis*** Mabille

Genus ***Parnara*** Moore

1881. *Parnara* Moore, *Lep. Ceyln.*, **1** : 166.

12. ***Parnara guttatus*** (Bremer & Grey)

1853. *Eudamus guttatus* Bremer & Grey, *Schmett. N. China,* : 10.

1949. *Parnara guttatus :* Evans, *A Catalogue of Hesperiidae from Europe, Asia and Australia in Brit. Mus. nat. Hist.*, : 433.

Material examined : 1 ex., Songsong Area, Mao, 13.ix.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, N.W.Himalayas). N. China, Japan, Korea and Linkin Island.

Genus ***Polytremis*** Mabille

1904. *Polytremis* Mabille, *In Wytsmans Genera Insectorum,* **17** : 136.

13. ***Polytremis discreta*** (Elwes & Edwards)

1897. *Parnara discreta* Elwes & Edwards, *Trans. Zool. Soc. London,* **14** : 282, fig. 16.

1949. *Polytremis discreta* : Evans, *A catalogue of Hesperiidae from Europe, Asia and Australia in Brit. Mus. nat. Hist.*, : 447.

13a. ***Polytremis discreta discreta*** (Elwes & Edwards)

1897. *Parnara discreta* Elwes & Edwards, *Trans. Zool. Soc. London,* **14** : 282, fig. 16.

1949. *Polytremis discreta discreta :* Evans, *A Catalogue of Hesperiidae from Europe, Asia and Australia in Brit. Mus. nat. Hist.*, : 447.

Material examined : 1 ex., Imphal Inspection Bunglow, 2.x.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, Assam and N.W. Himalayas). Myanmar, North Thailand, Malaya and China.

Suborder HETEROCERA

Key to the Families of the Suborder HETEROCERA

1. Hindwing with vein Sc + R_1 aborted .... CTENUCHIDAE
- Hindwing with vein Sc + R_1 2
2. Hindwing vein Sc + R_1 arising out of vein R_S ..... ARCTIIDAE
— Hindwing vein Sc + R_1 connected with vein R_S by a bar or touching it near middle of cell ..... HYPSIDAE

Family CTENUCHIDAE

Key to the Genera of the Family CTENUCHIDAE

1. Hindwing without Cu_{1a} ..... *Ceryx* Wallengren
— Hindwing with Cu_{1a} 2
2. Hindwing M_2 arising from lower angle of cell or stalked with Cu_{1a} .... *Syntomis* Ochsenheimer
— Hindwing M_2 arising well above angle of cell and not stalked with Cu_{1a} ..... *Eressa* Walker

Genus ***Ceryx*** Wallengren

1863. *Ceryx* Wallengren, *Wien, Ent, Mon.*, **7** : 140.

Key to the Species of the Genus *Ceryx* Wallengren

Hindwing with broad terminal black band extending nearly to cell ..... *imaon* (Cramer)
— Hindwing with narrow terminal black band ..... *godartii* (Boisduval)

14. ***Ceryx imaon*** (Cramer)

1780. *Sphinx imaon* Cramer, *Papil. Exot.*, **3** : 94, pl. 248, fig. E.

1992. *Ceryx imaon;* Arora, Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 11.

Material examined : 1 ex., Imphal, 800m., at light, 23.iii.1992 (Coll. D.K. Mandal & S.K. Ghosh), 4 exs., Tamenglong Dist., Tamenglong, 20.xi.1992 (Coll. A.K. Mandal & Party), 4 exs., Nambel, 1.iv.1993 (Coll. K.K. Roy & Party), 1 ex., Circuit House, Churachandpur, 19.v.1993 (Coll. M. Sil).

Distribution : India (Manipur, Assam, Meghalaya, Sikkim, West Bengal, Kashmir, Himachal Pradesh, Maharashtra (Bombay), Tamil Nadu (Nilgiris). Indonesia, SriLanka and Myanmar.

15. ***Ceryx godartii*** (Boisduval)

1829. *Syntomis godartii* Boisduval, *Mon. Zyg.*, p. 115, pl. 7, fig. 3.

1992. *Ceryx godartii :* Arora, Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 10-11.

Material examined : 1 ex., Churachandpur East, 21.ix.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Sikkim, Assam, Arunachal Pradesh, West Bengal and South India). SriLanka, Myanmar, Malaya and Sumatra.

Genus ***Syntomis*** Ochsenheimer

1808. *Syntomis* Ochsenheimer, *Eurr. Schmett.*, **2** : 103.

Key to the Species of the Genus *Syntomis* Ochsenheimer

1. Abdomen with two bands .... *sperbius* (Fabricius)
— Abdomen with more than two bands 2
2. Frons black, abdomen with cupreous red band ..... *passalis* (Fabricius)
— Frons white, abdomen with orange bands .. 3
3. Forewing with hyaline streak between vein M_2 and M_3, the veins and margin purplish black, inner margin of hindwing not orange ..... *malaena* (Walker)
— Forewing without hyaline streak between vein M_2 and M_3, the veins and margin not black, inner margin of hindwing orange .... *vitrea* Walker

16. ***Syntomis sperbius*** (Fabricius)

1787. *Zygaena sperbius* Fabricius, *Mant. Ins.*, **2** : 103.

1898. *Syntomis sperbius :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **1** : 106.

Material examined : 1 ex., Uchathal, 175m., 5 km. East of Jiribam, Imphal, 28.xi.1992 (Coll. A.K. Mandal).

Distribution : India (Manipur, Meghalaya, Assam, Sikkim). Also Myanmar.

17. ***Syntomis passalis*** (Fabricius)

1781. *Zygaena passalis* Fabricius, *Spec. Ins.*, **2** : 159.

1898. *Syntomis passalis :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **1** : 86.

Material examined : 1 ex., Ukhral, 14.vi.1993 (Coll. R.S. Barman & Party).

Distribution : India (Manipur, Assam, Calcutta, Karnataka and Tamil Nadu). Also SriLanka.

18. ***Syntomis malaena*** (Walker)

1854. *Syntomis melas* Walker, *List Lep. Insect Brit. Mus.*, **1** : 133.

1898. *Syntomis malaena :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **1** : 96.

Material examined : 2 exs., Manipur, Churachandpur East, 21.ix.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, West Bengal, N.W. Himalayas, Uttar Pradesh). Also China.

19. ***Syntomis vitrea*** Walker

1856. *Syntomis vitrea* Walker, *List Lep. Insect Brit. Mus.*, **7** : 1594.

1898. *Syntomis vitrea :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **1** : 90-91.

Material examined : 1 ex., Missionary School, Ukhrul, 6202 m., 8.x.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Assam). Also Myanmar.

Genus ***Eressa*** Walker

1854. *Eressa* Walker, *List Lep. Het. Brit. Mus.*, **1** : 149.

Key to the Species of the Genus *Eressa Walker*

Antennae of male bipectinate, abdomen with dorsal, ventral and lateral series of orange spots ..... *subaurata* (Walker)

— Antennae of male serrate, abdomen dorsally with blue black short band and lateral series of spots ..... *multigutta* (Walker)

20. ***Eressa subaurata*** (Walker)

1854. *Glaucopis subaurata* Walker, *List Lep. Het. Brit. Mus.*, **1** : 149.

1898. *Eressa subaurata :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **1** : 117.

Material examined : 1 ex., Circuit House, Churachandpur, 21.iii.1993, (at light), (Coll. D.K. Mandal & S.K. Ghosh).

Distribution : India (Manipur, Meghalaya, West Bengal). Also Sri Lanka.

21. ***Eressa multigutta*** (Walker)

1854. *Syntomis multigutta* Walker, *List Lep. Het. Brit. Mus.*, **1** : 134.

1992. *Eressa multigutta :* Arora, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 16.

Material examined : 1 ex., Missionary School, Ukhrul, 8.x.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Sikkim, Arunachal Pradesh). China, Tibet, Nepal and Myanmar.

Family ARCTIIDAE

Key to the Subfamilies of the Family ARCTIIDAE

1. Body stoutly built in one or both sexes, hindwing moderately large 2

— Body slenderly built in one or both sexes, hindwing uncommonly large ..... LITHOSIINAE

2. Wings usually white, antennae always bipectinate in male ..... NYCTEMERINAE

— Wings usually blackish, antennae of variable texture in male ..... SPILOSOMINAE

Subfamily LITHOSIINAE

Key to the genera of the Subfamily LITHOSIINAE

1. Forewing without vein M_2 2
— Forewing with vein M_2 6
2. Forewing vein R_3 absent, hindwing vein M_2 present 3
— Forewing vein R_3 present, hindwing vein M_2 absent 4
3. Forewing vein M_1 free, R_4-R_5 stalked or R_4 absent ..... ***Garudinia*** Moore
— Forewing vein M_1 stalked with R_4-R_5 ..... ***Padenia*** Moore
4. Hindwing with the cell open, a recurrent vein in the cell ..... ***Chrysorabdia*** Butler
— Hindwing with the cell closed, no recurrent vein in the cell 5
5. Forewing in male with secondary sexual character or both wing without secondary sexual character ..... ***Eilema*** Hübner
— Both wings in male with secondary sexual character ..... ***Teulisna*** Walker
6. Forewing with areole ..... ***Agylla*** Walker
— Forewing without areole 7
7. Forewing vein R_3-R_5 stalked in female, R_3-R_4 absent in male ..... ***Cyana*** Walker
— Forewing vein R_3-R_5 stalked in both sexes 8
8. Forewing vein R_1 anastomosing with SC, hindwing R_5-M_1 stalked ..... ***Asura*** Walker
— Forewing vein R_1 free 9
9. Forewing vein Cu_{1b} oblique, hindwing vein R_5-M_1 on a long stalk ..... ***Miltochrista*** Hübner
— Forewing vein Cu_{1b} strongly curved at base, hindwing R_5-M_1 shortly stalked ..... ***Oeonistis*** Hübner

Genus ***Garudinia*** Moore

1882. *Garudinia* Moore, *Lep. Ceylon.*, **2** : 59.

22. ***Garudinia simulana*** (Walker)

1863. *Tospitis simulana* Walker, *List Lep. Het. Brit. Mus.*, **28** : 429.

1983. *Garudinia simulana :* Arora, *Rec. Zool. Surv. India, Occ. Paper,* No. **60** : 20-21.

Diagnostic characters : Forewing white with purplish black antemedial patch from middle of cell to inner margin, rounded above, an oblique band from costa beyond middle, its inner edge sinuous, its outer side slightly excised below costa and below vein M_1 : hindwing fuscous, cilia white.

Material examined : 1 ex., Tamenglong Dist., Tamenglong, 1280m., 21.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Gt. Nicobar Island). Indonesia (Borneo and Java), Malayasia (Sarawak).

Genus ***Padenia*** Moore

1882-83. *Padenia* Moore, *Lep. Ceylon.* **2** : 58-59.

23. ***Padenia transversa*** (Walker)

1854. *Cyllene transversa* Walker, *List Lep. Het. Brit. Mus.*, **2** : 544.

1983. *Padenia transversa :* Arora, *Rec. zool, Surv. India, Occ. Paper* No. **60** : 22.

Diagnostic characters : Yellowish white, patagia and thorax with metallic purplish black patches, legs orange yellow; forewing with antemedial purplish black band and another from costa to beyond middle, underside of male costal fold orange with dark spot on it and fuscous suffusion on terminal area; hindwing fringe of hair brown.

Material examined : 1 ex., Tamenglong Dist., Tamenglong, 1280m., 24.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Tamil Nadu, Andamans). Also SriLanka and Indonesia.

Genus ***Chrysorabdia*** Butler

1877. *Chrysorabdia* Butler, *Trans. ent. Soc. Lond.*, : 357.

24. *Chrysorabdia bivitta* (Walker)

1856. *Lithosia bivitta* Walker, *List Lep. Insects Brit. Mus.*, **7** : 1682.

1900. *Chrysorabdia bivitta* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, **2** : 183-184.

Diagnostic characters : Pale orange yellow, tip of the palpi, frons and antennae greenish, patagia deep metallic green; forewing with green costal fascia from base to apex where it is narrower and another from below cell to inner margin before middle; hindwing pale yellow. In female patagia yellow, costal fascia border.

Material examined : 1 ex., Mao, Inspection Bunglow, 12.ix.1975 (Coll. M.S. Shishodia).

Distribution : India (Manipur, Meghalaya, Assam, Sikkim, N.W. Himalayas, Simla and Dalhousie).

Genus *Eilema* Hübner

1827. *Eilema* Hübner, *Verz. bek. Schmett.*, p. 165.

25. *Eilema tetragona* (Walker)

1854. *Lithosia tetragona* Walker, *List Lep. Insects Brit. Mus.*, **2** : 510.

1982. *Eilema tetragona* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India*, p. 33-35, pl. 3, figs. 19, 19a, 3A-C.

Diagnostic characters : Forewing discocellular cell folded and very long, nearly extending upto five-sixth length of wing and curved, with profuse tufts of scale in basal one-fourth portion, the remaining area sparsely tufted and with a quadrate black patch.

Material examined : 2 exs., Tamenglong Dist., Tamenglong, 1280m., 20-21.xi.1992 (Coll. A.K. Mandal & Party)

Distribution : India (Manipur, Arunachal Pradesh, Assam, Nagaland and Kerala). Bangladesh, Indonesia, Malayasia, Kampuchea and China.

Genus *Teulisna* Walker

1862. *Teulisna* Walker, *J. Proc. Linn. Soc. Zool.*, **6** : 109.

26. *Teulisna plagiata* Walker

1862. *Teulisna plagiata* Walker, *J. Proc. Linn. Soc. Zool.*, **6** : 109.

1982. *Teulisna plagiata* : Arora & Chaudhury, *Tech. Monogr. Zool. Surv., India*, No. **6** : 36-37.

Diagnostic characters : Forewing cell folded at base and overlapped by recumbent tufts of scale upto half the length of male; both wings with secondary sexual character.

Material examined : 5 exs., Tamenglong Dist., Tamenglong, 1280m., 21.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur and Arunachal Pradesh). Indonesia and Malaysia.

Genus *Agylla* Walker

1854. *Agylla* Walker, *List Lep. Insects Brit. Mus.*, **2** : 552.

Key to the Species of the Genus *Agylla* Walker

Antennae of male bipectinate with branches short, apical part serrate and fasciculate. Forewing without postmedial band; hindwing unspotted ..... *divisa* (Moore)

—Antennae of male ciliate. Forewing with postmedial band; hindwing spotted .... *alboluteola* Rothschild

27. *Agylla divisa* (Moone)

1878. *Hesudra divisa* Moore, *Proc. Zool. Soc. Lond.*, p. 16, pl. 1, fig. 4.

1982. *Agylla divisa;* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 82.

Material examined : 4 exs : Tamenglong Dist., Tamenglong, 1280m., 20.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Sikkim, Arunachal Pradesh). China and Indonesia.

28. *Agylla alboluteola* Rothschild

1912. *Agylla alboluteola* Rothschild, *Novit. Zool.*, **19** : 226.

1982. *Agylla alboluteola* : Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 43.

Material examined : 1 ex., Tamenglong Dist., Tamenglong, 1280m., 23.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Assam, Arunachal Pradesh). Malaysia.

Genus ***Cyana*** Walker

1854. *Cyana* Walker, *List Lep. Het. Brit. Mus.*, **2** : 528.

Key to the Species of the Genus *Cyana* Walker

1. Forewing apical lobe of male trifid; hindwing white ..... *signa* (Walker)

— Forewing apical lobe of male single; hindwing crimson 2

2. Palpi scarlet; forewing with three black spots in male and one in female ..... *catorhoda* Hampson

— Palpi yellowish; forewing with three black spots in both sexes 3

3. Forewing with a black streak beyond postmedial line and orange subterminal band ..... *bellissima* (Moore)

— Forewing without black streak beyond postmedial line but with a scarlet subterminal band ..... *dudgeoni* Hampson

29. ***Cyana signa*** (Walker)

1854. *Bizone signa* Walker, *List Lep. Het. Brit. Mus.*, **2** : 550.

1894. *Cyana signa* : Hampson, *Fauna Brit. India, Moths*, **2** : 58-59.

Material examined : 1 ex., Mao, Songsing area, 1500m., 12.ix.1975, 1 ex., Inspection Bunglow, Ukhrul, 2.x.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Meghalaya, Assam). Myanmar.

30. ***Cyana catorhoda*** Hampson

1897. *Cyana catorhoda* Hampson, *J. Bombay nat. Hist. Soc.*, **11** : 297.

In press. *Cyana catorhoda*; Ghosh & Chaudhury, *Rec. zool. Surv. India* (Fauna of Meghalaya).

Material examined : 1 ex.. Sialmatt, Churachandpur, 24.iii.1992, 1 ex : Methai, Churachandpur, 800m., 2.iv.1992 (Coll. D.K. Mandal, S.K. Ghosh & Party).

Distribution : India (Manipur, Meghalaya, Assam). Myanmar.

31. ***Cyana bellissima*** (Moore)

1878. *Bizone bellissima* Moore, *Proc. Zool. Soc. Lond.*, : 27, pl. iii, fig. 13.

1894. *Cyana bellissima;* Hampson, *Fauna Brit. India, Moths*, **2** : 61.

Material examined : 1 ex : Ukhrul, Inspection Bunglow, 2.x.1975 (Coll. M.S. Shishodia & Party).

Distribution : India (Manipur, Sikkim, Mussorie, N.W. Himalaya. Myanmar.

32. ***Cyana dudgeoni*** Hampson

1895. *Cyana dudgeoni* Hampson, *Trans. ent. Soc. Lond.*, : 293.

1982. *Cyana dudgeoni* : Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 46.

Material examined : 3 exs : Tamenglong, Tamenglong Dist., 1280m., 21.xii.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Sikkim, Assam, Arunachal Pradesh). Bhutan.

Genus ***Asura*** Walker

1854. *Asura* Walker, *List Lep. Het. Brit. Mus.*, **2** : 484.

Key to the Species of the Genus *Asura* Walker

1. Male forewing with cell very narrow, antemedial band curved and fuscous and subterminal series of spots ..... *dasara* Moore

— Male forewing with cell moderate without antemedial but streaks and subterminal series of spots 2

2. Forewing postmedial line highly dentate ..... *undulosa* (Walker)

— Forewing postmedial line not dentate ..... *strigipennis* (Herrich-Schäffer)

33. *Asura dasara* (Moore)

1859. *Setina dasara* Moore, *Lep. East Ind. Comp.*, : 303.

1900. *Asura dasara :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **2** : 432-433.

Material examined : 1 ex : Tamenglong Dist., Tamenglong, 1280m., 20.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Assam, Sikkim, N.W. Himalaya, Tamil Nadu). Sumatra.

34. *Asura undulosa* (Walker)

1854. *Cyllene undulosa* Walker, *List Lep. Insects Brit. Mus.*, **2** : 545.

1982. *Asura undulosa :* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 49.

Material examined : 2 exs. Tamenglong Dist., Tamenglong, 1280m., 23.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, Assam, Arunachal Pradesh). Bhutan and Myanmar.

35. *Asura strigipennis* (Herrich-Schaffer)

1855. *Paidia strigipennis* Herrich-Schaffer, *Ausser. eur. Schmett.*, p. 21, pl. 437.

1982. *Asura strigipennis :* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 50.

Material examined : 1 ex : Saikat, Churachandpur, 850m., 4.iv.1992 (Coll. D.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Sikkim, Assam, Arunachal Pradesh). Bhutan, Myanmar and Indonesia.

Genus *Milochrista* Hübner

1876. *Miltochrista* Hübner, *Verz. bek. Schmett.*, p. 166.

Key to the Species of the Genus *Miltochrista* Hübner

Forewing with medial line not inwardly angled in submedian fold and some outer streaks not reaching termen ..... *cruciata* (Walker)

— Forewing with medial line inwardly well angled in submedian fold and all the outer streaks reaching termen .... *cuneonotata* (Walker)

36. *Miltochrista cruciata* (Walker)

1862. *Hypoprepia cruciata* Walker, *J. Proc. Linn. Soc. Zool.*, **6** : 101.

1982. *Miltochrista cruciata :* Arora & chaudhury, *Tech. Monogr. Zool. Surv. India.*, No. **6** : 54-55, pl. iv., fig. 26.

Material examined : 1 ex., Tamenglong Dist., Tamenglong, 1280m., 22.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Sikkim, Assam, Meghalaya, Arunachal Pradesh). Indonesia, Malaysia.

37. *Miltochrista cuneonotata* (Walker)

1855. *Ammatho cuneonotata* Walker, *List Lep. Insects Brit. Mus.*, **3** : 759.

1982. *Miltochrista cuneonotata :* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India.*, no. 6 : 55.

Material examined : 1 ex., Tamenglong Dist., Tamenglong, 20.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Sikkim, Meghalaya, Nagaland, Arunachal Pradesh, West Bengal). SriLanka, Malaysia, Indonesia and Philippines.

Genus *Oeonistis* Hübner

1827. *Oeonistis* Hübner, *Verz. bek. Schmett.*, p. 165.

38. *Oeonistis entella* (Cramer)

1779. *Phalaena entella* Cramer, *Pap. Exot.*, **3** : 27, pl. 208, fig. D.

1982. *Oeonistis entella :* Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India*, No. **6** : 58.

Diagnostic characters : Thorax, patagia and legs deep metallic green except base; abdomen orange-yellow; forewing costal area deep metallic green, a medial green band expanding inwards below cell into a large quadrate patch on terminal area from costa to vein Cu_{1a}, apical area with a large elliptical yellow spot; hindwing pale yellow.

Material examined : 5 exs : Tamenglong Dist., Tamenglong, 1280m., 20-24.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Arunachal Pradesh, Maharastra, Tamil Nadu). South China, SriLanka and Indonesia.

Subfamily NYCTEMERIINAE

Key to the Genera of the Subfamily NYCTEMERIINAE

Forewing with long areole; second joint of palpi reaching vertex of head .... Dilemera Hübner

—Forewing with short areole; second joint of palpi not reaching vertex of head .... Nyctemera Hübner

Genus ***Dilemera*** Hübner

1818. *Dilemera* Hübner, *Verz. bek. Schmett.*, p..178.

39. ***Dilemera arctata*** (Walker)

1856. *Nyctemera arctata* Walker, *Cat. Lep. Het. Brit. Mus.*, **6** : 1664.

1894. *Dilemera arctata :* Hampson, *Fauna Brit. India, Moths.*, **2** : 45-46.

Diagnostic characters : Head, thorax and abdomen yellow, latter dorsally with short segmental bands and laterally with two pair of spots; forewing white with some black spots near base, broad fuscous streaks along costa and inner margin from base to medial maculate band, a broad marginal fuscous band of more or less conjoined streaks; hindwing white with a marginal series of rounded fuscous spots being elongated towards anal angle.

Material examined : 1 ex : Tamenglong Dist., Tamenglong, 1280m., 23.xi.1992 (Coll. A.K. Mandal & Party).

Distribution : India (Manipur, Meghalaya, Sikkim and Nagaland).

Genus ***Nyctemera*** Hübner

1816. *Nyctemera* Hübner, *Verz. bek. Schmett.*, : 178.

40. ***Nyctemera advarsata*** *(Schaller)*

1788. *Phalaena* (Geometra) *advarsata* Schaller, *Naturforscher*, **23** : 52.

1982. *Nyctemera advarsata* : Arora & Chaudhury, *Tech. Monogr. Zool. Surv. India*, No. **6** : 8-9, pl. 1, figs. 5, 5a.

Diagnostic characters : Antennae bipectinate in male, unipectinate in female; forewing white with cell-spots continuous with those on inner area, the inner edge of latter sending spurs along vein towards base, and three minute white spots on terminal band between R_5 and M_2; hindwing vein R_5 and M_1 stalked; both wings with discocellular spots; abdomen whitish with yellow tip, dorsal and lateral black spots.

Material examined : 1 ex., Muooiphai, Churachandpur, Boom., 2.iv.1992 (Coll. D.K. Mandal & S.K. Ghosh), 1 ex., Loktak, 30.iii.1993 (Coll. K.K. Roy & Party), 1 ex., Circuit House, Churachandpur, 19.vi.1993 (Coll. R.S. Barman & Party).

Distribution : Throughout India including Manipur. Also Bangladesh, Hongkong, Tonkin, South China, Indonesia, Japan, Sumatra and Malayasia.

Subfamily SPILOSOMINAE

Genus ***Phissama*** Moore

1859. *Phissama* Moore, *Lep. East India Comp.*, : 362.

41. ***Phissama transiens*** (Walker)

1855. *Spilosoma transiens* Walker, *List Lep. Insects Brit. Mus.*, **3** : 675.

1986. *Phissama transiens :* Ghosh & Chaudhury, *Rec. zool. Surv. India*, **84** (1-4) : 118.

Diagnostic characters : Male forewing dark grey-brown with ivory white costa; female whitish; both sexes with one black dot on inner and outerside of upper and lower angle of cell respectively; legs with coxae and femora yellowish, tibiae and tarsi ivory white, marked with longitudinal stripes.

Material examined : 1 ex., Imphal Sanctuary, 14.ix.1983 (Coll. S.K. Gupta & B.C. Saha), 1 ex.,

Churachandpur Forest Rest House, 8.iv.1992 (Coll. S.K. Saha & Party), 1 ex., Churachandpur, Circuit House, 19.vi.1993 (Coll. R.S. Barman & Party).

Distribution : India (Manipur, Sikkim, Assam, Meghalaya, Arunachal Pradesh and West Bengal). China, Indonesia and Philippines.

Family HYPSIDAE

Genus ***Hypsa*** Hübner

1818. *Hypsa* Hübner, *Verz. bek. Schmett.*, : 172.

42. ***Hypsa heliconia*** (Linnaeus)

1758. *Phalaena heliconia* Linnaeus, *Syst. Nat. edx.*, 511.

1892. *Hypsa heliconia :* Hampson, *Fauna Brit. India, Moths*, **1** : 501.

Diagnostic characters : Head, thorax and abdomen orange; 2nd joint of palpi with a black lateral stripe and 3rd entirely black ; forewing fuscuous, with basal orange patch not extending to costa, black spots white-edged, veins streaked white and a white stripe along inner margin; hindwing white with a large black spot at end cell and another below Cu_{1b}, a marginal black band broad at apex and bent inwards between Cu_{1b} and 2A and a white spot on margin.

Material examined : 1 ex., Manipur, Mao, Inspection Bunglow, 13.ix.1975 (Coll. M.S. Shishodia).

Distribution : India (Manipur, Meghalaya, Assam and Sikkim). Bangladesh, Myanmar, Thailand, Singapore, Borneo, Ceram and New Guinea.

APPENDIX

(List of species from Manipur reviewed from literature)

Family PIERIDAE

1. *Appias pandione lalage* (Doubledoey)

Family HESPERIIDAE

2. *Pelopidas thrax thrax* Evans
3. *P. subochracea subochracea* (Moore)
4. *Caltoris aurociliata* (Elwes & Edwards)
5. *C. siribus siribus* Evans
6. *C. cahira austeni* (Moore)
7. *Potanthus trachala tytleri* Evans
8. *Parnara ganga* Evans
9. *Borbo cinnara* Wallace
10. *Koruthailos sindu monda* Evans
11. *K. rubecula cachara* Evans
12. *Scobura tytleri* Evans
13. *S. woolletti woolletti* Riley
14. *S. cephaloides cephaloides* (de Nicéville)
15. *Halpe hauxelli* Evans
16. *H. homolea aucma* Swinhoe
17. *H. kumara* de Nicéville
18. *H. sikkima* Moore
19. *Pithauria marsena* Hawitson
20. *Thoressa hyrie* de Nicéville
21. *T. fusca fusca* (Elwes)
22. *T. masoni* (Moore)
23. *Aeromachus stigmata obsoleta* (Moore)
24. *A. dubius impha* Evans
25. *Sovia malta* Evans
26. *S. lucasii magna* Evans
27. *Pedestes panda* Evans
28. *Caprona agama agama* (Moore)
29. *C. alida alida* de Nicéville
30. *Apostictopterous curiosa* Swinhoe
31. *Plastingia margherita margherita* (Doherty)
32. *Ampitta maroides* de Nicéville
33. *Coladenia laxmi landa* Evans
34. *C. dan festa* Evans
35. *C. dan fatua* Evans
36. *C. indrani uposathra* Frushtorfer
37. *C. agnioides* Elwes & Edwards
38. *Sesaria dohertyi dohertyi* Watson
39. *S. sambara sambara* (Moore)
40. *Daimio bhagava* Moore
41. *Celaenorrhinus sumitra* (Moore)
42. *C. pulomaya pulomaya* (Moore)
43. *C. morena* Evans
44. *C. patula* de Nicéville

45. *Darpa striata minta* Evans
46. *Capila zennara* (Moore)
47. *C. phanaeus lalita* (Doherty)
48. *C. pieridoides pieridoides* (Moore)
49. *Hasora danda* Evans

Family ARCTIIDAE

50. *Diacrisia leopardina* (Kollar)
51. *Roesalia nitida* (Hampson)
52. *Ilema griseola* (Hübner)
53. *Miltochrista magna* Hampson
54. *Asura infumata* (Felder)

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INSECTA : LEPIDOPTERA : MOTHS

D. K. MANDAL & S. K. GHOSH
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Here is a systematic account of moths from Manipur in addition to that dealt with by Mandal and Maulik in other chapter of this State Fauna Series. It incorporates 32 species in 31 genera of 14 subfamilies under three families and superfamilies of the ditrysian Lepidopterous insects. Of these, 11 species, unrepresented in the collection under study, have been consolidated on reviewing from literature (*vide* Butler, 1885; Elwes, 1891-'92), while the rest based on examination of the recently collected material from all the eight districts but Thoubal by different scientists including the authors of the Zoological Survey of India, have all been recorded new for the state. The fauna also shows at least one geometrid element, i.e., *Abraxaphantes perampla* (Swinhoe), hitherto remaining unrecorded from India. Besides, four species have been found to enjoy a rather endemic status in Manipur. Conservation status of the moths in general is so far little known, but for the sphingids that were earlier bred in different localities by Bell & Scott (1937). Interestingly enough, the fore wing measurement of most of the specimens examined is on the lower side, as compared to that after Hampson (1892-'95). The basic classification of the concerned taxa has been adopted after Hampson (*1oc. cit.*), but with modification, particularly at the higher level, *sensu* Barlow (1982), Hacker (1992) and Inoue (1987) for Sphingidae, Noctuidae and Geometridae respectively.

LIST OF TAXA FROM MANIPUR

(*, Reviewed from literature; rest recorded new for Manipur. ψ, Earlier unknown in India. +, Endemic in Manipur; ?+, dubiously so).

Class **INSECTA**
Order LEPIDOPTERA
Suborder DITRYSIA
A. Superfamily BOMBYCOIDEA
A.1. Family SPHINGIDAE
A.1.1. Subfamily SPHINGINAE
I. Genus ***Agrius*** Huebner
*1. *convolvuli* (Linnaeus)
A.1.2. SUBFAMILY MACROGLOSSINAE
II. Genus ***Pergesa*** Walker
*2. *elpenor* (Linnaeus)
B. Superfamily NOCTUOIDEA
B.2 .Family NOCTUIDAE
B.2.3. Subfamily NOCTUINAE
III. Genus ***Neurois*** Hampson
3. *atrovirens* (Walker)
B.2.4. Subfamily HADENINAE
IV. Genus ***Leucania*** Ochsenheimer
+* 4. *rufipennis* Hampson
B.2.5. Subfamily AMPHIPYRINAE
V. Genus ***Condica*** Walker
5. *capensis* (Guenée)
B.2.6. Subfamily ACONTIINAE
VI. Genus ***Corgatha*** Walker
*6. *excisa* Hampson

B.2.7. Subfamily EUTELIINAE

VII. Genus *Anigraea* Walker

*7. *cinctipalpis* (Walker)

B.2.8. Subfamily CATOCALINAE

VIII. Genus ***Batracharta*** Walker

?+*8. *irrorata* Hampson

IX. Genus ***Artena*** Walker

9. *dotata* (Fabricius)

X. Genus ***Speiredonia*** Huebner

10. *suffumosa* (Guenée)

B.2.9. Subfamily OPHIDERINAE

XI. Genus *Eudocima* Billberg

11. *fullonia* (Clerck)

B.2.10. Subfamily HYPENINAE

XII. Genus ***Perciana*** Walker

?+*12. *flavifusa* Hampson

XIII. Genus ***Bomolocha*** Huebner

13. *tenebralis* (Moore)

XIV. Genus ***Mecistoptera*** Hampson

+*14. *duplicilinea* Hampson

C.Superfamily GEOMETROIDEA

C.3. Family GEOMETRIDAE

C.3.11. Subfamily OENOCHROMINAE

XV. Genus ***Abraxaphantes*** Warren

*15. *perampla* (Swinhoe)

XVI. Genus ***Eumelea*** Duncan

16. *feliciata* Guenée

C.3.12. Subfamily GEOMETRINAE

XVII. Genus ***Dysphania*** Huebner

17. *militaris* (Linnaeus)

XVIII. Genus ***Dooabia*** Warren

*18.*viridata* (Moore)

XIX. Genus ***Agathia*** Guenée

*19. *beata* Butler

XX. Genus ***Hemithea*** Duponchel

20. *tritonaria* (Walker)

XXI. Genus ***Thalassodes*** Guenée

21. *quadraria* Guenée

C.3.13. Subfamily STERRHINAE

XXII. Genus ***Scopula*** Schrank

22. *remotata* (GuenGuenée)

XXIII. Genus ***Calothysanis*** Huebner

23. *correspondens* (Hampson)

C.3.14. Subfamily ENNOMINAE

XXIV. Genus ***Ourapteryx*** Leach

24. *ebuleata* Guenée

XXV. Genus ***Phalaena*** Linnaeus

*25. *albifrons* (Moore)

XXVI. Genus ***Gnophos*** Treitschke

26. *eolaria* Guenée

XXVII. Genus ***Boarmia*** Treitschke

27. *boarmiaria* (Gueneé)

28. *alienaria* Walker

XXVIII. Genus ***Medasina*** Moore

29. *similis* Moore

XXIX. Genus ***Arichanna*** Moore

30. *transectata* (Walker)

XXX. Genus ***Abraxas*** Leach

31. *sylvata* (Scopoli)

XXXI. Genus ***Heterabraxas*** Warren

32. *ductaria* (Walker)

SYSTEMATIC ACCOUNT

Class **INSECT**

Order LEPIDOPTERA

Suborder DITRYSIA

(= Heterocera : Hpsn., *part.*)

Superfamily BOMBYCOIDEA

(= Sphingoidea : Common)

Family SPHINGIDAE

Subfamily SPHINGINAE

(= Asemanophorae : Acherontiinae : Bell & Scott)

I. Genus ***Agrius*** Huebner

(= *Protoparce* : Hpsn.; *Herse* : Mandal & Ghosh)

*1. ***Agrius convolvuli*** (Linnaeus)

(= *Protoparce orientalis* : Hpsn.)

1758. *Sphinx convolvuli* Linnaeus, *Syst. Nat.*, ed. **10** : 490.

1982. *Agrius convolvuli* : Barlow, *Intr. moths S.E. Asia*, p.55, pl. 16, fig. 4.

Distribution : India : Manipur. Widespread in the Indian subregion.

Elsewhere : Eastern Hemisphere except higher latitudes in general; also, U.K.

Remarks : This is known to be the commonest sphingid to be caught at light and represented by the sole nominate subspecies in India. For other details on biology and habits, *vide* Bell & Scott (1937).

Subfamily MACROGLOSSINAE
(= Semanophorae : Choerocampinae : Bell & Scott)

II. Genus ***Pergesa*** Walker
(= Choerocampa : Hpsn.)

*2. ***Pergesa elpenor*** (Linnaeus)

1746. *Sphinx elpenor* Linnaeus, *Faun. Suec.*, p. 288.

1937. *Pergesa elpenor* : Bell & Scott, *Fauna Brit. India*, Moths, **5** : 411, fig. 104.

Distribution : India : Manipur : Meghalaya; Nagaland; throughout the Himalaya.

Elsewhere : Pakistan; Bangladesh; U.K.

Remarks : This is a common and very beautiful moth represented by a couple of subspecies in India, of which *P. e. macromera* (Butler) seems to be restricted to north-East India and Sylhet of Bangladesh. For other details, *vide* Bell & Scott (1937).

Superfamily NOCTUOIDEA

Family NOCTUIDAE

Subfamily NOCTUINAE
(= Agrotinae : Hpsn.)

III. Genus ***Neurois*** Hampson
(= Hypernaenia : Hpsn.)

3. ***Neurois atovirens*** (Walker)

1865. *Diphtera atrovirens* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 614.

1903. *Neurois atrovirens :* Hampson, *Cat. Lep. Phal. Brit. Mus.*, **4** : 611, pl. 76, fig. 20.

Material examined : One ♀, Mao, *c* 2150 m, 'at light', 13.ix.1975, *M.S. Shishodia & party leg. Fore wing length* : 20 mm.

Distribution : India : Manipur (Senapati district); Sikkim.

Elsewhere : Myanmar.

Subfamily HADENINAE

IV. Genus ***Leucania*** Ochsenheimer

+*4. ***Leucania rufipennis*** Hampson

1894. *Leucania rufipennis* Hampson, *Fauna Brit. India*, Moths, **2** : 276.

Distribution : India : Manipur, Mao (Senapati district), *c* 2150 m.

Remarks : Endemic in Manipur, this apparently rare species was described under the genus *Leucania* by Hampson (1894), who subsequently (1905) placed it with *Cirphis* Walker. Recently, Hacker (1992) has treated these genera as synonyms of *Mythimna* Ochsenheimer, but, not dealt with the concerned species, which has, therefore, been provisionally considered under the genus *Leucania.*

Subfamily AMPHIPYRINAE
(= Acronictinae : Hpsn.)

V. Genus ***Condica*** Walker
(= *Euplexia* : Hpsn.; *Perigea* : Hpsn.)

5. ***Condica capensis*** (Gueneé)
(= *E. conducta* : Hpsn.)

1852. *Apamea capensis* Gueneé, *Hist. nat. Ins. Noct.*, **1** : 213.

1992. *Condica capensis* : Hacker, *Esp. Buch. zur Ent.*, **3** : 93.

Material examined : One ♂, Mao, 12.ix.1975, *M.S. Shishodia & party leg. Fore wing length* : 15 mm.

Distribution : India : Manipur (Senapati district); widespread in the rest of mainland and also the Andaman Islands. Further extending to other regions of the Old World (*vide* Mandal & Maulik, 1991a; Hacker, 1992).

Subfamily ACONTIINAE

VI. Genus ***Corgatha*** Walker

*6. ***Corgatha excisa*** Hampson

1894. *Corgatha excisa* Hampson, *Fauna Brit. India,* Moths, 2 : 348.

1976. *Corgatha excisa :* Holloway, *Moths of Borneo,* p. 15.

Distribution : India : Manipur, Mao (Senapati district); Assam.

Elsewhere : Malayan (*vide Holloway,* 1976).

Remarks : The species occurs amidst shrub and field layers well below the forest canopy.

Subfamily EUTELIINAE

VII. Genus ***Anigraea*** Walker
(= *Eutelia* : Hpsn.)

*7. ***Anigraea cinctipalpis*** (Walker)

1865. *Eutelia cinctipalpis :* Walker, *Cat. Lep. Het. Brit. Mus.,* **33** : 820.

1976. *Anigraea cinctipalpis :* Holloway, *Moths of Borneo,* p. 17.

Distribution : India : Manipur; Nagaland; Sikkim; southern Peninsula.

Elsewhere : Bhutan; Sri Lanka; Borneo; Philippines.

Subfamily CATOCALINAE

VIII. Genus ***Batracharta*** Walker

?+*8. ***Batracharta irrorata*** Hampson

1894. *Batracharta irrorata* Hampson, *Fauna Brit. India,* Moths, **2** : 444, fig. 251.

Distribution : India : Manipur.

Remarks : On the basis of literature at hand, this species seems to be restricted to North-East India (*of.* Elwes, 1891, '92). Hampson (1894) described it only by male, but since then neither topotype nor other material from any other region of India and elsewhere is apparently represented possibly due to its rare status.

IX. Genus ***Artena*** Walker
(= *Ophiusa* : Hpsn.; *Thyas* Swinhoe)

9. ***Artena dotata*** (Fabricius)

1794. *Noctua dotata* Fabricius, *Ent. syst.,* **3** (2) : 55.

1992. *Artena dotata* : Hacker, *Esp. Buch. zur Ent.,* **3** : 105.

Material examined : One ♂, 1♀, Tamenglong, *c* 1280 m, 25.xi.1992, *A.K. Mandal & party leg. Fore wing length :* 32-35 mm.

Distribution : India : Manipur (Tamenglong district).

Elsewhere : (*vide* Mandal & Maulik, 1991a; Hacker, 1992).

Genus ***Speiredonia*** Huebner

10. ***Speiredonia suffumosa*** (Guenée)
(= *Spirama retorta* : Hpsn.)

1852. *Spirama suffumosa* Guenée, *Hist. nat. Ins. Noct.,* **3** : 195.

1991a. *Speiredonia suffumosa :* Mandal & Maulik, *State Fauna Series 1 : Fauna of Orissa,* (3) : 217.

Material examined : One ♀, Moreh, 26.ix.1975, *M.S. Shishodia & party leg. Fore wing length :* 30 mm.

Distribution : India : Manipur (Chandel district).

Elsewhere : Widespread in the Oriental Region (*vide* Mandal & Maulik, 1991a).

Remarks : The moth is known to be polyphenic (*vide* Hampson, 1894).

Subfamily OPHIDERINAE

XI. Genus ***Eudocima*** Billberg
(= *Ophideres* : Hpsn.; *Othreis* : Mandal & Ghosh)

11. ***Eudocima fullonia*** (Clerck)
(= *Ophideres fullonica* : Hpsn.)

1759. *Phalaena fullonia* Clerck, *Icones Ins.,* pl. 48.

1992. *Eudocima fullonia* : Hacker, *Esp. Buch. Zur. Ent.* **3** : 108.

Material examined : One ♂, Thanging, *c* 1750 m, 20.vii.1989, *Mus. coll. Fore wing length* : 48 mm.

Distribution : India : Manipur (Bishnupur district).

Elsewhere : Widespread almost all over the Old World Tropics (*vide* Holloway, 1976; Barlow, 1982; Hacker, 1992; Mandal & Ghosh, *in* press, b).

Subfamily HYPENINAE
(= Deltoidinae : Hpsn.; Acontiinae, *part.* : Hpsn.)

XII. Genus ***Perciana*** Walker

?+*12. ***Perciana flavifusa*** Hampson

1894. *Perciana flavifusa* Hampson, *Fauna Brit. India,* Moths, **2** : 296.

Distribution : India : Manipur, *c* 1800 m.

Remarks : As for *Batracharta irrorata.*

XIII. Genus ***Bomolocha*** Huebner
(= *Hypena* : Hpsn.)

13. ***Bomolocha tenebralis*** (Moore)

1867. *Hypena tenebralis* Moore, *Proc. zool. Soc. Lond.*, p. 83.

1900. *Bomolocha tenebralis* : Swinhoe, *Cat. E. & Austr. Lep. Het.*, (2) : 212.

Material examined : One ♂, Ukhrul, *c* 2000 m, 2.x.1975, *M.S. Shishodia & party leg. Fore Wing length* : 18 mm.

Distribution : India : Manipur (Ukhrul district); West Bengal; Sikkim; Meghalaya.

XIV. Genus ***Mecistoptera*** Hampson

+*14. ***Mecistoptera duplicilinea*** Hampson

1895. *Mecistoptera duplicilinea* Hampson, *Fauna Brit. India,* Moths, 3 : 102.

Distribution : India : Manipur.

Remarks : Hampson (1895) described this rare endemic species only by male from Manipur.

Superfamily GEOMETROIDEA

C.3. Family GEOMETRIDAE

Subfamily OENOCHROMINAE

XV. Genus ***Abraxaphantes*** Warren

*15. ***Abraxaphantes perampla*** (Swinhoe)

1890. *Abraxas perampla* Swinhoe, *Trans. ent. Soc. Lond.*, p. 211.

1912a. *Abraxaphantes perampla* : Prout. *Lep. Cat.*, **8** : 51.

Material examined : One ♂, Chandel, *c* 900m, 29.iii.1992, 2♂, 5♀, Churachandpur, *c* 850m, 4.iv.1992, *D. K. Mandal & party leg.;* 1♀, Moirang, 7.iv.1992, *S. K. Saha & party leg. Fore Wing length :* 35-40 mm.

Distribution : India : Manipur (Chandel, Churachandpur and Bishnupur districts).

Elsewhere : Myanmar, Canton (*vide* Prout, 1912a).

Remarks : This species, with its limited distributional range within the Indian subregion, makes the authors acclaim its new record for India through its discovery in the state of Manipur. The specimens examined differ from the Myanmar material by a very few cell-spots and the infra-end-cell band rather narrow, triangular and unforked on the dorsum of fore wing. The moth seems to be locally common in the districts of Manipur. All the specimens have been netted at day time below thick forest cover.

XVI. Genus ***Eumelea*** Duncan

16. ***Eumelea feliciata*** Gueneé
(= *E. rosalia* : Hpsn.)

1857. *Eumelea feliciata* Guenée, *Hist. nat. Ins. Noct.*, **1** : 393.

1912a. *Eumelea feliciata* : Prout, *Lep. Cat.*, **8** : 53.

Material examined : One ♂, Uchathal, *c* 175 m, 28.xi.1992, *A. K. Mandal & party leg. Fore wing length* : 25 mm.

Distribution : India : Manipur (Imphal district); Assam; Tripura (*vide* Mandal, *et al,* 2000); Sikkim.

Elsewhere : Bangladesh; Malayan (*vide* Prout, 1912a).

Remarks : Prout (1912a) segregated *E. feliciata* as a good species from the Hampsonian synonymy list of *E. rosalia* Stoll for which he (*loc cit.*) did not. however, mention any Indian range of distribution.

Subfamily GEOMETRINAE
(= Hemitheinae : Prout)

XVII. Genus ***Dysphania*** Huebner
(= *Euschema* : Hpsn.)

17. ***Dysphania militaris*** (Linnaeus)

1758. *Phalaena militaris* Linnaeus, *Syst. Nat.*, ed. **10** : 505.

1913. *Dysphania militaris* : Prout, *Lep. Cat.*, **14** : 29.

Material examined : One ♀, Churachandpur, 4.iv.1992, D. K. Mandal & party leg. Fore Wing length : 38 mm.

Distribution : India : Manipur (Churachandpur district). Widespread in the Oriental Region (*vide* Prout, 1912 c; Mandal & Ghosh, *in* press, b).

Remarks : The moth is gorgeously coloured and typically diurnal in habit.

XVIII. Genus ***Dooabia*** Warren
(= *Chlorodontopera* : Hpsn.)

*18. ***Dooabia viridata*** (Moore)

1867. *Ennomos viridata* Moore, *Proc. zool. Soc. Lond.*, p. 623.

1997. *Dooabia viridata* : Mandal & Ghosh, *State Fauna Series 3, Fauna of West Bengal,* **7** : 528

Distribution : India : Manipur; Meghalaya; Assam; West Bengal.

Elsewhere : Taiwan (Prout, 1912b).

Remarks : No recent literature at hand has referred to this species, of which the earlier synonym. *lunifera* (Moore) [*vide* Hampson, 1895; Swinhoe, 1900], has been considered as a full species from Borneo by Holloway (1976).

XIX. Genus ***Agathia*** Guenée

*19. ***Agathia beata*** Butler

1880. *Agathia beata* Butler, *Ann. Mag. nat. Hist.*, (5) **6** : 218.

1997. *Agathia beata* : Mandal & Ghosh, *State Fauna Series 3, Fauna of West Bengal* **7** : 528.

Distribution : India : Manipur; Meghalaya; West Bengal; Sikkim.

XX. Genus ***Hemithea*** Duponchel

20. ***Hemithea tritonaria*** (Walker)

1862. *Thalassodes tritonaria* Walker, *Cat. Lep. Het. Brit. Mus.*, **26** : 1560.

1912b. *Hemithea tritonaria* : Prout, *Gen. Ins.*, **129** : 170.

Material examined : One ♂, Tamenglong, *c* 1280m, 23.xi.1992. *A. K. Mandal & party leg. Length of fore wing* : 9 mm.

Distribution : India : Manipur (Tamenglong district); Meghalaya; Nilgiris.

Elsewhere : China to Java; Philippines; Sri Lanka (*cf.* Hampson, 1895).

Remarks : The species feeds on *Ficus.*

XXI. Genus ***Thalassodes*** Guenée

21. ***Thalassodes quadraria*** Guenée

1857. *Thalassodes quadraria* Guenée, *Hist. nat. Ins. Noct.*, 1 : 360.

1999. *Thalassodes quadraria :* Mandal & Ghosh, *State Fauna Series 4, Fauna of Meghalaya.*

Material examined : One ♂, Chandel, 'at light', *c* 900 m, 29.iii.1992, *D. K. Mandal & party leg.;* 1♂, Tamenglong, *c* 1280 m, 24.xi.1992, *A. K. Mandal & party leg. Fore wing length* : 19 mm.

Distribution : India : Manipur (Chandel and Tamenglong districts).

Elsewhere : Widely distributed in the Indo-Australian (*vide* Mandal & Ghosh, *in* press, b).

Remarks : The specimen from Chandel has the abdomen longer than the hind wing.

Subfamily STERRHINAE
(= Acidaliinae : Hpsn.)

XXII. Genus ***Scopula*** Schrank

22. ***Scopula remotata*** (Guenée)

1857. *Acidalia remotata* Guenée, *Hist. nat. Ins. Noct.*, **1** : 458.

1999. *Scopula remotata :* Mandal & Ghosh, *State Fauna Series 4, Fauna of Meghalaya.*

Material examined : One ♂, Mao, *c* 1750 m, 12.ix.1975, *M.S. Shishodia & party leg. Fore wing length* : 13 mm.

Distribution : India : Manipur (Senapati district).

Elsewhere : vide Mandal & Maulik (1991 b) and also Mandal & Ghosh (*in* press, b).

XXIII. Genus ***Calothysanis*** Huebner
(= *Timandra* : Hpsn.)

23. ***Calothysanis correspondens*** (Hampson)

1895. *Timandra correspondens* Hampson, *Fauna Brit. India,* Moths, 3 : 459.

1997. *Calothysanis correspondens* : Mandal & Ghosh, *State Fauna Series 3, Fauna of West Bengal* **7**: 527.

Material examined : One ♀, Tamenglong, 1280 m, 22.xi.1992, A. K. Mandal & party leg. Fore wing length : 17 mm.

Distribution : India : Manipur (Tamenglong district); Assam; West Bengal (*vide* Mandal & Ghosh, 1997,a); Sikkim; Himachal Pradesh.

Remarks : Holloway (1976) fixed the generic authority as 'Walker', possibly for the reason that Huebner had left his genus *Calothysanis* undescribed (*cf.* Hampson, 1895). Prout (1913) noted that the members of the genus (used as *Timandra)* feed on dock and other low plants, passing the winter in the larval state.

Subfamily ENNOMINAE
(= Boarminae : Hpsn.)

XXIV. Genus ***Ourapteryx*** Leach
(= *Urapteryx* : Hpsn.)

24. ***Ourapteryx ebuleata*** Guenée

1857. *Ourapteryx ebuleata* Guenée, *Hist. nat. Ins. Noct.*, **1** : 32.

1987. *Ourapteryx ebuleata* : Inoue, *Bull. Fac. domest. Sci., Otsuma Wom. Univ.*, **23** : 270.

Material examined : One ♂, Rakhai, Churachandpur, *c* 900 m, 5.iv.1992, *D. K. Mandal & party leg. Fore wing length :* 23 mm.

Distribution : India : Manipur (Churachandpur district).

Elsewhere : *vide* Mandal & Ghosh (*in* press, b).

XXV. Genus ***Phalaena*** Linnaeus
(= *Pericallia* : Hpsn.)

*25. ***Phalaena albifrons*** (Moore)

1887. *Endropia albifrons* Moore, *Descr. Indian Lep. Ins. Atk.*, p. 229.

Distribution : India; Manipur; Sikkim.

Remarks : The species, restricted in North-East India, is apparently rare, as it has not been dealt with in any recent literature since the date of original description followed by the subsequent citation of only male by Hampson (1895), nor represented in the museum collections. The generic name, *Pericallia,* preoccupied with the Arctiidae, was replaced by *Phalaena* after Prout (1915).

XXVI. Genus ***Gnophos*** Treitschke
(= *Gnophus* : Hpsn.)

26. ***Gnophos eolaria*** Guenée
(= *G. eolarius* : Hpsn.)

1857. *Gnophos eolaria* Guenée, *Hist. nat. Ins. Noct.*, **1** : 294.

1997. *Gnophos eolaria* : Mandal & Ghosh, *State Fauna Series 3, Fauna of West Bengal* **7** : 520.

Material examined : One ♂, Ukhrul, 30.ix.1975, *M. S. Shishodia & party leg. Fore wing length :* 23 mm.

Distribution : India : Manipur (Ukhrul district); Meghalaya; West Bengal; Punjab.

Remarks : While Hampson (1895) and Prout (1915) mentioned the moth occurring throughout the Himalayas, the latter author also cited its range farther extending to West China.

XXVII. Genus ***Boarmia*** Treitschke

27. ***Boarmia boarmiaria*** (Guenée)

1857. *Hypochroma boarmiaria* Guenée. *Hist. nat. Ins. Noct.*, **1** : 282.

2000. *Boarmia boarmiaria* : Mandal, *et al. State Fauna Series* 7, *Fauna of Tripura.*

Material examined : One ♀, Ukhrul, 2.x.1975, *M. S. Shishodia & party leg. Fore Wing length* : 25 mm.

Distribution : India : Manipur (Ukhrul district).

Elsewhere : *vide* Mandal (1991) and Mandal, *et al.* (*in* press), also Bhutan, S. China, Borneo and Japan (vide. Holloway, 1976).

Remarks : Holloway (1976) treated the species under the genus *Racotis* Moore.

28. ***Boarmia alienaria*** Walker

1860. *Boarmia alienaria* Walker, *Cat. Lep. Het. Brit. Mus.*, **21** : 370.

2000. *Boarmia alienaria* : Mandal, *et al., State Fauna Series 7, Fauna of Tripura.*

Material examined : One ♂, Ukhrul, 2.x.1975, *M. S. Shishodia & party leg. Fore wing length :* 20 mm.

Distribution : India : Manipur (Ukhrul district).

Elsewhere : *vide* Mandal, *et al.* (*in* press).

XXVIII. Genus ***Medasina*** Moore

29. ***Medasina similis*** Moore

1887. *Medasina similis* Moore, *Descr. Indian Ins. Lep. Atk.*, p. 235.

1997. *Medasina similis* : Mandal & Ghosh, *State Fauna Series3, Fauna of West bengal* **7** : 522.

Material examined : One ♂, 1♀, Ukhrul, 2.x.1975, *M. S. Shishodia & party leg. Fore wing length :* 30-35 mm.

Distribution : India : Manipur (Ukhrul district); Meghalaya; West Bengal.

XXIX. Genus ***Arichanna*** Moore

30. ***Arichanna transectata*** (Walker)

1862. *Rhyparia transectata* Walker, *Cat. Lep. Het. Brit. Mus.*, **24** : 1112.

1987. *Arichanna (Epicterodes) transectata* : Inoue, *Bull. Fac. domest. Sci. Otsuma Wom. Univ.*, **23** : 258.

Material examined : One ♂, 1♀ Churachandpur, *c.* 900 m, 5.iv.1992, *D. K. Mandal & party leg. Fore wing length* : 29 mm in both the sexes.

Distribution : India : Manipur (Churachandpur district); Sikkim; Kumaon; Chamba; Khandala.

Elsewhere : Eastern Nepal.

XXX. Genus ***Abraxas*** Leach

31. ***Abraxas sylvata*** (Scopoli)

1763. *Phalaena* (?) *sylvata* Scopoli, *Ent. Carn.*, p. 220.

1997. *Abraxas sylvata* : Mandal & Ghosh, *State Fauna Series 3, Fauna of West Bengal* **7**: 523.

Material examined : One ♂, Mao, 12.ix.1975, *M. S. Shishodia & party leg. Fore wing length* : 25 mm.

Distribution : India : Manipur (Senapati district); Assam; Meghalaya; Sikkim; West Bengal; Punjab; Himachal Pradesh; Nilgiris.

Elsewhere : Bangladesh; China; Japan; Penang; also, N. Asia and Europe.

Remarks : For bionomics and habits of this locally common palaearctic species, *vide* Prout (1915).

XXXI. Genus ***Heterabraxas*** Warren
(= *Percnia* : Hpsn.)

32. ***Heterabraxas ductaria*** (Walker)

1862. *Rhyparia ductaria* Walker, *Cat. Lep. Het. Brit. Mus.*, 24 : 1111.

1900. *Heterabraxas ductaria* : Swinhoe, *Cat. Eastern & Austral. Lep. Het.*, (2) : 304.

Material examined : 3♀, Tamenglong, *c* 1280 m, 20-24.xi.1992, *A. K. Mandal & party leg. Forewing length* : 32-33 mm.

Distribution : India : Manipur (Tamenglong district); Sikkim; West Bengal (*vide* Mandal & Ghosh, 1997).

Remarks : This species, like some of the preceding ones, is localised in North-East India. It is congeneric with *spontaneata* (Walker), the type of the genus *Heterabraxas* (*vide* Swhinhoe, 1900; also, *cf.* Inoue, 1987).

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Table of District-wise Distribution of Manipur Moths Examined (Districts of the State of Manipur)

Name of spp.	I Imphal	II Thoubal	III Bishnu-pur	IV Chandel	V Chura-chand-pur	VI Ukhrul	VII Tameng-long	VIII Sena-pati
Neurois atrovirens								+
Condica capensis								+
Artena dotata							+	
Speiredonia suffumosa				+				
Eudocima fullonia			+					
Bomolocha tenebralis						+		
Abraxaphantes perampla			+	+	+			
Eumelea feliciata	+							
Dysphania militaris					+			
Hemithea tritonaria							+	
Thalassodes quadraria				+			+	
Scopula remotata								+
Calothysanis correspondens							+	
Ourapteryx ebuleata					+			
Gnophos eolaria						+		
Boarmia boarmiaria						+		
Boarmia alienaria						+		
Medasina similis						+		
Arichanna transectata					+			
Abraxas sylvata								+
Heterabraxas ductaria							+	

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INSECTA : LEPIDOPTERA : NYMPHALIDAE AND SATURNIIDAE

I. J. GUPTA

Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The North-eastern states of India are well known for the richness and diversity of butterflies. Of the 1500 species occurring in India, more than 50% are found in this part of India. The state of Manipur though small in geographical area yet it supports over 300 species of butterflies. Seventy five species of butterflies of the family Nymphalidae and five species of moths of the family Saturniidae are dealt with from state of Manipur. Amongst the butterflies, 26 species though within range of their earlier known distribution are first definitive records from the state.

The earlier works on Nymphalidae of India are by De Niceville (1886), Bingham (1905). Antram (1924), Evans (1932), Piele (1937), Talbot (1947) and Wynter-Blyth (1957). The information on nymphalid fauna particularly from the state of Manipur is mainly due to Butler (1885), Fruhstorfer (1913) and Tytler (1914, 1915).

Present studies are based on a collection of butterflies made by several survey parties of the Zoological Survey of India, *viz.*, M.S.Shishodia (1975), P.T. Cherian (1975), A.K. Mandal (1992), A.K. Sanyal (1992), D.K. Mandal and S.K. Ghosh (1992) and P.H. Roy (1992). Besides, specimens of butterflies available in the old collections of Zoological Survey of India have also been examined.

Of the 80 species of Lepidoptera; five species of moths are represented by five genera under the family Saturniidae and 75 species/subspecies of butterflies are represented by 38 genera belonging to five subfamilies, *viz.*, Morphinae, Calinaginae, Acraeinae, Nymphalinae and Charaxinae under the family Nymphalidae. Two species namely, *Lexias khasiana intermedia* (Tytler) and *Eulaceura manipurensis* (Tytler) are endemic to Manipur. Of the 75 species of butterflies, 26 are rare and endangered and have been listed in Schedules of the Indian Wildlife Protection Act : Schedule-I (Part-4) : 10 spp. and Schedule-II (Part-2) : 16spp.

The keys to identification of species and genera of families Nymphalidae and Saturniidae have been. given. The common name, fore wing length/ wing expanse, distribution and remarks on distinguishing features of species/subspecies and status have been provided. The species not available in the collection, but known from Manipur, have been reviewed from literature. An appendix of species with their distribution in Manipur has been provided.

SYSTEMATIC ACCOUNT

Family NYMPHALIDAE

Antennae completely or partially scaled. Labial palpi not more than twice as long as the head except in Libytheinae. Fore wing with all the 12 veins present, one vein usually dilated at base, origin of R_4 nearer apex of cell or apex of wing, vein 1A+2A may or may not be bifurcated at base. Hind wing cell closed by a tubular or nontubular vein, precostal veint present. Fore legs imperfect in both sexes and not used for walking except in the female of Libytheinae. In

male, fore tarsus always reduced to a single segment covered with hair like scales resembling a small brush; in female fore tarsus with a variable number of segments.

The subfamilies under the family Nymphalidae have been treated after Eliot (1992). Presently, five subfamilies have been included from the state of Manipur.

Subfamily MORPHINAE
Subfamily CALINAGINAE
Subfamily ACRAEINAE
Subfamily NYMPHALINAE
Subfamily CHARAXINAE

Subfamily MORPHINAE

The subfamily Morphinae includes very large and showy species of butterflies. The size of wings may be enormous as compared to that of the body. Of the three tribes of Morphinae, *viz.* Morphini, Brassolini and Amathusiini, only the latter is known in the tropics of the Oriental Region (including the Papuan subregion).

Tribe **Amathusiini**

Eyes smooth; labial palpi usually long, prominent and laterally compressed; termen of wings usually entire, underside of hind wing usually with a submarginal ocellus in space Cu_{1a} and M_1 ; fore legs imperfect in both sexes.

This tribe is known in India by 24 species and subspecies belonging to eight genera of which six genera are dealt with from Manipur.

Key to genera

1. Fore wing with discocellular veins tubular throughout. Hind wing with vein 3A longer than abdomen. In male, abdomen at base not ventrally compressed 2
– Fore wing with a middle discocellular vein absent. Hind wing with vein 3A shorter than abdomen. In male, abdomen basally ventrally compressed 5
2. In fore wing, vein Cu_{1a} arising about midway between Cu_{1b} and M_3 ; vein M_3 not strongly curved proximad ..... *Aemona* Hewitson
– In fore wing, vein Cu_{1a} arising much nearer M_3 than to Cu_{1b}, vein M_3 strongly curved proximad 3
3. In fore wing, vein R_2 absent, veins R_1 and Sc free ..... *Stichophthalma* C. R. Felder
– In fore wing, vein R_2 and R_1 anastomosed with vein Sc 4
4. Fore wing with veins M_2 and M_1 well separated at base, M_1 much nearer R_5. Hind wing with vein M_3 approximating to and nearly touching M_2 ..... *Thaumantis* Huebner
– Fore wing with veins M_2 and M_1 approximate at base, and far from R_5. Hind wing with vein M_2 curved, not angled and well removed from M_3 ..... *Thauria* Moore
5. In fore wing, veins R_2 and R_1 anastomosed with Sc. In male, upperside of hind wing with rounded discal black brand extending into spaces Cu_{1a}, Cu_{1b} and M_3 .... *Discophora* Boisduval
– In fore wing, vein R_2 absent, R_1 anastomosed with Sc. In male, upperside of hind wing with the area of cell strongly hairy. .... *Enispe* Doubleday

I. Genus ***Aemona*** Hewitson

1868. *Aemona* Hewitson, *Exot. Butts.*, 4 : pl., figs 3. 4.

This genus is represented in India by only a single species, *Aemona amathusia* (Hewitson).

1. ***Aemona amathusia amathusia*** (Hewitson) (The Yellow Dryad)

1867. *Clerome amathusia* Hewitson, *Trans. ent. soc. Lond.* 5(3) : 566, female.

1914 *Aemona amathusia* (Hewitson) : Tytler, *J. Bombnay nat. Hist., Soc.*, **23** : 228.

1947. *Aemona amathusia amathusia* (Hewitson) : Talbot, *Fauna of British India* (Butterflies), **2** : 413

Material examined : Nil.

Wing expanse : 75-90 mm.

Distribution : India : Manipur, Assam and Sikkim.

Elsewhere : Northern Myanmar.

Remarks : Tytler (1914) collected specimes of both sexes in May-June and again in September-October at Saitu at the northern end of the Manipur Valley at an altitude of ca 1220 m and on Burma Road near Sebong. He held, although not rare, this butterfly to be extremely local and found in dense shady nullahs. It is fairly common in Manipur (Wynter-Blyth, 1957). Its two broods emerging in May and September do not differ from each other. Its status of occurrence, especially female, is rare and it has been listed in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

II Genus ***Stichophthalma*** C. R. Felder

1862. *Stichophthalma* C. & R. Felder, *Wien. Ent. Mon.*. **6** : 271.

The genus is known in India by three species, which are treated from Manipur.

Key to species

1. Hind wing upperside with submarginal markings small and slender .... *nourmahal* (Westwood)

– Hind wing upperside with submarginal markings lage and prominent 2

2. Upperside of hind wing with a post discal series of conspicuous black spots adjacent to submarginal dark line .... *louisa* (Wood-Mason)

– Upperside of hind wing without black spots inside the submarginal broad dark line .... *camadeva* (Westwood)

2. ***Stichophthalma nourmahal nourmahal*** (Westwood) (Chocolate Jungle Queen)

1851. *Thaumantis nourmahal* Westwood, In Doubleday, Hewitson, *Gen. diurn. Lep.*. : 227.

1914. *Stichophthalma nourmahal* (Westwood) : Tytler, *J. Bombay nat. Hist. Soc.*, **23** (2) : 227.

1947. *Stichophthalma nourmahal nourmahal* (Westwood) : Talbot, *Fauna of British India"(ButterflieS)*, **2** : 417.

Material examined : Nil.

Wing expanse : 95-10.5 mm.

Distribution : India : Manipur, Assam, Nagaland and West Bengal.

Elsewhere : North-Eastern Myanmar.

Remarks : Only the nominate subspecies is found in India. Its status is rare and it has been listed in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

3. ***Stichophthalma louisa tytleri*** Rothschild (Manipur Jungle Queen)

1918. *Stichophthalma tytleri* Rothschild, *Nov. Zool.*, **25** : 310.

1932. *Sticopthalma sparta tytleri* Rothschild: Evans, *Identification of Indian butterflies*: 132.

1947. *Stichophthalma louisa tytleri* Rothschild: Talbot, *Fauna of Brithish India*, (Butterflies), **2** : 422.

Material examined : Manipur : Chandel District, Sebong, 1 ex, —:— 1913, (no *coll)* Manipur, 1 ex, no date, *(De Nicéville coll.)*.

Fore wing length : 63 mm.

Distribution : India : Manipur (Chandel, Eastern Manipur Hills), Assam and Nagaland.

Eleswhere : Myanmar.

Remarks : Only this single subspecies occurs in India and differs from its conterpart S. *louisa sparta* De Niceville by upperside of fore wing having outer half creamy-white and underside of hind wing bearing discal line bordered with white distally. Tytler (1914) recorded it as species S. *sparta* De Nicéville from Sebong, Eastern Manipur Hills.

4. ***Stichophthalma camadeva camdevoides*** de Nicéville (Northern Jungle Queen)

1899. *Stichopthalma camadeva camdevoides* de Niceville, *J. Bombay nat. Hist. Soc.* **12** : 330.

1932. *Sticopthalma camadeva camdevoides* de Niceville : Evans, *Identification of Indian Butterflies* : 132.

Material examined : *Nil.*

Wing expanse : 125-150 mm.

Distribution : India : Manipur.

Elsewhere : N. Myanmar.

Remarks : Evans (1932) treated four subspecies of *Stichopthalma camadeva* Westwood from India and none from Manipur. D'Abrera (1985) provided illustrations of male and female specimens from Manipur. This subspecies differs from the nominate one found in Sikkim, *nicevllei* in Assam and *nagaensis* Rothschild in Nagaland by being pale, upperside of hind wing with terminal area much wider and submarginal band narrow. Butler (1885) recorded it as *Thaumantis camadeva* (Westwood) from Manipur.

III Genus ***Thaumantis*** Huebner

1826. *Thawnantis* Huebner, *Samml. exot. Schmett.* **2** : pl. 61.

This genus is represented in India by a single species—*Thaumantis diores* Doubleday.

5. ***Thaumantis diores diores*** Doubleday (Jungleglory)

1845. *Thaunantis diores* Doubleday, *Ann. Mag. nat. Hist.*, **16** : 234.

1885. *Thallmantis diores* Doubleday : Butler, *Ann. Mag. nat. Hist.* (5) **16** : 302.

1947. *Thaumantis diores diores* Doubleday: Talbot, *Fauna of British India,* (Butterflies) **2** : 427.

Material examined : Nil.

Wing expanse : Male, female, 95-115 mm.

Distribution : India : Manipur, Sikkim.

Elsewhere : Mynmar.

Remarks : Only this nominate subspecies occurs in India. Bulter (1885) reported it from Manipur.

IV Genus ***Thauria*** Moore

1893. *Thauria* Moore, *Lep. Ind.*, **2** : 173, 185.

Only a single species, *Thauria aliris* (Westwood) represents this genus in India.

6. ***Thauria aliris amplifascia*** Rothschild (Jungle King)

1916. *Thauria aliris amplifascia* Rothschild, *Ann. Mag. nat. Hist.*, (8) **17** : 475 male, female.

1932. *Thauria lathyi ampl!fascia* Rothschild. Evans, *Identification of Indian butterflies*: 134.

1947. *Thauria aliris amplifascia* Rothschild : Talbot, *Fauna of British India,* (Butterflies), **2** : 431.

Material examined : Nil.

Wing expanse : Male, Female, 126-140 mm.

Distribution : India : Manipur and Assam.

Elesewhere : Myanmar.

Remarks : This subspecies differs from *T. aliris intermedia* Crowley by upperside of hind wing, in male, having no brand or tuft around cell. Evans (1932) and Talbot (1947) mentioned its occurrence in Manipur. Evans *(loc. cit.)* also stated its distribution in S. Myanmar and Talbot *(loc. cit)* referred its occurence in Northern Myanmar. Its status is rare and it has been included in Schedule-II (Part-2) of the India Wild Life Protection Act.

7. ***Thauria aliris intermedia*** Crowley (Tufted Jungle King)

1896. *Thauria intemedia* Crowley, *Ann. Mag. nat. Hist.* (6) **17** : 66

1932. *Thauria aliris intermedia* Crowley : Evans, *Identification of Indian Butterflies* : 134.

1947. *Thauria aliris intermedia* Crowley: Talbot, *Fauna of British India,* (Butterflies) **2** : 431

Material examined : Nil.

Wing expanse : Male, female, 110-120 mm.

Distribution : India : Manipur (Chandel District, Eastern Manipur Hills).

Elsewhere : Myanmar, Peninsular and Western Thailand (Siam).

Remarks : This subspecies differs from *T. aliris amplifascia* Rothschild by upperside of hind wing, in male, bearing a large brand and tufts about cell. Tytler (1914) collected specimens of both sexes of this subspecies from Chandel District (Sebong), at the foot of the Eastern Manipur Hills in March–May. Evans (1932) and Talbot (1947) did not mention its distribution in Manipur but Talbot *(loc. cit)* referred Tytler (1914) for record of male and female of this subspecies from Manipur.

V. Genus ***Discophora*** Boisduval

1836. *Discophora* Boisduval, (Roret's suite a Buffon), *Hist. nat. Ins. Consid. gen. Lepid.*. **1** : pl. 4. (=4a), fig. 12 (Larva et pupa) as *(Discophorus)* Pl. 13 (=8B), Fig. 3 (as *discophora).*

This genus is represented in India by five species, of which two, viz., *Discophora sondaica* Boisduval and *D. deo* De Niceville are dealt with from Manipur.

Key to the species

Upperside of fore wing marked with blue spots ..... *sondaica* Boisduval

– Upperside of fore wing marked with an ochraceous brown band ... *deo* De Niceville

8. ***Discophora sondaica zal*** Westwood (Common Duffer)

1851. *Discophora zal* Westwood, In Doubleday & Westwood, *Gen. diurn. Lep.*. **2** : 331.

1932. *Discophora tullia zal* Westwood : Evans, *Identification of Indian Butterflies*: 135

1947. *Discophora sondaica zal* Westwood: Talbot, *Fauna of British India,* (Butterflies) **2** : 448.

Material examined : Manipur, 1 ex.,-xi-1913, (Capt. *Evans call).*

Fore wing length : 39 mm.

Distribution : India : Manipur, Sikkim and West Bengal.

Elsewhere : Myanmar.

Remarks : This subspecies is a definitive record for the state.

9. ***Discophora deo deo*** De Nicéville (Banded Duffer)

1898. *Discophora deo* De Niceville, *J. Bombay nat. Hist. Soc.*, **12** : 137, male, female, pl. y, fig. 10 (male, N. Shan States).

1947. *Discophora deo deo* : Talbot, *Fauna of British India,* (Butterflies), **2** : 451.

Material examined : Nil.

Fore wing expanse : Male, female, 80-90 mm.

Distribution : India : Manipur and Assam.

Elsewhere : Northern Myanmar and Southern Shan States.

Remarks : This nominate subspecies differs from *D. deo deodoides* Tytler found in Nagaland by less wing expanse and tornus of hind wing not produced. Evans (1932) mentioned its occurrence in Manipur. Its status is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

VI. Genus ***Enispe*** Doubleday

1848. *Enispe* Doubleday, *Gen. diurn. Lep.*, (2) : pl. 40, fig. 2.

Of the two species, viz., *Enispe cycnus* Westwood and *E. euthymius* (Doubleday) of this genus occurring in India, the latter is treated here from Manipur.

10. ***Enispe euthymius euthymius*** (Doubleday) (Red Caliph)

1845. *Adolias euthymius* Doubleday, *Ann. Mag. nat. Hist.*, **16** : 179.

1914. *Enispe euthymius* (Doubleday)': Tytler, *J. Bombay nat. Hist. Soc.*, **23** : (2) : 228.

1947. *Enispe euthymius euthymius* (Doubleday) : Talbot, *Fauna of British India,* (Butterflies), **2** : 460.

Material examined : Nil

Wing expanse : Male, female, 85-95 mm.

Distribution : India : Manipur (Western Manipur Hills), Assam, Meghalaya, Nagaland and Sikkim.

Elsewhere : Myanmar.

Remarks : Only this nominate subspecies occurs in India. Tytler (1914) recorded it from western Manipur Hills (along the Lengba and Irang Rivers). Talbot (1947) mentioned its two forms, *viz. tesselata* Moore collected by Tytler *(loc. cit)* from Manipur and Nagaland during March-July and November and f. *melaena* Tytler, darker than *tesselata,* collected during March-April by Tytler *(loc. cit).* These forms occur together both in dry and wet seasons.

Subfamily CALINAGINAE

Thorax clothed in part with orange or red hairs. Cell closed in both fore and hind wing,

vein R_2 arising from R_1 in fore wing, hind wing with prediscodal cell present.

This subfamily is represented in India by two genera; viz., *Calinaga* Moore and *Penthema* Doubleday of which the latter is treated here.

VII. Genus ***Penthema*** Doubleday

1847. *Penthema* Doubleday, In Doubleday, Westw. & Hewit. *Gen. diurn. Lep.*, ; pl. 39

Diagnostic characters : Eyes not hairy. Antennae equal to one half the length of costa of fore wing. Fore wing with lower discocellular vein curved. Hind wing with vein Sc + R_1 ending, as usual, at apex.

This genus is known in India by a single species, ie., *Penthema lisarda* (Doubleday).

11. ***Penthema lisarda lisarda*** (Doubleday) (Yellow Kaiser)

1845. *Diadema lisarda* Doubleday, *Ann. Mag. Nat Hist.*, (1) **16** : 233.

1932. *Penthema lisarda lisarda* (Doubleday) : Evans, *Identification of Indian Butterflies*, : 149.

1994. *Penthema lisarda* (Doubleday) : Varshney, *Oriental Insects*, **28** : 163.

Material examined : Manipur (Eastern Hills), 1 ex, no date *(De Nicéville coll.)*.

Fore wing length : 66 mm.

Distribution : India : Manipur (Eastern Hills) and Sikkim.

Remarks : This nominate subspecies is distinguished from its counterpart *P. lisarda mihintala* Fruhstorfer found is Myanmar (Chin Hills) by underside being reddish brown and in dry season form apex of fore wing is produced. Its status is rare and it has been included in Schedule–II (Part-2) of the Wildlife Protection Act.

Subfamily ACRAEINAE

Wings sparsely scaled and spotted, cell in fore and hind wing closed by tubular veins, hind wing flat; and fore legs imperfect in both sexes.

This subfamily is known in India by a single genus *Acraea* Fabricius.

VIII Genus ***Acraea*** Fabircius

1807. *Acraea* Fabricius, *Mag., f. Insekenk* (Illiger), **6** : 248.

Both the species, *viz. Acraea violae* (Fabricius) and *A. issoria* (Huebner) occur in India and treated here from Manipur.

Key to species

Antennae with a short abrupt club. Hind wing with veins M_1 and R_5 not stalked, vein R_5 arising from apex of cell .... *violae* (Fabricius)

– Antennae with a gradually formed club. Hind wing with veins M_1 and R_5 stalked well beyond upper apex of cell .... *issoria* (Huebner)

12. ***Acraea violae*** (Fabricius) (Tawny Coster)

1775. *Papilio violae* Fabricius, *Syst. em.*, : 460.

1932. *Telchinia violae* (Fabricius) : Evans, *Identification of Indian Butterflies* : 192.

1997. *Acraea violae* (Fabricius) : Gupta, *Zool. Surv. India., State Fauna Series* 3 : *Fauna of West Bengal*, Part 7 : 543.

Material examined : Manipur : Ukhrul District, Awungtang, 3 km North-West, 2000 m, 1 ex, 25ix-I975; Ukhrul, 2 exs, l-x-1975 *(M.S. Shishodia & Party coll.)*

Fore wing length : 25-28 mm.

Distribution : India : Manipur (Ukhrul District), widely distributed in India.

Elsewhere : Sri Lanka.

Remarks : The upperside of wings is tawny and bears black spots. The white spots on black border on upperside of hind wing are more prominent on underside.

13. ***Acraea issoria issoria*** (Huebner) (Yellow Coster)

1818. *Telchinia issoria* Huebner, *Zutr. Z. Samml. exot. Schmett.* **1** : 27.

1932. *Pareba vesta* Felder : Evans, *Identification of Indian Butte/flies* : 192.

1997. *Acraea issoria issoria* (Huebner) : Gupta, *Zool. Surv. India, State Fauna Series* 3 : *Fauna of West Bengal*, Part 7 : 544.

Material examined : Manipur : Churachandpur District, Bungmual, alt. 900m, 1 ex, 19-ix-1975; Senapati District, Song Song area, Mao, alt. 1756m, 2exs, 13-ix-1975; Ukhrul district, Awungtang, lex, 1-x-1975 *(M. S. Shishodia & Party).*

Fore wing length : 30 mm.

Distribution : India : Manipur (Churachandpur, Senapati and Ukhrul), Assam, Jammu & Kashmir, Meghalaya and West Bengal.

Elsewhere : Bhutan and Myanmar.

Remarks : This species exhibits sexual dimosphism as black markings on upperside of fore wing in male are broadened in female. The species is highly variable as whole of fore wing may be covered with black scaling.,

Subfamily NYMPHALINAE

Butterflies of medium to large size; antennae always at least partly scaled, with two grooves separated by a central ridge and bordered by two lateral carinae on the ventral surface; wings with terminal margins may be scalloped, crenulate or dentate, hind wing may be caudate; fore tarsi imperfect, brush like and useless for walking in both sexes, although usually longer and several segmented, often spined and rarely clawed in female; male secondary sexual characters not strongly developed except in Heliconiini.

These nymphalids have ground colour of wings bright brown or yellowish brown, some with striking or beautiful colour patterns. These are sun lovers and are often seen at flowering plants in the garden and forest. Some larger species are attracted by over-ripe fruits, toddy, excreta of animals, etc.

There is no accord on the higher classification of the subfamily Nymphalinae but the widely accepted arrangement into tribes has been followed after Eliot (1992). The following tribes are represented in Manipur.

Tribe **Heliconiini**

Tribe **Nymphalini**

Tribe **Cyrestini**

Tribe **Limenitidini**

Tribe **Pseudergolini**

Tribe **Apaturini**

Tribe Heliconiini

Labial palpi with second segment inflated. Fore wing vein Sc not dilated at base, R_2 arising from R_5 or cell, apex of cell and origin of Cu_{1a} equidistant from wing base or former more distant; hind wing with precostal vein arising beyond origin of vein Sc + R_1.

This tribe is represented in India by eight genera of which, two are treated from Manipur.

Key to genera

Claws very long and without appendages ... . *Cethosia* Fabricius

– Claws normal and with appendages .... *Argynnis* Fabricius

IX. Genus *Cethosia* Fabricius

1806 *Cethosia* Fabricius, *Mag. f Insektenk* (Illiger), **6** : 280.

This genus is known is India by three species of which two *viz. Cethosia biblis* (Drury) and C. *cyane* (Drury) are dealt with from Manipur.

Key to species

Upperside of fore wing, in either sex, without a broad oblique discal white or yellowish band ..... *biblis* (Drury)

– Upperside of fore wing, in both sexes marked with a broad oblique discal white or yellowish band .. .. *cyane* (Drury)

14. *Cethosia biblis tisamena* Fruhstorfer (Red Lacewing)

1909. *Cethosia tisamena* Frushstorfer. *In* Seitz, *Macrolepidoptera of the world* **9** : 725.

1932. *Cethosia biblis tisamena* Fruhstorfer Evans, *Identification of Indian Butterflies*: 190.

1997. *Cethosia biblis tisamena* : Gupta, *Zool. Surv. India*, State *Fauna Series*: 3 *Fauna of West Bengal*, Part, 7 : 563.

Material examinaed : Manipur : Senapati District, Song-Song area, Mao alt. 1756m, lex, 13-ix-1975, 2 km Mao North, alt. 1737 m, 2 exs. 16-ix-1975 *(M.S. Shishodia & Party coll.);* Churachandpur District, Vaiphae, alt. 900 m, lex, 3-iii-1992 *(D. K. Mandal* & S. *K. Ghosh & Party coll.).* Ukhrul District, Awungtang, lex, 1-x-1975 *(M.* S. *Shishodia & Party).*

Fore wing length : 33-46 mm.

Distribution : India : Manipur (Churachandpur, Senapati and Ukhrul), Arunachal Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : This subspecies differs from C. *biblis andamana* Stichel found in Andamans and C. *biblis nicobarica* Felder in Nicobars by the upperside of fore wing bearing discal row of marks of white horse-shoes complete from spaces Cu_{1b} or Cu_{1a} to M_3 and female varying from red, as in male, to moss green. This subspecies is a definitive record from Manipur.

15. ***Cethosia cyane*** (Drury) (Leopard Lacewing)

1770. *Papilio cyane* Drury, *ill. exot. Ent.*, **1** : pl. 4, fig. 1.

1932. *Cethosia cyane* (Drury) : Evans, *Identification of Indian Butterflies* : 190.

1997. *Cethosia cyane* (Drury): Gupta, *Zool. Surv. India, State Fauna Series*: 3, *Fauna of West Bengal*, Part 7 : 563.

Material examined : Manipur : Churachandpur District. Lathampuveng, alt. 900m., lex, 3-iii1992 *(D. K. Mandal,* S. *K. Ghosh & Party coll.).*

Fore wing length : 34 mm.

Distribution : India : Manipur (Churachandpur), Arunachal Pradesh, Orissa, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : This species is a definitive record from Manipur.

X Genus ***Argynnis*** Fabricius

1807. *Argynnis* Fabricius, *Illig. Mag.*, **6** : 283.

This genus is represented in India by 14 species of which two *viz. Argynnis hyperbius* (Linnaeus) and *A. childreni* Gray are treated from Manipur.

Key to species

Upperside of hind wing ochreous and olive green ..... *hyperbius* (Linnaeus)

– Uppers ide of hind wing dark green .... *childreni* Gray

16. ***Argynnis hyperbius hyperbius*** (Linnaeus)

1764. *Papilio hyperbius* Linnaeus, *Amoen. A cad.* **6** : 408, female.

1885. *Argynnis niphe (Linnaeus)* : Butler, *ann. Mag. nat. Hist.* (5)16 : 303.

1932. *Argynnis hyperbius hyperbius* (Linnaeus) : Evans, *Ident(fication of Indian Butterflies,* : 182.

Material examined : Nil.

Wing expanse : 70-85 mm.

Distribution : India : Manipur, Arunachal Pradesh, Madhya Pradesh, Rajasthan, Sikkim. Uttar Pradesh and West Bengal.

Elsewhere : North Myanmar, Pakistan (Baluchistan).

Remarks : This nominate subspecies di.fers from its counterparts, *viz. hyperbius castesi* Oberthuer occurring in Travancore and Palni Hills and *A. hyperbius hybrida* Evans in Nilgiris by apex of fore wing much produced in male and female and termen concave in middle, female with white band and dark blue apex of fore wing. Butler (1885) recorded it from Manipur. Varshney (1994) treated it as *Argyreus hyperbius* (Linnaeus).

17. ***Argynnis childreni childreni*** Gray (Large Silverstripe)

1831. *Argynnis childreni* Gray, *Zool. Misc.*, **1** : 33.

1932. *Argynnis childreni childreni* Gray : Evans, *Identification of Indian Butteiflies,* : 182.

Material examined : Manipur : Senapati District, Senapati, lex, 12-iv-1992 *(D. K. Mandai, S. K. Ghosh & Party coll.);* Turibari, alt. 150m., 5 Km. West of Kangpokri, lex, 9-x-1992 *(A. K. Mandal & Party coll).*

Fore wing length : 31-46 mm.

Distribution : India : Manipur (Senapati), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : North Myanmar.

Remarks : This nominate subspecies is distinguished from *A. childreni sakontala* Kollar found from Pakistan (Chitral) to India (Uttar Pradesh: Kumaon) by its wing expanse larger, more richly coloured and upperside of hind wing with marginal blue suffusion broad and prominent. This subspecies is a definitive record from Manipur.

Tribe **Nymphalini**

Fore wing with termen and dorsum subequal. vein Sc not dilated at base, R_2 arising from end cell, R_5 equidistant between R_2 and M_1 or only a little closer to M_1, R_4 arising well beyond origin of R_1 and ending at apex or on termen. Hind wing precostal vein arising beyond origin of Sc. Female fore tarsi normal and not clawed.

Of the 11 genera of this tribe known in India, four are dealt with from Manipur.

Key to genera

1. Eyes hairy 2
– Eyes named 3
2. Labial palpi hairy ..... *Araschnia* Huebner
– labial palpi smooth .... *Symbrenthia* Huebner
3. Labial palpi black above and white beneath. Head and thorax black, and each with a pair of white dots. Fore wing slightly falcate .... *Hypolimnas* Huebner
– Labial palpi not as above. Head and thorax without white dots. Fore wing markedly falcate ..... *Junonia* Huebar

XI. Genus ***Araschnia*** Huebner

1819. *Araschnia* Huebner, *Verz. bekannt. Schmett.* (3): 37.

Only a single species *Araschnia prorsoides* Blanchard occurs in India.

18. ***Araschnia prorsoides dohertyi*** Moore (Mongol)

1899. *Araschnia dohertyi Moore, Lep. Ind* **4** : 108, pl. 320, figs. 3, 3a; 3b, male female.

1932. *Araschnia prorsoides dohertyi Moore;* Evans, *Identification of Indian Butterflies* : 180.

Material examined : Nil.

Wing expanse : 51-54 mm.

Distribution : India : Manipur, Assam, Nagaland 1800-2400m.

Remarks : Only this subspecies occurs in India

XII. Genus ***Symbrenthia*** Huebner

1819. *Symbrenthia Huebner,* Yerz. bekannt. Schmett., (3) : 43.

Of the four species occurring in India, two *Symbrenthia silana* De Niceville and S. *hypselis* Godart are treated from Manipur.

Key to species

Underside of hind wing with subterminal lunules metallic cerulean blue .... *silana* De Nicéville

– Underside of hind wing with subterminal lunules metallic green ..... *hypselis* Godart

19. ***Symbrenthia silana*** De Nicéville (Scarce Jester)

1885. *Symbrenthia silana* De Niceville, *J. Asiat. Soc. Beng.*, **54** (2) : 117, pl. 2, fig. 9, male.

1994. *Symbrenthia silana* De Niceville : Varshney *Oriental Insects,* **28** : 173.

Material examined : Nil.

Fore wing expanse : 50-60 mm.

Distribution : India : Manipur (Chandel,

Eastern Manipur Hills and on the Irang River, Western Manipur Hills) and Sikkim.

Elsewhere : Bhutan.

Remarks : Bingham (1905) treated it as a race of *S. niphanda* Moore but Evans (1932) and Varshney (1994) maintained its status of separate and independent species. Tytler (1915) recorded it from near Sebong, Eastern Manipur Hills, and on the Irang River, Western Manipur Hills at low elevations in February, March and April. He (Tytler, *loc. cit.)* distinguished it from S. *niphanda* Moore. Its status is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

20. ***Symbrenthia hypselis cotanda*** Moore (Spotted Jester)

1874. *Symbrenthia cotanda* Moore, *Zool. Soc. Lond.*, : 569, pl. 46, fig. 9.

1932. *Symbrenthia hypselis cotanda* Moore' Evans, *Identification of Indian Butterflies*: 181.

1997. *Symbrenthia hypselis cotanda* Moore: Gupta, *Zool Surv. India, State Fauna Series* 3, *Fauna of West Bengal,* Part 7 : 571.

Material examined : Nil.

Wing expanse : 45-55.

Distribution : India : Manipur, Arunachal Pradesh, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : Evans (1932) mentioned occurrence of two subspecies of S. *hypselis* Godart, *viz., brabira* Moore and *cotanda* Moore in India. Varshney (1994). followed Bingham (1905) treating both these subspecies as separate species. This subspecies was reported from Manipur by Roonwal and Avinash Chandra (1961-63).

XIII Genus ***Hypolimnas*** Huebner

1819. *Hypolimnas* Huebner, *Verz. bekannt. Schmett.* (3) : 45.

Two species, *viz., Hypolimnas bolina* (Linnaeus) and *H. misippus* (Linnaeus) represent this genus in India and the latter is treated from Manipur.

21. ***Hypolimnas misippus*** (Linnaeus) (Danaid Eggfly)

1764. *Papilio misippus* Linnaeus, *Mus. Ulr.*, : 264.

1932. *Hyolimnas misippus* (Linnaeus) : Evans, *Identification of Indian Butterflies* : 173.

1997. *Hypolimnas misippus* (Linnaeus): Gupta, *State Fauna Series* 3 : *Fauna of West Bengal.* Part 7 : 560.

Material examined : Manipur : Churachandpur District, Bungmual, 900 m 1 ex, 19-ix-1975 (M. S. *Shishodia coll.).*

Fore wing length : 33 mm.

Distribution : India : Manipur (Churachandpur), Andaman & Nicobar Islands, Arunachal Pradesh, Sikkim. Uttar Pradesh and West Bengal.

Elsewhere : Myanmar, Pakistan and Sri Lanka.

Remarks : The female of this species is polymorphic. It mimicks the female of *Danaus chrysippus* (Linnaeus) of the subfamily Danainae. It is included in Schedule-I (Part-4) and Schedule-II (Part-2) of the Indian Wild Life Protection Act.

XIV Genus ***Junonia*** Huebner

1816. *Junonia* Huebner. *Verz. bek. Schmett.*, : 34.

All the six species of this genus occurring in India are treated from Manipur.

Key to species

1. Upperside of fore wing without an ocellus in area Cu_{1a} ..... *iphita* (Cramer)
– Upperside of fore wing with a black spot of variegated ocellus in area Cu_{1a} 2
2. Uppers ide of hind wing with a black spot in space Cu_{1a} ..... *hierta* (Fabricius)
– Upperside of hind wing with a variegated ocellus in space Cu_{1a} 3
3. Upperside of fore wing and hind wing with submarginal ocelli in all spaces .... *atlites* (Linnaeus)
– Upperside of fore wing and hind wing without submarginal ocelli in spaces Cu_{1b} and M_3 4

4. Upperside of fore wing with whitish subapical band ..... *orithya* (Linnaeus)

– Uppers ide of fore wing without a whitish subapical band 5

5. Upperside of fore wing born with pale yellow spots..... *lemonias* (Linnaeus)

– Upperside of fore wing fulvous orange and without pale yellow spots ....*almana* (Linnaeus)

22. ***Junonia iphita iphita*** (Cramer) (Chocolate Soldier)

1779. *Papilio iphita* Cramer, *Pap. exot.*, 3 : pl. 209, fig. C, D.

1932. *Precis iphita iphita* (Cramer) : Evans: *Identification of Indian Buttetflies* : 177.

1992. *Junonia iphita* (Cramer) : Eliot, In Corbet: Pendlebury, *Butterflies of Malay Peninsula,* : 159.

Material examined : Manipur : Churachandpur Dist., Rakhai, alt. 850 m, 3 exs, 4-iv-1992, alt. 900 m, 1 ex 5-iv-1992; Saikot, 850 m, 3 exs, 4-iv-1992; Senapati District, Kangpokari, alt. 850 m, 2 exs., 10-iv-1992 *(D. K. Mandal* & S. *K. Ghosh & Party).*

Fore wing length : 25-29 mm.

Distribution : India : Manipur (Churachandpur and Senapati), Arunachal Pradesh, Assam, Sikkim and West Bengal.

Elsewhere : Myanmar.

Remarks : This nominate subspecies differs from *J. iphita pluviatalis* Fruhstorfer found in South India, Madhya Pradesh, (Central India), Maldives and Sri Lanka and *J. iphita siccata* Stichel from Kashmir to Kumaon by darker colouration and larger wing expanse (55-80 mm). It is a definitive record from Churachandpur and Senapati Districts.

23. ***Junonia hierta magna*** (Evans) (Yellow Pansy)

1926. *Precis hierta magna* Evans. *J. Bombay nat. Hist. Soc.*, **31** : 715.

1932. *Precis hierta magna* Evans : Evans, *Identification of Indian Butterflies*: 176.

1994. *Junonia hierta* (Fabricius) : Varshney, *Oriental Insects,* **28** : 176.

Material examined : Manipur : Churachandpur District, near Forest Office Morch, 1 ex, 24-ii 1995 *(P. T. Cherian & Party, coll.),* Christian Villa, 1 ex, 22-iii-1992, Methai alt. 800 m, 2 exs, 2-iv-1992, Huranung, 800m, 1 ex, 2-iv-1992 *(D. K. Mandal,* S. *K. Ghosh & Party coll.).*

Fore wing length : 20-25 mm.

Distribution : India : Manipur (Churachandpur), Andamans, Arunachal Pradesh, Assam, Sikkim and West Bengal.

Elsewhere : Myanmar.

Remarks : This subspecies differs from its counterpart, *J. hierta hierta* Fabricius found in other parts of India, Pakistan (Baluchistan) and Sri Lanka by its larger wing expanse and brighter colouration. It is a difinitive record from Churachandpur District.

24. ***Junonia atlites*** (Linnaeus) (Grey Pansy)

1763. *Papilio atlies* Linnaeus, *Centur. Ins..* : 24.

1932. *Precis atlites* (Linnaeus) : Evans, *Identification of Indian Butterflies*: 176.

1994. *Junonia atlites* (Linnaeus) : Varshney, *Oriental Insects,* **28** : 176.

Material examined : Manipur : Churachandpur District, Rakhai, 1 ex, 4-iv-1992; Impha1 District, lrioshemba, alt. 800m, 12-iv-1992 *(D. K. Mandal,* S. *K. Ghosh & Party coll);* Imphal District, lrioshemba, lex, 30-x-1992 *(P. H. Roy & Party coll).*

Fore wing length : 27-29 mm.

Distribution : India : Manipur (Churachandpur and Imphal), Sikkim, widely distributed.

Elsewhere : Myanmar and Sri Lanka.

Remarks : This species is a definitive record from Churachandpur and Imphal Districts.

25. ***Junonia orithya ocyale*** Huebner (Blue Pansy)

1819. *Junonia ocyale* Huebner, *Verz. Bekannt. Schmett.*, : 34.

1932. *Precis orithya ocyale* (Huebner) : Evans, *Identification of Indian Butterflies*: 176.

1994. *Junonia orithya* (Linnaeus) : Varshney, *Oriental Insects* **28** : 176.

Material examined : Manipur : Churachandpur District, Song Sang area Mao, alt. 1756m, 2 exs, 13-ix-1975 (M. S. *Shishodia and Party coll.);* Methai, alt. 800 m, 2 exs.; 2-iv-1992, Rakhai, 850 m, 3 ex., 4-iv-1992, Saikhot, 850, 4 exs, 4-iv-1992, *(D. K. Mandal* & S. *K. Ghosh coll.).* Chandel District, Leikul, 900 m, 2 exs, 29-iii-1992, Sinadam colony, 900 m, 2 ex., 29-iii-1992 *(D. K. Mandal* & S. *K. Ghosh coll.).* Bishnupur District, Lonkoipot, 800 m., 3 exs, 7-ix-1992 *(D. K. Kandal* & S. *K. Ghosh coll.).* Imphal District, Iroishmba, 800 ml, 2 ex., 2-ix-1992, 2 exs, 12-iv1992 *(D. K. Mandal* & S. *K. Ghosh coll.).* Ukhrul District, Ukhrul 1890m, 2 exs, 4-iii-1997 *(P. T. Cherian & Party coll.).*

Fore wing length : 20-29 mm.

Distribution : India : Manipur (Bishnupur, Churachandpur, Chandel, Imphal, Senapati and Ukhrul), Arunachal Pradesh, Assam, Sikkim and West Bengal.

Elsewhere : Myanmar.

Remarks : This subspecies differs from *J. orithya swinhoei* Butler occurring in other parts of India, Baluchistan and Sri Lanka by its comparatively large wing expanse and underside being darker. It is a definitive record from districts, *viz.* Bishnupur, Chandel, Churachandpur, Imphal, Senapati and Ukhrul.

26. ***Junonia lemonias lemonias*** (Linnaeus) (Lemon Pansy)

1758. *Papilio lemonias* Linnaeus, *Syst. Nat.* ed. **10** : 473.

1932. *Precis lemonias lemonias* (Linnaeus) : Evans, *Identification of Indian Butterflies* : 176.

1994. *Junonia lemonias* (Linnaeus) : Varshney, *Oriental Insects,* 28 : 176.

Material examined : Manipur, Churachandpur District, Rakhai, 850 m, 2 ex, 2-iv-1992 *(D. K. Mandal* & S. *K. Ghosh Party).*

Fore wing length : 23-25 mm.

Distribution : India : Manipur (Churachandpur), Arunachal Pradesh, Sikkim.

Elsewhere : Myanmar.

Remarks : This nominate subspecies is distinguished from *J. lemonias vaisya* Fruhstorfer occurring in Central India, South India and Sri Lanka and *J. lemonias persicaria* Fruhstorfer from Kashmir to Kumaon mainly by its larger wing expanse. It is a definitive record from Churachandpur district.

27. ***Junonia almana almana*** (Linnaeus) (Peacock Pansy)

1758. *Papilio almana* Linnaeus, *Syst. Nat.* (ed 10) : 472.

1932. *Precis almana almana* (Linnaeus) : Evans, *Identification of Indian Butterflies*: 176.

1994. *Junonia almana* (Linnaeus): *Oriental Insects,* 28 : 176.

Material examined : Manipur, Churachanpur District, Joya Hill, Keibul Sanctury, 1 ex, 18-ii-1975 *(P T. Cherian and Party coll)*; Vaiphae, 900m, 1 ex, 3-iii-1992 *(D. K. Mandal* & S. *K. Ghosh and Party coll.).*

Fore wing length : 26 mm.

Distribution : India : Manipur (Churachandpur), Andamans and widely distributed.

Elsewhere : Myanmar, Sri Lanka.

Remarks : This nominate subspecies is distinguished from *J. almana nicobariensis* Felder found in Car Nicobars mainly by its larger wing expanse. It is a definitive record from Churachandpur.

Tribe **Cyrestini**

Fore wing and hind wing marked with transverse lines and stripes running across their surfaces. Fore wing with vein Sc not dilated at base, R_4 ending on coata; hind wing precostal vein arising beyond origin of Sc + R_1

This tribe is represented in India by two genera, *viz., Chersonesia* Distant and *Cyrestis* Boisduval of which the former is dealt with.

XV. Genus ***Chersonesia*** Distant

1883. *Chersonesia* Distant, *Rhop. Malay.*, : 142.

This genus is represented in India by two species, *viz.*, *Chersonesia risa* (Doubleday) and C. *rahroides* Moore and these are treated here from Manipur.

Key to species

Fore wing with sixth. line from base, quite straight throughout and parallel to others ... . *risa* (Doubleday)

– For wing with sixth line from base sinuous and much curved at upper end .... *rahroides* Moore.

28. ***Chersonesia risa*** (Doubleday) (Common Maplet)

1850. *Cyrestis risa* Doubleday, In Doubleday, *Westwood & Hewitson Gen. diurn Lep.*, **2** : 262, pl. 32, fig. 4.

1932. *Chersonesia risa* (Doubleday & Hewitson) : Evans, *Identification of Indian Butterflies* : 173.

1997. *Chersonesia risa* (Doubleday) : Gupta, *Zool. Surv. India, State Fauna Series* 3 : *Fauna of West Bengal.* Part 7 : 557.

Material examined : Manipur, Eastern Hills, 1 ex, April-May, *(De Nicéville coll.).*

Fore wing length : 19 mm.

Distribution : India : Manipur (Eastern Hills), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Bhutan Myanmar and Nepal.

Remarks : This species a definitive record from Manipur.

29. ***Chersonesia rahroides*** Moore (Wavy Maplet)

1899. *Chersonesia rahroides Moore, Lep. Ind.*, : 56, pl. 307, fig. 4, 4a.

1932. *Chersonesia rahria rahroides* Moore: Evans, *Identification of Indian Butterflies* : 173.

1994. *Chersonesia rahroides* Moore: Varshncy, *Oriental Insects,* **28** : 178.

Material examined : Nil.

Wing expanse : 35-45 mm.

Distribution : India : Manipur (Chandel) and Nagaland.

Elsewhere : Myanmar.

Remarks : Tytler (1915) collected a few specimens of males and females from Sebong in October and April. The males collected in October exhibited much variation in size and depth of colour. Its status is rare and it has been listed in Schedule II (Part-2) of the Indian Wild Life Protection Act.

Tribe **Limenitidini**

Fore wing vein Sc not dilated at base, R_2 arising before end cell, origin of R_4 opposite or beyond end of R_1, R_4 ending at apex or on termen, R_5 arising close to M_1 than R_2; termen and dorsum subequal. Hind wing precostal vein arising opposite or beyond origin of vein Sc + R_1.

Of the 21 genera of this tribe known in India, 11 are dealt with from Manipur.

Key to genera

1. In hind wing precostal vein arising at or before the origin of vein Sc 2

– In hind wing precostal vein arising beyond the origin of vein Sc 6

2. In hind wing vein Sc ending on costa .... *Neptis* Fabricius

– In hind wing vein Sc reaching termen ...3

3. Hind wing cell open 4

– Hind wing cell closed 6

4. Fore wing lower discocellular vein ending well beyond origin of Cu_{1a} .... *Moduza* Moore

– Fore wing cell open or, if closed, with lower discocellular vein ending close to vein Cu_{1a} 5

5. Proximal end of abdomen with a pale band (except in *selenophora* male), the latter with a longitudinal whitish cell streak on underside of fore wing) .... *Athyma* Westwood

– Proximal end of abdomen without a pale band. Underside of fore wing without any whitish cell streak ..... *Parasarpa* Moore

6. Upperside of fore wing with a highly zig zagged postdiscal double line .... *Bhagadatta* Moore

– Upperside of fore wing without any zig zagged postdiscal double line .... *Sumalia* Moore

7. In fore wing vein R_4 arising before ending of R_2 8

– In fore wing vein R_4 arising beyond ending of R_2 8

8. Labial palpi with thin long hairs. Fore wing vein R_3 distorted; hind wing precostal forked at end ..... *Parthenos* Huebner

– Labial palpi smooth. Fore wing vein R_3, R_2 and R_1 distorted; hind wing precostal curved forwar ..... *Lebadea* Felder

9. Fore wing cell open 10

– Fore wing cell closed II

10. Thorax relatively slender. Fore wing with veins R_1 and Sc anastomosed in both sexs; in female vein R_2 arising approximately midway between apex of cell and origin of ..... *Tanaecia* Butler

– Thorax robust. Fore wing with veins R_1 and Sc free in male; free or anastomosed in female and with vein R_3 arising close to cell apex and remote from R_4 .... *Euthalia* Huebner

11. Fore wing lower discocellular vein ending well beyond origin of CU_{1a}; veins R_1 and Sc anastomosed in one or both sexes. Underside of fore wing with two contiguous central cell spots echeloned one below the other. ..... *Lexias* Biosduval

– Fore wing lower discocellular vein ending close to origin of vei : Cu_{1a}; veins R_1 and Sc free in both sexes. Underside of fore wing with central cell spot undivided .... *Bassarona* Moore.

XVI Genus *Neptis* Fabricius

1807. *Neptis* Fabricius, *Mag. f. Insektenk.* (Hliger), **6** : 282.

Of the 25 species of this genus occurring in India, seven are treated from Manipur.

Key to species

1. Uppers ide of fore wing cell streak always divided into a basal streak and a spot beyond 2

– Upperside of fore wing cell streak and a spot beyond it conjoined 3

2. Underside of wings with some shade of yellow to ochreous, hind wing discal band and usually most of other white markings outlined by black lines ..... *hylas* Linnaeus

– Underside of wings always more reddish, hind wing discal band and other white markings usually weakly outlined by black ..... *sappho* Pallas

3. Uppers ide of fore wing with cell streak extending into base of area 3 4

– Uppers ide of fore wing with cell streak not entering into base of area 3 5

4. Underside of fore wing with costal spot or spots above end cell-streak .... *narayana* Moore

– Underside of fore wing without costal spots above end cell-streak ..... *zaida* Westwood

5. Upperside fore wing with discal spots in area 1 and 2 conjjoined or very close. Underside of hind wing basal costal streak narrow; obscure streak at base of cell .... *miah* Moore

– Upperside fore wing with discal spot in area 1 and 2 well separated. Underside of hind wing with basal costal streak broad and no streak at base of cell 6

6. Upperside markings broader and paler. cilia very obscurely chequered. Female with fore wing upper and lower post discal bands well separated ..... *ananta* Moore

– Upperside markings narrower and rich 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

30. *Netpis hylas kamarupa* Moore (Common Sailer)

1875. *Neptis kamarupa* Moore, *Proc. zool. Soc. Lond.*. : 570, ♂♀.

1932. *Neptis hylas adara* Moore: Evans, *Identification of Indian Butterflies.* : 166.

1969. *Neptis hylas kamarupa* Moore: Eliot, *Bull. Br. Mus. nat. Hist.*. Entomology, London, Suppl., **15** : 61.

Material examined : Manipur 1 ex, ix-12 *(Evans coll).* Churachandpur District, Bungmual, 914 m, ex, 19-ix-1975 *(M. S. Shishodia and Party coll.);* Rekhai, 900 m, 1 ex, 5-iv-1992 *(D. K. Mandal,* S. *K. Ghosh & Party coll.);* Reserve Forest area, 1 ex, ll-xii-1992 *(P. H. Roy and Party coll.),*

Fore wing length : 23-26 mm.

Distribution : India : Manipur (Churachandpur), Assam, and Uttar Pradesh.

Elsewhere : Myanmar, North and South Vietnam and Thailand.

Remarks : Evans (1932) referred its distribution from Assam to Myanmar. Eliot (1969) mentioned that Moore (1899) erroneously treated *kamarupa* as a synonym of subspecies *varmona* occurring in Peninsular India. It is a definitive record from Churachandpur District.

31. *Neptis sappho astola* Moore (Common Sailer)

1872. *Neptis astola* Moore, *Proc. zool. Soc. Lond.*, : 560.

1932. *Neptis hylas astola* Moore: Evans, *Identification of Indian Butterflies,* : 166.

1969. *Neptis sappho astola* Moore: Eliot, *Bull. Br. Mus. nat. Hist.*, Enjtomology, Supp!. **15** : 60.

Material examined : Manipur, Churachandpur District, Churachandpur, 900 m, 1 ex, 2-iii-1993 *(D. K. Mandal,* S. *K. Ghosh & Party col!.).*

Fore wing length : 25 mm.

Distribution : India: Manipur (Churachandpur), Arunachal Pradesh, Jammu & Kashmir and Sikkim.

Elsewhere : Myanmar.

Remarks : Eliot (1969) held *sappho* (Pallas) and *hylas* Linnaeus as distinct species. The occurrence of *N. sappho astola* Moore in Manipur is a definitive record from Churachandpur District.

32. *Neptis narayana nana* De Nicéville (Broad Stick Sailer)

1888. *Neptis nana* De Nic6ville, *J. Asiat, soc. Beng.*, **57**(2) : 273-293, 2 pls.

1969. *Neptis narayana nana* De Niceville; Eliot, *Bull. Br. Mus., nat. Hist.*, Entomology, Suppl., **15** : 107.

Material examined : Nil.

Wing expanse : 60-70 mm.

Distribution : India : Manipur, Nagaland and Sikkim.

Elsewhere : Bhutan.

Remarks : This subspecies differs from the nominate subspecies found from Kulu to Kumaon by upperside of wings bearing yellow markings. Its status is rare and it has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

33. *Neptis zaida manipurensis* Tytler (Pal a Yellow Sailer)

1926. *Neptis zaida manipurensis* Tytler, *J. Bombay nat. Hist. Soc.* **31** : 583, p!. 2, fig. 6, male, Manipur male cotype BMNH.

1932. *Neptis zaida manipurensis* Tytler : Evans, *Identification of Indian Butterflies* : 170.

1969. *Neptis zaida manipurensis* Tytler : Eliot, *Bull Br. Mus.* (Ent.), Suppl. **15** : 102.

Material examined : Nil.

Wing expanse : 65-75 mm.

Distribution : India : Manipur

Remarks : This subspecies differs from *Neptis zaida bhutanica* Tytler occurring in Sikkim, Bhutan and the nominate one found from Pakistan

(Murree) to India : Uttaranchal (Kumaon) by the upperside of wings bearing orange yellow markings and underside with sharply defined red brown markings.

34. *Neptis miah miah* Moore (Small yellow sailer)

1857. *Neptis miah* Moore, *Cat Lep. Ins. Mus., East. India Coy.*, : 164, pl. 4a, fig. 1, ♂, Darjeeling.

1932. *Neptis miah miah* Moore: Evans, *Identification of Indian Butterflies* : 169.

Material examined : Manipur : Manipur, 1 ex, -xii-12, *(no coll.).*

Fore wing length : 21 mm.

Distribution : India : Manipur, Assam, Arunachal Pradesh and West Bengal.

Remarks : This nominate subspecies is distinguished from *N. maih nolana* Druce found in Myanmar by uppers ide of fore wing with spots in area 1A + 2A and CU_{1b} separated by black vein, and underside of wings having more or less whitish markings particularly the band on hind wing. It is a definitive record from Manipur.

35. *Neptis ananta ochracea* Evans (Yellow Sailer)

1924. *Neptis ananta ochracea* Evans, *J. Bombay nat. Hist.* Soc. **21** : 79.

1932. *Neptis ananta ochracea* Evans: Evans, *Identification of Indian Butterflies* : 168.

1969. *Neptis ananta ochracea* Evans : Eliot, *Bull. Br. Mus.* (Ent.) Suppl. **15** : 99.

Material examined: Nil.

Wing expanse : (not given)

Distribution : India : Manipur, Meghalaya, Nangaland and Sikkim,

Elsewhere : Bhutan.

Remarks : This subspecies differs from the nominate one occurring from Himachal Pradesh (Chamba) to Uttaranchal (Kumaon) by the underside of wings bearing dark ferruginous markings. Eliot (1969) mentioned that specimens from Sikkim and Bhutan are 'not quite common'

36. *Neptis namba namba* Tytler (Yellow Sailer)

1915. *Neptis namba* Tytler, *J. Bombay nat. Rist. Soc.* **23** : 510, pl. 3, fig. 20, ♂.

1932. *Neptis namba namba* Tytler : Evans, *Identification of Indian Butteifiies* : 170.

1969. *Neptis namba namba* Tytler : Eliot, *Bull. Br. Mus., nat. Hist.* London, Suppl, **15** : 100.

Material examined : Nil.

Wing exapanse : 55-70 mm.

Destribution : India : Manipur, Assam and Nagaland.

Elsewhere : North Myanmar and Tonkin.

Remarks : Tytler (1915) described this species on the basis of specimens collected from Nagaland and Manipur(on Myanmar and Cachar Roads). Evans (1932) also mentioned its occurrence in Manipur and Nagaland. The seasonal forms do not differ markedly.

XVII Genus *Moduza* Moore

1819. *Moduza* Moore, *Lep. Ceylon.* **1**(2) : 47.

This genus is represented in India by a single species—*Moduza procris* (Cramer).

37. *Moduza procris procris* (Cramer) (Commander)

1777. *Papilio procris* Cramer, *Pap. exot.*, **2** : Pl. 106, figs., E, F.

1885. *Moduza procris* (Cramer) : Bulter, *Ann. Mag. nat., Hist.* (5) **16** : 304.

1932. *Limenitis procris* (Cramer) : Evans, *Identification of Indian Butterflies.*

2003. *Moduza procris procris(Cramer)* : Gupta, *Zool. Surv. India, State Fauna Series* 9, *Fauna of Sikkim,* Part-3 : 26.

Maierial examined : Nil.

Wing expanse : Male, female, 95-115 mm.

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

Elsewhere : Mynmar.

Remarks : Only this nominate subspecies occurs in India. Butler (1885) recorded it from Manipur.

XVIII Genus *Athyma* Westwood

1850. *Athyma* Westwood, In Doubeiday's, *Gen. diurm. Lep.*, (2) : 272.

This genus is represented in India by 13 species of which six are dealt with from Manipur.

Key to the species

1. Fore wing cell closed 2
- Fore wing cell open 5
2. Fore wing upperside with prominent discal spot in space Cu_{1a}. In female, upperside of wings with white or sullied brownish bands 3
- Fore wing upperside without any prominent discal spot in space Cu_{1a}. In female, upperside of wings with broad orange marking normally arranged 4
3. Fore wing underside with the discal streak twice divided by a brown line across cell; a triangular spot at base of space M_2, beyond cell well separated ..... *selenophora* (Kollar)
- Fore wing underside with the discal streak entire and hardly separated from the spot at end cell in space M_3 ..... *zeroca* Moore
4. In male, fore wing underside with discal streak much broken. In female, discfll spots in spaces M_3, M_2 and M_1 forming a continuous, even edged apical band .... *nefte* (Cramer)
- In male, fore wing underside with discal streak continuous but upper edge irregular. In female, a small discal spot in space M_3 and against outer edge spot in space Cu_{1a}... .....*cama* Moore
5. Fore wing upperside with a discal spot present in space Cu_{1a} ..... *larymna* (Doubleday)
- Fore wing uppers ide without a discal spot in space Cu_{1a} ..... *perius* (Linnaeus)

38. *Athyma selenophora selenophora* (Kollar) (Staff Sergeant)

1844. *Liminitis selenophora* Kollar, In *Huegel's Kashmir,* 4(2) : 426, pl. 7, figs. 1,2.

1997. *Athyrna selenophora selenophra* (Kollar) : Gupta, *Zool. Surv. India, State Fauna Series* 3 : *Fauna of West Bengal.* Part-7 : 587.

Material examined : Manipur : Manipur, 2 exs, -xi-12, *(W. H. Evans call.).* Eastern Hills, 1 ex, April-May, *(De Nicéville call.)* Chandel District, Sinadam, 900 m., 1 ex, 12-iv-1992 *(D. K. Mandal, S. K. Ghosh & Party call.).*

Fore wing length : 30-32 mm.

Distribution : India : Manipur (Chandel, Eastern Hills), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : This nominate subspecies is distinguished from its counterpart, *A. selenophora kanara* Evans found in South India by uppers ide of wings darker with narrow bands in male and broad white markings in female. It is a definitive record from Chandel District and Eastern Hills in Manipur.

39. *Athyma zeroca* Moore (Small Staff Sergeant)

1872. *Athyrna zeroca* Moore, *Proc. zool. Soc. Lond.*, : 564.

1932. *Pantoporia zeroca* (Moore); Evans *Identification of Indian Butterflies,*: 162.

1997. *Athyrna zeroca* Moore: Gutpa, *ZooL Surv. India, State Fauna Series* 3 : *Fauna of West Bengal,* Part-7 : 587-88.

Material examined : Manipur (Eastern Hills), 1 ex., April-May, *(De Nicéville coll.).*

Fore wing length : 29 mm.

Distribution : India : Manipur (Eastern Hills), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Remarks : This species is a definitive record from Eastern Hills.

40. *Athyma nefte inara* (Doubleday) (Colour Sergeant)

1850. *Lirnenitis inara* Doubleday, In Doubleday, *Gen. diurn. Lep.* 2 : pl. 34, fig. 30.

1932. *Pantoporia nefte inara* (Doubleday); Evans, *Identification of Indian Butterflies,* : 166.

1997. *Athyrna nefte inara* (Doubleday) : Gupta *Zool. Surv. India, State Fauna Series* 3, *Fauna of West Bengal.* Part 7 : 588.

Material examined : Manipur : Manipur, 1 ex, -ix-1912 *(W. H. Evans, coll.* Indian Museum).

Fore wing length : 28 mm.

Distribution : India : Manipur, Arunachal Pradesh, Odssa, Sikkim, South India and West Bengal.

Elsewhere : North Myanmar.

Remarks : This subspecies differs from *A. nefte rufula* De Nicéville found in Andamans by upperside of hind wing bearing broad orange post discal band in male, apical orange markings and always a small discal spot in space Cu_{1a}. It is a definitive record from Manipur.

41. ***Athyma cama*** Moore
(Orange staff sergeant)

1857. *Athyma cama* Moore. *Cat. Lep. Ins. Mus. East., India Coy,* **1** : 174 pl. 5, fig. 5 ♂♀.

1932. *Pantoporia cama* (Moore) : Evans, *Identification of Indian Butterflies,* 162

1997. *Athyma cama* Moore: Gupta, *Zool. Surv. India, State Fauna Sries* : 3, *Fauna of West Bengal,* Part 7 : 588.

Material examined : Manipur, (Eastern Hills), 1 ex, April-May, *(De Niceville coll).*

Fore wing length : 32 mm.

Distribution : India : Manipur, (Eastern Hills), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : North Myanmar.

Remarks : This species is a definitive record from Eastern Hills in Manipur.

42. ***Athyma perius*** (Linnaeus)
(Common Sergeant)

1758. *Papilio perius* Linnaeus, *Syst. nat.,* **10** : 471.

1932. *Pantoporia perius* (Linnaeus) : Evans, *Identification of Indian Butterflies*: 164.

1997. *Athyma perius* (Linnaeus) : Gupta: *Zool. Surv. India., State Fauna Series* 3.', *Fauna of West Bengal,* Parts 7 : 587.

Material examined : Manipur : Manipur (Assam), 1 ex, -ix-1912 *(Evans coll.).* Senapati District, Kangpokri, 1 ex, 12-iii-1992; Bishnupur District, Loukoipot, 800m, 1 ex, 7-iv-1992 *(D. K. Mandai, S. K. Ghosh & Party call.).* Churachandpur District, Lathampurveng, 900m., 2 exs, 3-iii-1992, *(D. K. Mandai,* S. *K. Ghosh & Party coll)* ; Chaldongkam, I ex, 4-iv-1992 *(A. K. Sanyal & Party coll.).*

Fore wing length : 28-31 mm.

Distribution : India : Manipur (Bishnupur, Churachandpur and Senapati), Arunachal Pradesh, Himachal Pradesh, Sikkim, South India and West Bengal.

Elsewhere : Myanmar and Nepal.

Remarks : This species is a definitive record from Bishnupur, Churachandpur and Senapati Districts, in Manipur. It is widely distributed in India.

43. ***Athyma larymna siamensis*** (Fruhstorfer)
(Great Sergeant)

1906. *Pantoporia siamensis* Fruhstorfer, *Verh. Zool. bot. Ges. Wien,* **56** : 394.

1915. *Athyma larymna* (Doubleday) : Tytler, *J. Bombay nat. Hist. Soc.,* **23** : 508.

1932. *Pantoporia larymna siamensis* Fruhstorfer : Evans, *Identification of India Butterflies,* : 164.

1994. *Athymna larymna siamensis* (Fruhstorfer) : Varshney, *Oriental Insects,* **28** : 180.

Material examined : Nil.

Wing expanse : 75-100 mm.

Distribution : India : Manipur (Chandel).

Elsewhere : South Myanmar.

Remarks : Tytler (1915) collected male and female specimens of this subspecies from Sebong in March and July, respectively. Its status is rare and it has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

XIX. Genus ***Parasarpa*** Moore

1898. *Parasarpa* Moore, *Lep. indica,* **3**(32) : 146.

Two species, *viz., Parasarpa dudu* (Westwood) and *P. zayla* (Doubleday) of this genus occur in India of which the latter is treated from Manipur.

44. ***Parasarpa zayla*** (Doubleday) (Bicolour Commodore)

1850. *Limenitis zayla* Doubleday, In Doubleday, Westwood & Hewitson *Gen. diurn. Lep.*, **2** : 276,.pl. 35, fig. 4.

1932. *Limenitis zayla* Doubleday: Evans, *Identification of Indian Buttterflies* : 160.

1994. *Parasarpa zayla* (Doubleday) : Varshney, *Oriental Insects*, **28** : 181.

Material examined : Manipur, 1 ex, -viii-1913 *(Capt. Evans call.).*

Fore wing length: 40 mm.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Meghalaya, Sikkim and West Bengal.

Elsewhere : Bangladesh.

Remarks : This species is a definitive record from Manipur.

XX. Genus ***Bhagadatta*** Moore

1898. *Bhagadatta* Moore, *Lep. indica*, 3(32) : 146, 154.

This genus is known in India by a single species, *Bhagadatta austenia* Moore.

45. ***Bhagadatta austenia austenia*** (Moore) (Grey Commodore)

1872. *Lebadea austenia* Moore, *Proc. zool. Soc. Lond.*, : 560, pl. 32, fig. 1e.

1932. *Limenitis austenia austenia* (Moore) : Evans, *identification of Indian Buttellies*, : 160.

1994. *Bhagadatta austenia austenia* (Moore) : Varshney, *Oriental Insects*, **28** : 181.

Material examined : Nil.

Fore wing length : 85-90 mm.

Distribution : India : Manipur (Lengba and Irang Rivers).

Elsewhere : North Myanmar.

Remarks : This nominate subspecies is distinguished from B. *austenia purpurascens* Tytler and known from Abor Valley (Arunachal Pradesh) by upperside of wings not purple glossed and underside grey. Tytler (1915) reported its occurrence near the Lengba and Irang Rivers, on the Cachar Road, Manipur, in April and May. Its status is rare and it has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act. Assam and Nagaland.

XXI. Genus ***Sumalia*** Moore

1898. *Sumalia* Moore, *Lep, Indica*, 3(32) : 146, 150.

This genus is represented in India by two species *viz., Swnalia daraxa* (Doubleday) and S. *zulema* (Doubleday) of which the former is dealt with from Manipur.

46. ***Sumalia daraxa*** (Doubleday) (Green Commodore)

1850. *Limenitis daraxa* Doubleday, In Doubleday, Westwood & Hewitson, *Gen. diurn. Lep.*, **2** : 276, pl. 34, fig. 4.

1932. *Limenitis daraxa* Doubleday & Hewitson : Evans, *Identification of Indian Butterflies* : 160.

1994. *Swnalia daraxa* (Doubleday) : Varshney, *Oriental Insects*, **28** : 181.

Material examined : Manipur, 2 exs, no date *(De Niceville coll.).*

Fore wing length : 30-31 mm.

Distribution : India : Manipur, Arunachal Pradesh and Sikkim.

Elsewhere : Myanmar.

Remarks : This species is a definitive record from Manipur.

XXII. Genus ***Parthenos*** Huebner

1819. *Parthenos* Huebner, *Verz. bekannt. Schmett.*, (3) : 38.

This genus is represented in India by a single species, *Parthenos sylvia* (Cramer).

47. ***Parthenos sylvia gambrisius*** (Fabricius) (Clipper)

1787. *Papilio gambrisius* Fabricius, *Mantissa Ins.* **2** : 12.

1905. *Parthenos gambrisius* (Fabricius) : Bingham *Identification of Indian* (Butterflies), **1** : 288-289.

1932. *Parthenos sylvia gambrisius* (Fabricius) : Evans, *Identification of Indian Butterflies*, : 159.

Material examined : Nil.

Wing expanse : 95-110 mm.

Distribution : India : Manipur, Arunachal Pradesh, Assam and Eastern Bengal.

Elsewhere : Myanmar.

Remarks : The subspecies differs from its other counterparts, *viz., virens* Moore occurring in South India, *roepstorfi* Moore in Andamans and *nila* Evans in South India by upperside of wings rather pale bluish green in dry season form and upperside of fore wing with apex whitish and white spots more continguous. The species *P. sylvia* (Cramer) has been included in Schedule-II (Part-2) of the Indian Wild Life (Protection) Act. Bingham (1905) mentioned its occurrence in Manipur.

XXIII. Genus *Lebadea* Felder

1861. *Lebadea* Felder, *Nova Acta Leop. Carof* **28** : (3) : 28.

This genus is represented in India by a single species-*Lebadea martha* (Fabricius).

48. *Lebadea martha ismene* Doubleday (Kinght)

1850. *Lebadea ismene* Doubleday. *In* Doubleday, Westwood & Hewitson, *Gen. Dium Lep.* **2** : 276, pl. 34. fig. 2 male.

1886. *Lebadea ismene* Doubleday : De Nicéville *Butterflies of India, Burmah and Ceylon*, **2** : 153, pl. 19, fig. 79 male.

1932. *Lebadea martha ismene* Doubleday : Evans, *Identification of Indian Butterflies*: 159.

Material examined : Nil.

Wing expanse : 60-70. mm.

Distribution : India : Manipur and Assam.

Remarks : This subspecies differs from the nominate one by having less wing expanse, uppers ide of wings bearing narrower bands, inner edge of spot curved in area Cu_{1b} of fore wing and discal band just entering base of area Cu_{1a} of hind wing in male only.

XXIV. Genus *Tanaecia* Butler

1869. *Tanaecia* Butler, *Proc. zooL Soc. Lond.*, (3) : 610.

Of the five species of this genus known in India, three are treated from Manipur.

Key to species

1. Fore wing with vein R_3 arising from basal half of vein R_5 ..... *julii* (Bougainville)
– Fore wing with vein R_3 arising from middle of vein R_5 2
2. Sexes similar, upperside of wings blackish brown with a comparatively narrow band on hind wing occupying about terminal third of wing ..... *lepidea* (Butler)
– Sexes not similar, male with upperside of wings blackish brown having a very broad grey band on hind wing occupying fully terminal half of wing, female with upperside of wings dark brown with a transverse inwardly-oblique darker discal band and no terminal band on hind wing..... ..... *cocytus* (Fabricius)

49. *Tanaecia julii sedeva* (Moore) (Common Earl)

1859. *Adolias sedeva* Moore, *Trans. ent. Soc.*, new series, **5** : 68, pl. 4, fig. 3

1915. *Euthalia sedeva* (Moore) : Tytler, *J. Bombay. nat. Hist. Soc.*, **23** : 507.

1932. *Euthalia julii sedeva* (Moore) : Evans, *Identification of Indian Butterflies*, : 151

Material examined : Manipur : Manipur 1 ex, -xi-1913, *(Capt. Evans coll.).*

Fore wing length : 34 mm.

Distribution : India : Manipur and Assam.

Elsewhere : Bangladesh and Myanmar.

Remarks : This subspecies differs from *T. julii adima* Moore occurring in Meghalaya and *T. julii appiades* Menetries from Kumaon to Sikkim by upperside of fore wing with dark bands closer and in female often with pale brown large spots in cell and beyond; in male hind wing upperside

paler and blue border broader. Tytler (1915) mentioned that both *T. julii sedeva* and *T. julli appiades* occurred in Manipur and did not fly together but confined to Western and Eastern Hills, respectively. Evans (1932) clearly stated distribution of *T. julii appiades* from Kumaon to Sikkim.

50. ***Tanaecia lepidea lepidea*** (Butler) (Grey Count)

1868. *Adolias lepidea* Butler, *Ann. Mag. nat. Hist. Lond.*, (4) : 71.

1932. *Euthalia lepidea lepidea* (Butler) : Evans, *Identification of Indian Butterflies*, : 150.

1997. *Tanaecia lepidea lepidea* (Butler) : Gupta, *Zool. Surv. India, State Fauna Series* 3 : *Fauna of West Bengal*, Part 7 : 584.

Material examined : Manipur : (Myanmar border), March, alt. 610m , 1 ex, 24-ix-1975 *(M. S. Shishodia & Party coll.).*

Fore wing length : 32 mm.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Sikkim and West Bengal.

Remarks : This nominate subspecies differs from *T. lepidea miyana* (Fruhstorfer) found in North Kanara and Orissa by upperside of wings having pale-grey borders. It is a definitive record from Manipur. It has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

51. ***Tanaecia cocytus satrapaces*** (Hewitson) (Lavender Count:)

1876. *Adolias satrapaces* Hewitson, *Ent. Month. Mag.*, **13** : 150, ♂♀.

1915. *Euthalia cocytus* (Fabricius) : Tytler. *J. Bombay nat. Hist. Soc.*, **23** : 507.

1932. *Euthalia cocytus satrapaces* (Hewitson) : Evans. *Identification of Indian Butterflies*, : 150.

Material examined : Nil.

Wing expanse : 65-80 mm.

Distribution : India : Manipur (Chandel),

Elsewhere : South Myanmar.

Remarks : Tytler (1915) collected several males of this subspecies from Sebong on Burma Road, Manipur during months of March, April October and November. This subspecies is included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

XXV. Genus ***Euthalia*** Huebner

1819. *Euthalia* Huebner, *Verz. bekannt. Schmett.*, (3) : 41.

Of the 12 species of this genus occurring in India, only one, i.e. *Euthalia jama* (Felder) is dealt with from Manipur.

52. ***Euthalia jama jama*** (Felder) (Streaked Baron)

1866. *Adolias jama* Felder, *Novara Riese, Lep. Rhopal* : 431.

1932. *Euthalia jama jama* (Felder) : Evans, *Identification of Indian Butteiflies* : 154.

Material examined : Nil.

Wing expanse : 55-85 mm.

Distribution : India : Manipur and Assam.

Remarks : This nominate subspecies is distinguished from *Euthalia jamu jamida* Fruhstosfer found in Sikkim by its more wing expanse; darker colouration and prominent white streaks on upperside of fore wing in male of wet season form are absent in dry season form.

XXVI. Genus ***Lexias*** Boisduval

1832. *Lexias* Boisduval, In : *d'Urville, Voy, 'Astrolabe', Fauna Ent.* **1** (Lep) : 125.

Of the three species of this genus known in India, two *viz., Lexias dirtea* (Fabricius) and *L. khasiana* (Swinhoe) are treated from Manipur.

Key to species

1. Antennae black above. Underside in male ferruginous brown ..... *khasiana* (Swinhoe)

– Antennae prominently yellow tipped above. Underside in male pale ochreous brown..... ..... *dirtea* (Fabricius)

53. ***Lexias khasiana intermedia*** (Tytler) (Dark Archduke)

1915. *Symphaedra dirtea intermedia* Tytler, *J. Bombay nat. Hist. Soc. Soc.*, **23** : 505.

1932. *Adolias khasiana intermedia* (Tytler) : Evans, *Identification of Indian Butterflies,* : 158.

1994. *Lexias khasiana* (Swinhoe) : Varshney, *Oriental Insects,* **28** : 185.

Material examined : Manipur : Manipur, 2 exs, -xi.-1912 *(W. H. Evans coll.* Indian Museum).

Fore wing length : 39-40 mm.

Distribution : India : Manipur (Chandel, Eastern and Western Hills).

Remarks : This subspecies is distinguished from the nominate one found in Sikkim and Assam by fore wing upperside in male bearing more developed markings, hind wing with blue border broader and mostly blue, turning to green at the tornus; in female upperside of fore wing bearing pale yellow spots and hind wing having dark yellow spots. Tytler (1915) collected its several specimens from Sebong, Eastern Manipur Hills and on the Irang River, Western Manipur Hills from March to October. The species *L. khasiana* (Swinhoe) has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

54. ***Lexias dirtea jadeitina*** (Fruhstorfer) (Archduke)

1913. *Euthalia dirtea jadeitina* Frushstorfer, *Macrolepidoptera of the World,* **9** : 687.

1932. *Adolias dirtea jadeitina* (Frushtorfer) : Evans, *Identification of Indian Butterflies,* : 158.

1994. *Lexias dirtea* (Fabricius) : Varshney, *Oriental Insects,* **28** : 185.

Material examined : Nil.

Wing expanse : 80-105 mm.

Distribution : India : Manipur (Eastern Hills) and Nagaland.

Elsewhere : Myanmar.

Remarks : Tytler (1915) mentioned that the species *L. dirtea* and subspecies *L. khasiana khasiana* (Swinhoe) and *L. khasiana intermedia* (Tytler) flew together in Eastern Manipur hills whereas two subspecies of *L. khasiana* flew together on Cachar road, in Western Manipur Hills. Evans (1932) considered all these three taxa and provided characters to differentiate one from the another. The species *Lexias dirtea* (Fabricius) is included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

XXVII. Genus ***Bassarona*** Moore

1897. *Bassarona* Moore, *Lep. Indica,* 3(7): 49, 59.

This genus is known in India by ten species, of which five are treated from Manipur.

Key to species

1. Fore wing upperside with white discal and vertical, reaching dorsum just beyond middle, veins Sc and R_1 anastomosed. Hing wing cell open ..... *durga* (Moore)

– Fore wing upperside with white discal band, if present, directed to tornus and not extending below vein Cu_{1b} vein R_1 free. Hind wing cell closed 2

2. Fore wing upperside with spot in space M_3 smaller than others, hind wing with continuous curved discal band from costa to vein M_3 ..... *khama* Alpheraky

– Fore wing upperside with spot in space M_3 as large as others, hind wing with discal band macular 3

3. Fore wing uppers ide with subapical spots approximately equal and one above the other ..... *patala* (Kollar)

– Fore wing upperside with lower subapical spot very much larger than the upper one.. 4

4. In fore wing upperside, distance of outer edge of spot in space Cu_b from termen about equal to the length of the spot .... *sahadeva* (Moore)

– In fore wing uppers ide, distance of outer edge of spot in space Cu_{1b} from termen about half the length of t e spot .... *iva* (Moore)

55. *Bassarona durga splendens* (Tytler) (Blue Duke)

1915. *Dophla durga splendens* Tytler, *J. Bombay nat. Hist. Soc.* **23** : 505.

1932. *Euthalia durga splendens* (Tytler) : Evans, *Identification of Indian Butte/flies.* : 155.

1994. *Bassarona durga* (Moore) : Varshney, *Oriental Insects,* **28** : 184.

Material examined : Nil.

Fore wing length : 95-105 mm.

Distribution : India : Manipur (Imphal) and Nagaland.

Remarks : This subspecies is distinguished from the nominate one found from Sikkim to Abor by hind wing uppers ide with blue area formed into blue lunules throughout Tytler (1915) collected a male specimen of this subspecies near the foot of the hills on the Ukral Road about 45 km east of Imphal at altitude about 914m, in July. Its status is very rare and it has been listed in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

56. ***Bassarona khama curvifascia*** (Tytler) (Naga Duke)

1915. *Dophla curvifascia* Tytler, *J. Bombay nat. Hist. Soc.,* **23** : 505.

1932. *Euthalia khama curvifascia* (Tytler) : Evans, *Identification of Indian Butterjlies,* : 156.

1994. *Bassarona khama curvifascia* (Tytler) : Varshney, *Oriental Insects,* **28** : 1&4.

Material examined : Nil.

Wing expanse : 75-95 mm.

Distribution : India : Manipur (Western Manipur Hills) and Nagaland.

Remarks : Only this subspecies occurs in India. Tytler (1915) collected a single male from Kabur Peak (244m) in August. Its status is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

57. ***Bassarona patala taooana*** (Moore) (Grand Duchess)

1887. *Adolias taooana* Moore, *Proc. zool. Soc. Lond.,* : 831.

1915. *Dophla taooana* (Moore) : Tytler, *J. Bomb. nat. Hist. Soc.,* **23** : 507.

1932. *Euthalia patala taooana* (Moore) : Evans, *Identification of Indian Butterflies,* : 157.

1994. *Bassarona patala taooana* (Moore) : Varshney, *Oriental Insects,* **28** : 184.

Material examined : Nil.

Wing expanse : 85-105 mm.

Distribution : India : Manipur.

Elsewhere : Myanmar.

Remarks : This subspecies differs from its nominate counterpart found from Pakistan (Murree) to Nepal by upperside or underside of fore wing bearing two small white spots in space 1A+2A. Tytler (1915) collected two males of this subspecies on Cachar Road, Manipur at the end of April/beginning of May. Its status is rare and it has been included in Schedule-II (Part-2) of the Indian Wild Life Protection Act.

58. ***Bassarona sahadeva nadaka*** (Fruhstorfer) (Green Duke)

1913. *Euthalia sahadeva nadaka* Fruhstorfer, *Macrolepidoptera of the world,* **9** : 682.

1915. *Dophla sahadeva* (Moore) : Tytler, *J. Bombay nat. Hist. Soc.,* **23** : 506.

1932. *Euthalia sahadeva nadaka* Fruhstorfer : Evans, *Identification of Indian Butterflies,* : 156.

1994. *Bassarona sahadeva* (Moore) : Varshney, *Oriental Insects,* **28** : 184.

Material examined : Nil.

Wing expanse : 80-105 mm.

Distribution : India : Manipur and Assam.

Remarks : This subspecies differs from its nominate counterpart found in Sikkim and Bhutan by its darker colouration, upperside of hind wing in male with discal spots at most only to space Cu_{1b}; in female, hind wing uppers ide having usually only spots in spaces M_1 and R_5 and often none at all. Tytler (1915) mentioned two forms of female-(i) pale form with three spots in hind wing and (ii) a large and darker form with two spots in hind wing, but considered these two forms belonging to the same species.

59. *Bassarona iva* (Moore) (Grand Duke)

1857. *Adolias iva* Moore, *Cat. Lep. Mus. East India Coy.* **1** : 195.

1905. *Dophla iva* (Moore) : Bingham, *Fauna of British India*, (Butterflies), **1** : 263.

1932. *Euthalia iva* (Moore) : Evans, *Identification of Indian Butterflies*, : 156.

1994. *Bassarona iva* (Moore) : Varshney, *Oriental Insects*, **28** : 184.

Material examined : Nil.

Fore wing length : 115-125 mm.

Distribution : India : Manipur, Sikkim and Nagaland.

Remarks : The status of this species is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

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, two are treated from Manipur.

Key to genera

1. Eyes hairy ..... *Stibochiona* Butler
– Eyes not hairy ..... *Pseudergolis* Felder

XXVIII Genus ***Stibochiona*** Butler

1868. *Stibochiona* Butler, *Proc. zoot. Soc. Lond.*, (3) : 614.

Only a single species, *Stibochiona nicea* (Gray) represents this genus in India.

60. *Stibochiona nicea nicea* (Gray) (Popinjay)

1846. *Adolias nicea* Gray, *Lep. Ins. Nepal*, : 13, pl. 12, fig. 1.

1932. *Stibochiona nicea nicea* (Gray) : Evans, *Identification of Indian Butterflies* : 150.

1997. *Stibochiona nicea nicea* (Gray) : Gupta, *Zoot. Surv. India, State Fauna Series* **3**. *Fauna of West Bengal*, Part 7 : 551.

Material examined : Manipur; 1 ex, -v-1993, 2 exs, -x-1913, 1 ex, -xi-1913 *(Capt. Evans coll).*

Fore wing length : 27-33 mm.

Distribution : India : Manipur, Arunachal Pradesh, Himachal Pradesh and West Bengal.

Elsewhere : North Myanmar.

Remarks : Only the nominate subspecies occurs in India. It constitutes a definitive record from Manipur.

XXIX Genus ***Pseudergolis*** Felder

1867. *Pseudergolis* Felder, *Novara Reise, Lep.*, **3** : 404.

This genus is known in India by a single species, *Pseudergolis wedah* (Kollar).

61. *Pseudergolis wedah* (Kollar) (Tabby)

1844. *Ariadne wedah* Kollar, *Huegel's Kashmir*, 4 (Part 2) : 437.

1994. *Pseudergolis wedah* (Kollar) : Varshney *Oriental Insects*, **28** : 180.

Material examined : Manipur, 1 ex, -vi-1911, *(Evans coll., Indian Museum).*

Fore wing length : 30 mm.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya Sikkim and West Bengal.

Elsewhere : Bangladesh and Myanmar.

Remarks : This species is a definitive record from Manipur.

Tribe **Apaturini**

Second segment of labial palpi not swollen; in fore wing vein Sc not dilated at base, R_4 ending at apex or termen (with a few exceptions), R_2 arising from R_5 or from end cell, a ex of cell closer to wing base than origin of Cu_{1a} cell short and open. Hind wing with precosta vein arising beyond origin of Sc + R_1.

Of the ten genera of this tribe known in India, six are dealt with.

Key to genera

1. Antennae longer than half the length of costa of fore wing. Palpi white or brown throughout 2
- Antennae equal to half the length of costa of fore wing. Palpi black or black and white 5
2. Eyes hairy. In fore wing vein Cu_{1a} much shorter than the median vein .... *Eulaceura* Butler
- Eyes smooth. In fore wing vein Cu_{1a} nearly equal to the median vein 3
3. Underside of fore wing with prominent small subapical white dots in spaces M_2, M_1 and R_4 .... *Rohana* Moore
- Underside of fore wing without any of the subapical white dots in spaces M_2, M_1 and R_4 4
4. Underside of fore wing with Fabricius spots in cell ..... *Apatura* Fabrinas
- Underside of fore wing without any black spot in cell ..... *Chitoria* Moore
5. In fore wing vein R_2 arising from R_5 .... *Sephisa* Moore
- In fore wing vein R_2 arising from the cell ..... *Hestina* Westwood

XXX Genus ***Eulaceura*** Butler

1872. *Eulaceura* Butler, *Proc. zoot. Soc.* London, (3) : 726.

Only a single species, *Eulaceura manipurensis* (Tytler) represents this genus in fndia.

62. ***Eulaceura manipurensis*** (Tytler) (Tytler's Emperor)

1915. *Apatura manipuriensis* Tytler, *J. Bombay nat. Hist. Soc.*, **23** : 503, pl. 2, figs, II, 12, male, female.

1932. *Eulaceura manipuriensis* (Tytler) : Evans, *Identification of Indian Butterflies*: 145

1994. *Eulaceura manipurensis* (Tytler), Varshney, *Oriental Insects*, **28** : 187.

Material examined : Nil.

Wing expanse : 75-80 mm.

Distribution : India : Manipur (Chandel).

Remarks : Tytler (1915) described this species on the basis of 15 males and one female taken at the foot of the hills near Sebong (Manipur on the Burma Road) in April. He remarked that it appeared to be single brooded and belonged to the subgenus *Eulaceura.* It is endemic to Manipur. Its status is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

XXXI Genus ***Rohana*** Moore

1880. *Rohana* Moore, *Lep. Ceylon.* **1** (1) : 27.

This genus is known in India by two species *Rohana parvata* (Moore) and *R. parisatis* (Westwood) and the latter is dealt with from Manipur.

63. ***Rohana parisatis parisatis*** (Westwood) (Black Prince)

1850. *Apatura parisatis* Westwood, In Doubleday, Westwood and Hewitson, Gen. *diurn.* Lep., **2** : 305, no. 20.

1932. *Apatura parisatis parisatis* Westwood; Evans, *Identification of Indian Butterflies* : 147.

1994. *Rohana parisatis* (Westwood) : Varshney, *Oriental Insects*, **28** : 186.

Material examined : Manipur, 1 ex, no date, (Indian. Museum, *Evans coll.)*

Fore wing length : 20 mm.

Distribution : India : Manipur, Assam, Meghalaya and Sikkim.

Elsewhere : Bangladesh and Myanmar.

Remarks : This nominate subspecies differs from *R. parisatis atacinus* Fruhstorfer found in South India by the presence of a single apical dot on upperside of fore wing and female being much darker. It is a definitive record from Manipur.

XXXII Genus ***Apatura*** Huebner

1825. *Apatura* Huebner, *Mag. f. Insektenk* (illiger), **6** : 280

Of the three species of this genus occurring in India, *Apatura chevana* (Moore) is treated from Manipur.

64. *Apatura chevana* (Moore) (Sergeant Emperor)

1865. *Athyma chevana* Moore, *Proc. Zool. Soc. London*: 763, pl. 12. Fig. 1.

1932. *Apatura chevana* (Moore) : Evans, *Identification of Indian Butterflies* : 152.

Material examined : Nil.

Wing expanse : 75-80 mm.

Distribution : India : Manipur, Assam, Nagaland and Sikkim.

Elsewhere : N. Myanmar.

Remarks : This species mimicks *Athyma* spp.

XXXIII Genus *Chitoria* Moore

1896. *Chitoria* Moore, *Lep. Indica.* 3 (25) : 10.

This genus is represented in India by three species of which two *Chitoria sordida* (Moore) and *C. ulupi* (Doherty) are treated from Manipur.

Key to species

Upperside dark brown, fore wing with discal pale band macular in male, continuous in female, in addition to the white apical spots ..... *sordida* (Moore)

– Upperside dark greenish brown, fore wing with two pale discal bands in addition to the apical spots..... *ulupi* (Doherty)

65. *Chitoria sordida sordida* (Moore) (Sordid Emperor)

1865. *Apatura sordida* Moore, *Proc. zool. Soc. Lond.*, : 765, pl. 41, fig. 2, male.

1994. *Chitoria sordida* (Moore) : Varshney, *Oriental Insects*, **28** : 186.

Material examined : Manipur, Imphal District, Imphal, 3 exs, 25-x-1932 (label illegible)

Fore wing length : 26-32 mm.

Distribution : India : Manipur (Imphal) and Sikkim.

Elsewhere : North Myanmar.

Remarks : This nominate subspecies is distinguished from *Chitoria sordida naga* (Tytler) found in Nagaland by the upperside of fore wing bearing discal white band, prominent ocellus in space Cu_{1a} in hind wing and underside of wings being brown. Tytler (1915) found it rather common in Manipur Valley.

65. *Chitoria ulupi ulupi* (Doherty) (Tawny Emperor)

1889. *Apatura ulupi* Doherty, *J. Asiat. Soc. Beng.*. : 125, pl. 10, fig. 2, male.

1932. *Apatura ulupi ulupi* Doherty : Evans, *Identification of Indian Butterflies* : 146.

1994. *Chitoria ulupi* (Doherty) : Varshney, *Oriental Insects*, 28 : 186.

Material examined : Nil.

Wing expanse : Male : 68 mm.

Distribution : India : Manipur and Assam.

Remarks : Evans (1932) distinguished the nominate subspecies from *C. ulupi florenciae* (Tytler) found in Nagaland by upperside fore wing with outer discal band continuous and hind wing mostly tawny. D'Abrera (1985) mentioned that *florenciae* (Tytler) appeared to be a wet seasonal form of *ulupi*. Its status is very rare and it has been listed in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

XXXIV Genus *Sephisa* Moore

1882. *Sephisa* Moore, *Proc. zoot. Soc. Lond.*, : 240.

The genus is known in India by two species, *viz.*, *Sephisa dichroa* (Kollar) and S. *chandra* (Moore), and the latter is treated from Manipur.

67. *Sephisa chandra* (Moore) (Eastern Courtier)

1858. *Castalia chandra* Moore, *Cat. Lep. Ins. Mus., East India Coy.*, **1** : 200, pl. 6A.

1932. *Sephisa chandra* (Moore) : Evans, *Identification of Indian Butterflies* : 147.

1994. *Sephisa chandra* (Moore) : Varshney, *Oriental Insects*, **28** : 187.

Material examined: Manipur (Eastern Hills), 1 ex, *(Evans coll).*

Fore wing length : 34 mm.

Distribution : India : Manipur (Eastern Hills), Arunachal Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : Evans (1932) mentioned its status not rate but considered female of very rare occurrence. Also, female is variable and forms *albina* Evans and *chandrana* Evans of very rare and rare status, respectively. This species has been included in Schedule-I (Part-4) of the Indian Wild Life ProtectIon Act.

XXXV. Genus ***Hestina*** Westwood

1850. *Hestina* Westwood, In Doubleday's *Gen. diurn. Lep.*, (2) : 281.

This genus is represented in India by a single species, *Hestina nama* (Doubleday).

68. ***Hestina nama*** (Doubleday) (Circe)

1845. *Diadema nama* Doubleday, *Ann. Mag. Nat. Rist.* (1) **16** : 232.

1932. *Hestina nama* (Doubleday) : Evans, *Identification of Indian Butteiflies* : 148.

1994. *Hestina nama* (Doubleday) : Varshney, *Oriental Insects*, **28** : 188.

Material examined : Manipur, 1 ex, -ix-1992, 1 ex, -xi-1912, *(Evans coll.)*, Manipur, 1 ex,-x-1913.

Fore wing length : 42-43 mm.

Distribution : India : Manipur, Assam, Himachal Pradesh, Meghalaya, Nagaland, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar.

Remarks : This species mimicks *Parantica sita sita* (Kollar) (Chestnut Tiger) of the subfamily Danainae. The discal streaks and postdiscal spots are bifurcated outwardly. It is a definitive record from Manipur.

Subfamily CHARAXINAE

Large and robust butterflies. In fore wing, cell closed, vein R_4 arising nearer to end of cell than to termen. Cell open or closed in hind wing.

All the three genera of this subfamily known in India are treated from Manipur.

Key to genera

1. Fore wing costa not serrate, hind wing with a broad lobe between veins Cu_{1b} and M_3 ..... *Prothoe* Huebner

– Fore wing costa serrate, hind wing with a pointed tooth or tail at vein M_3 and sometimes at vein Cu_{1b} also 2

2. Upperside predominently reddish to dark brown and discal areas not white. Hind wing cell slenderly closed, a single tooth or tail at vein M_3 ..... *Charaxes* Ochsenheimer

– Upperside predominantly ,pale yellowish or greenish white. Hind wing with cell open, subequal tails at veins Cu_{1b} and M_3 ..... *Polyura* Billberg

XXXVI Genus ***Prothoe*** Huebner

1816. *Prothoe* Huebner, *Samml. exot. Schmett.* (2) : Pl. 54.

This genus represented in India by a single species–*Prothoe franck* Godart.

69. ***Prothoe franck regalis*** Bulter

1885. *Prothoe regalis* Butler, *Ann. Mag. nat. Hist.* 5th Series, **16** : 53, 54, 306, No. 53. pl. 8, fig. 1, male.

1932. *Prothoe franckii regalis* Butler : Evans, *Identification of Indian Butterflies* : 144.

1994. *Prothoe franck* Godart : Varshney, *Oriental Insects*, **28** : 189.

Material examined : Nil.

Fore wing length : 70-80 mm.

Distribution : India : Manipur.

Remarks : Only this subspecies occurs in India. Its occurrence is very rare and it has been included in Schedule-I (Part-4) of the Indian Wild Life Protection Act.

XXXVII Genus ***Charaxes*** Ochsenheimer

1816. *Charaxes* Ochsenheimer, *Schmett. Europe*, **4** : 18.

Of the five species of this genus known from India, only one i.e. *Charaxes polyxena hierax* Felder is treated from Manipur.

70. *Charaxes polyxena hierax* Felder (Tawny Rajah)

1867. *Charaxes hierax* Felder, *Novara Reise, Lep. Rhop.* 3 : 422.

1932. *Charaxes polyxena hierax* Felder: Evans, *Identification of Indian Butterflies*: 141.

1997. *Charaxes polyxena hierax* Felder : Gupta, *Zool. Surv. India, State Fauna Series*: 3, *Fauna of West Bengal*, Part, 7 : 548.

Material examined : Manipur, 2 exs, no date, (Indian Museum coll.), 1 ex, no date, *(Evans coll).*

Fore wing length : 39-40 mm.

Distribution : India : Manipur, Sikkim and West Bengal.

Elsewhere : North Myanmar.

Remarks : This subspecies differs from C. *polyxena hemana* Butler occurring from Mussoorie to Kumaon and *C. polyxena imna* Butler from South India to Orissa by upperside of fore wing without any distinct postdiscal transverse lunular band and black terminal margin narrower scarcely occupying one-fourth of wing on dorsal margin. This subspecies is a definitive record from Manipur. The males are highly variable.

XXXVIII. Genus *Polyura* Billberg

1820. *Polyura* Billberg, *Enum. Ins. Mus. Billb,* : 79.

Of the nine species known from India, five are dealt with from Manipur.

Key to species

1. Upperside of wings with ground colour black or deep indigo blue 2
- Upperside 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 yellowish *white* ..... *arja* (Felder & Felder)
3. Upperside of fore wing with,only one or two, often without white spots on black apex of wing; postdiscal *row* .of spots absent .... *delphis* (Doubleday)
- Uppers ide *of* fore wing with one *or* two prominent transverse postdiscal series of white spots 4
4. One transverse postdiscal series *of* white spots.. ..... *dolon* (Westwood)
- Two transverse postdiscal series of white spots ..... *eudamippus* (Doubleday)

71. *Polyura athamas athamas* (Drury) (Common Nawab)

1770. *Papilio athamas* Drury, *Ill. exot. Ent.* 1 : 5, pl. 2, fig. 2.

1932. *Eriboea athamas athamas* (Drury) : Evans, *Identification of Indian Butterflies* : 143.

1997. *Polyura athamas athamas* (Drury) : Gupta, *Zool. Surv. India, State Fauna Series*: 3. *Fauna of West Bengal*, Part 7 : 550.

Material examined : Manipur, 1 ex, -x-1913, (Capt. Evans *call.*, Indian Museum).

Fore wing length : 33 mm.

Distribution : India : Manipur, Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, North-West Himalaya, Orissa, Uttar Pradesh, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, China, Hainan, Hong Kong, Laos, Myanmar, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam and West Malaysia.

Remarks : This nominate species differs from *P. athamas andamanica* (Fmhstorfer) found in Andamans by upperside *of* fore wing with a discal band broader than 4 mm at its narrowest point in male and 7 mm in female. It is previously known from Manipur.

72. ***Polyura arja*** (Felder & Felder) (Pallid Nawab)

1867. *Charaxes arja* Felder & Felder, *Novara Reise, Lep. Rhop.*, : 438.

1932. *Eriboea arja* (Felder & Felder) : Evans, *Identification of Indian Butteiflies* 143.

1994. *Polyura arja* (Felder & Felder) : Varshney, *Oriental Insects*, **28** : 190.

Material examined : Manipur, lex, -x-1913, *(Indian Museum, Capt. Evans call).*

Fore wing length : 29 mm.

Distribution : Manipur, Assam, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : Bangladesh, Bhutan, Myanmar, Thailand and Vietnam.

73. ***Polyura delphis delphis*** (Doubleday) (Jewelled Nawab)

1843. *Charaxes delphis* Doubleday, *Ann. Soc. Ent. Fr.*, : 217, pl. 7.

1932. *Eriboea delphis* (Doubleday) : Evans, *Identification of Indian Butterflies*, : 144.

1982 *Polyura delphis delphis* (Doubleday) : Smiles, *Bull. Br. Mus. nat. Hist.* (Ent.), **44** : 190.

Material examined : Nil.

Wing expanse : Male, female, 96-112 mm.

Distribution : India : Manipur, Assam, Meghalaya, Mizoram, Nagaland and Sikkim.

Elsewhere : Bangladesh, Myanmar and Thailand.

Remarks : Only this nominate subspecies occurs in India. Smiles (1982) recorded it from Manipur. It has been included in Schedule-II (Part-2) of the Wild Life Protection Act.

74. ***Polyura dolon magniplaga*** (Fruhstorfer) (Stately Nawab)

1904. *Eulepis dolon magniplagus* Fruhstorfer, *Insekterboerse*, **21** : 381.

1932. *Eriboea dolon magniplaga* (Fruhstorfer) : Evans *Identification of Indian Butterflies* : 143.

1982. *Polyura dolon magniplaga* (Fruhstorfer) : Smiles, *Bull. Br. Mus. nat. Hist.* (Ent.), **44** : 210.

Material examined : Nil.

Wing expanse : 95-105 mm.

Distribution : India : Manipur, Meghalaya and Nagaland.

Remarks : This subspecies differs from its counterparts, *P. dolon dolon* Westwood found from Kulu to Kumaon and *P. dolon centralis* Rothschild occurring in Sikkim, Bhutan and Nepal by upperside of fore wing with larger spots in space 1A + 2A, submarginal band narrow and blue lunules small. Evans (1932) mentioned its occurrence in Myanmar whereas Smiles (1982) did not refer its distribution in Myanmar. Its status is rare and it is included in Schedule-II (Part-2) of the Wild Life Protection Act.

75. ***Polyura eudamippus eudamippus*** (Doubleday) (Great Nawab)

1843. *Charaxes eudamippus* Doubleday, *Ann. Soc. Ent. Fr.*, : 281, pl. 8.

1932. *Eriboea eudamippus eudamippus* (Doubleday) : Evans, *Identification of Indian Butterflies*, : 144.

1982. *Polyura eudamippus eudamippus* (Doubleday) : Smiles, *Bull. Br. Mus. nat. Hist. (Ent.*, **44** (1) : 199-200.

Material examined : Nil.

Fore wing length : 100-120 mm.

Distribution : India : Manipur (Imphal), Assam, Meghalaya, Nagaland, Sikkim and West Bengal.

Elsewhere : Bangladesh, Bhutan and Nepal.

Remarks : Only the nominate subspecies is found in India. Smiles (1982) reported it from Imphal.

Family SATURNIIDAE

Antennae heavily scaled at the base but with the shaft and ramii unsealed or sparely scaled, quadripectnate with ramii generally longer in male than those in female; ocelli absent; mouth

parts reduced, probosis lacking, or if present, very short; tympanum absent; fore wing mayor may not possessing all radials; M_1 arising from upper angle of cell, M_2 absent, M_3 from the lower angle of cell, Cu_2 absent, 2nd anal forming a fork with 1st anal; hind wing without frenulum and a bar between veins Sc and Rs absent, Cu_2 absent and usually one anal vein present; epiphysis on fore tibia long, rarely reaching as far as apex of the fore tibia, mid and hind tibia usually with a pair of short terminal spurs (except in *Aitacus),* tarsal spines may or may not be present, last tarsal segment bearing claws, with well-developed arolium pad and paired pulvilli.

Of the seven subfamilies of family Saturniidae (Michener, 1952), two, *viz.* Saturniidae and Salassinae occur in India. More than 40 species of Saturniidae are known from India. Only subfamily Saturniinae is dealt with from Manipur.

Subfamily SATURNIINAE

Of the 36 species in 17 genera known from India, only five species under five genera are treated from Manipur.

Key to genera

1. Both the fore-and hind wing each with the cell completely or partly closed. 2
- Both the fore-and hind wing each with the cell completely open 4
2. Hind wing tailed ..... *Actias* Macleay
- Hind wing tailless.....3
3. Fore wing with four radials ....*Antheraea* Huebner
- Fore wing with five radials..... ..... *Cricula* Walker
4. Frons convex, labial palpi three segmented. Fore wing without reddish streak between veins R_4 and R_5 ; antemedial line sending whitish spurs at bases of veins Cu_{1a} and Cu_{1b}. Mid and hind tibiae with terminal spurs. ... . *Samia* Huebner
- Frons flat, labial palpi one segmented. Fore wing with a slender reddish streak between veins R_4 and R_5; antemedial line not sending spurs along veins Cu_{1a} and Cu_{1b}. Mid and hind tibiae without terminal spurs..... ..... *Attacus* Linnaeus

XXXIX Genus *Actias* Macleay 1815

1815. *Actias* Macleay, In Leech, *Zool. Miscell.,* 2: 25.

This genus is represented in India by a single species, *Actias selene* (Huebner) which is already known from Manipur.

76. *Actias selene* (Huebner)

1806. *Echidna caudata selene* Huebner, *Samml. Exot. Schmett.,* 1 : 3, pl. 172 G, pl. 174 E. 1892. *Actias selene* (Huebner): Hampson, *Fauna of British India (Moths),* **1** : 13.

1979. *Actias selene* (Huebner): Arora & Gupta, *Mem. zool. Surv. India,* **(16)**(1) : 12.

2000. *Actias selene* (Huebner): Gupta, *Zool. Surv. India. State Fauna Series:* 4, *Fauna of Meghalaya,* Part 5: 423.

Material examined : Manipur, on Burma Road near Kanchinjom, lex (male) (no further data),

Fore wing length : Male 64mm.

Distribution : India : Manipur, Andamans, Assam, Bihar, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu and Uttar Pradesh.

Elsewhere : Bangladesh, Bhutan, China, Indonesia, Japan, Myanmar, Nepal, Pakistan, Sri Lanka and USSR.

Ramarks : This moth is popularly known as Indian Moon-moth. Fresh specimens are beautifully coloured apple green. Hind wing is tailed. The species has a large number of food plants.

XL Genus *Antheraea* Huebner 1816

1820. *Antheraea* Huebner, *Verz. bek. Schmett. :* 152.

Of the ten species of this genus known from India, only *Antheraea helferi* Moore is particularly known from Manipur.

77. ***Antheraea helferi*** Moore

1859. *Antheraea helferi* Moore, *Cat. Lep. Ins. E.I. House,* **2** : 397.

1892. *Caliguea helferi* (Moore): Kirby, *Syn. Cat. Lep. Het,* **1** : 760. No.2, 937.

1979. *Antheraea helferi* Moore: Arora & Gupta, *Mem. zool. Surv. India,* **(16)(1):** 33.

1997. *Antheraea helferi* Moore: Gupta, *Zool. Surv. India, State, Fauna Series:* 3. *Fauna of West Bengal, Part,* **7** : 417

Material examined : Manipur, I. B. Mao, 1757m, 1 male, 16.ix.1975 (M.S.Shishodia & Party coll.)

Fore wing length : Male, 62mm.

Distribution : India : Manipur, Sikkim and West Bengal.

Remarks : The species is represented in the collection of Zoological Survey of India by a single (damaged) specimen.

XLI Genus ***Cricula*** Walker 1855

1855. *Cricula* Walker, *Cat. Lap. Het. Brit. Mus.,* **2** : 1186-1187.

Of the two species, *viz., Cricula andrei* Jordan and C. *trifenestrata* (Helfer) of this genus occurring in India, the former is earlier known from Manipur.

78. ***Cricula andrei*** Jordan

1909. *Cricula andrei* Jordan, *Novit, zool.,* 16 (2) : 301, fig. G (nom. novo for *zuleika* Westwood, 1858).

1979. *Cricula andrei* Jordan: Arora & Gupta, *Mem. zool. Surv. India,* **(16)**(1) : 38.

2000. *Cricula andrei* : Gupta, *Zoo!. Surv. India, State Fauna Series :* 4, *Fauna ofMeghalya,* Part, 5 : 428.

Material examined: Manipur, I. B. Mao, one male, 14.ix.1975 (M.S.Shishodia & Party coIL).I

Wing expanse : Male, 70mm.

Distribution : India : Manipur, Meghalaya and Sikkim,. *Elsewhere:* Bhutan and Indonesia (Java).

XLII Genus ***Samia*** Huebner 1820

1820. *Samia* Huebner, *Verz. bek. Schmett,:* 156.

The genus is represented by only a single species i.e. *Samia cynthia* (Drury).

79. ***Samia cynthia*** (Drury)

1773. *Phalaena Attacus cynthia* Drury, *Illust. Nat. Hist. Exot. Ins.,* **2** : 10, pl. 6, fig. 2.

1820. *Samia cynthia* (Drury): Huebner, *Verz. bek. Schmett.,:* 156.

1892. *Attacus cynthia* (Drury) : Hampson, *Fauna of British India (Moths),* **1** : 16.

1956. *Philosamia cynthia* (Drury) : Sen-Sarma, *Indian Forest Leaffit No.* 121 (Fart 4) : 289.

1979. *Samia cynthia* (Drury) : Arora & Gupta, *Mem. zoo!. Surv. India,* **(16)** (1): 50.

Material examined : Nil.

Fore wing length : Males 42-67 mm, females 50-70 mm.

Distribution : India : Manipur, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Meghalaya, Nilgiri Hills, Sikkim, South Andamans, Uttar Pradesh and West Bengal.

Elsewhere : Australia, Bangladesh, Myanmar, China, Indonesia, Sri Lanka and U.K.

Remarks : This moth is popularly known as Eri Silkmoth or Ailanthus Silkmoth and it feeds on a large number of species of plants. Its cocoons yield 'Eri Silk'. Chowdhury (1982b) has provided information regarding domestication of this species and Eri Silk industry.

XLIII Genus ***Attacus*** Linnaeus 1767

1767. *Phalaena Attacus* Linnaeus, *Syst. Nat.* 12 ed., 1(2) : 808.

Only a single species i.e. *Attacus atlas* (Linnaeus) occurs in India.

80 ***Attacus atlas*** (Linnaeus)

1758. *Phalaena Bombyx atlas* Linnaeus, *Syst. Nat.* Ed. 10. **1** : 495.

1767. *Phalaena Attacus atlas* (Linnaeus), Linnaeus, : *Syst. Nat.* Ed. 12, 1 (2): 808. 1892. *Attacus atlas* (Linnaeus) : Hampson, *Fauna of British India (Moths),* **1** : 15.

1979. *Attacus atlas* (Linnaeus): Arora & Gupta, *Mem. zool. Surv. India,* **(16)**(1) : 44.

2000. *Attacus atlas* (Linnaeus) : Gupta, *2001. Surv. India, State Fauna Series* 4 : *Fauna ofMeghalaya. Part,* 5 : 428.

Material examined : Nil.

Fore wing length : Males 95-110 mm, Females 110-120mm.

Distribution : India : Manipur, Andamans, Assam, Bihar, Gujarat, Karnataka, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Bangladesh, Indonesia, Myanmar, Singapore, Sri Lanka, South Asia and Western Malaysia.

Remark : This moth is popularly known as 'Indian Atlas Moth' It has the largest wing-area of all the known Lepidoptera. It feeds on several species of plants. The cocoons of these moths yield " Fagara" silk.

SUMMARY

The study deals with 80 species / subspecies of butterflies and moths of families Nymphalidae and Saturniidae from the state of Mizoram. The family Saturniidae is represented by five species of moths under five genera, whereas the family Nymphalidae is represented by 75 species of butterflies belonging to 38 genera and five subfamilies, *viz.*, Morphinae, Calinaginae, Acraeinae, Nymphalinae and Charaxinae. Of these, two species of butterflies namely, *Lexias khasiana intermedia* (Tytler) and *Eulaceura manipurensis* (Tytler) are endemic to Manipur. Twenty six species / subspecies of butterflies have been included in Schedules-I (Part-4) and II (Part-2) of the Indian Wildlife Protection Act. Twenty seven species/subspecies of butterflies are first definitive records trom the state.

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APPENDIX

List of species of butterflies and moths and their distribution in Manipur

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
	Family NYMPHALIDAE										
	Subfamily MORPHINAE										
1.	*Aemona amathusia amathusia* (Hewitson)	–	–	–	–	–	–	–	–	–	–
2.	*Stichophthalma nourmahal* (Westwood)	–	–	–	–	–	–	–	–	–	–
3.	*Stichophthalma louisa tytleri* Rothschild	–	+	–	–	–	–	–	–	+	–
4.	*Stichophthalma camadeva camadevoides* de Niceville	–	–	–	–	–	–	–	–	–	–
5.	*Thaumantis diores diores* Doubleday	–	–	–	–	–	–	–	–	–	–
6.	*Thauria aliris amplifascia* Rothschild	–	–	–	–	–	–	–	–	–	–
7.	*Thauria aliris intermedia* Crowley	–	+	–	–	–	–	–	–	+	–
8.	*Discophora sandaica zal* Westwood	–	–	–	–	–	–	–	–	–	–
9.	*Discophora deo deo* de Niceville	–	–	–	–	–	–	–	–	–	–
10.	*Enispe euthymius euthymius* (Doubleday)	–	–	–	–	–	–	–	–	–	+
	Subfamily CALINAGINAE										
11.	*Penthema lisarda lisarda* (Doubleday)	–	–	–	–	–	–	–	–	+	–

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
	Subfamily ACRAEINAE										
12.	*Acraea viole* (Fabricius)	–	–	–	–	–	–	–	+	–	–
13.	*Acraea issoria issoria* (Huebner)	–	–	+	–	+	–	–	+	–	–
	Subfamily NYMPHALINAE Tribe **Heliconini**										
14.	*Cethosia biblis tisamena* Fruhstorfer	–	–	+	–	+	–	–	+	–	–
15.	*Cethosia cyane* (Drury)	–	–	+	–	–	–	–	–	–	–
16.	*Argynnis hyperbius hyperbiu* (Linnaeus)	–	–	–	–	–	–	–	–	–	–
17.	*Argynnis childreni childreni* Gray	–	–	–	–	+	–	–	–	–	–
	Tribe **Nymphalini**										
18.	*Araschnia prorsoides dohertyi* Moore	–	–	–	–	–	–	–	–	–	–
19.	*Symbrenthia silana* de Niceville	–	+	–	–	–	–	–	–	–	+
20.	*Symbrenthia hypselis cotanda* Moore	–	–	–	–	–	–	–	–	–	–
21.	*Hypolimnas misippus* (Linnaeus)	–	–	+	–	–	–	–	–	–	–
22.	*Junonia iphita iphita* (Cramer)	–	–	+	–	+	–	–	–	–	–
23.	*Junonia hierta magna* (Evans)	–	–	+	–	–	–	–	–	–	–
24.	*Junonia atlites* (Linnaeus)	–	–	+	+	–	–	–	–	–	–

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
25.	*Junonia orithya ocyale* Huebner	+	+	+	+	+	–	–	+	–	–
26.	*Junonia lemonias lemonias* (Linnaeus)	–	–	+	–	–	–	–	–	–	–
27.	*Junonia almana almana* (Linnaeus)	–	–	+	–	–	–	–	–	–	–
	Tribe **Cyrestini**										
28.	*Chersonesia risa* (Doubleday)	–	–	–	–	–	–	–	–	+	–
29.	*Chersonesia rahroides* Moore	–	+	–	–	–	–	–	–	–	–
	Tribe **Limenitidini**										
30.	*Neptis hylas kamarupa* Moore	–	–	+	–	–	–	–	–	–	–
31.	*Neptis sappho astola* Moore	–	–	+	–	–	–	–	–	–	–
32.	*Neptis narayana nana* de Niceville	–	–	–	–	–	–	–	–	–	–
33.	*Neptis zaida manipurensis* Tytler	–	–	–	–	–	–	–	–	–	–
34.	*Neptis miah miah* Moore	–	–	–	–	–	–	–	–	–	–
35.	*Neptis ananta ochracea* Evans	–	–	–	–	–	–	–	–	–	–
36.	*Neptis namba namba* Tytler	–	–	–	–	–	–	–	–	–	–
37.	*Moduza procris procris* (Cramer)	–	–	–	–	–	–	–	–	–	–
38.	*Athyma selenophora selenophora* (Kollar)	–	+	–	–	–	–	–	–	+	–

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
39.	*Athyma zeroca* Moore	–	–	–	–	–	–	–	–	+	–
40.	*Athyma nefte inara* (Doubleday)	–	–	–	–	–	–	–	–	–	–
41.	*Athyma cama* Moore	–	–	–	–	–	–	–	–	+	–
42.	*Athyma perius* (Linnaeus)	+	–	+	–	+	–	–	–	–	–
43.	*Athyma larymna siamensis* (Fruhstorfer)	–	+	–	–	–	–	–	–	–	–
44.	*Parasarpa zayla* (Doubleday)	–	–	–	–	–	–	–	–	–	–
45.	*Bhagadatta austenia austenia* (Moore)	–	–	–	–	–	–	–	–	–	–
46.	*Sumalia daraxa* (Doubleday)	–	–	–	–	–	–	–	–	–	–
47.	*Parthenos sylvia gambrisius* (Fabricius)	–	–	–	–	–	–	–	–	–	–
48.	*Lebadea martha ismene* Doubleday	–	–	–	–	–	–	–	–	–	–
49.	*Tanaecia julii sedeva* (Moore)	–	–	–	–	–	–	–	–	–	–
50.	*Tanaecia lepidea lepidea* (Butler)	–	–	–	–	–	–	–	–	–	–
51.	*Tanaecia cocytus satrapaces* (Hewitson)	–	+	–	–	–	–	–	–	–	–
52.	*Euthalia jama jama* (Felder)	–	–	–	–	–	–	–	–	–	–
53.	*Lexias khasiana intermedia* (Tytler)	–	+	–	–	–	–	–	–	+	+
54.	*Lexias dirtea jadeitina* (Fruhstorfer)	–	–	–	–	–	–	–	–	+	–

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
55.	*Bassarona durga splendens* (Tytler)	–	–	–	+	–	–	–	–	–	–
56.	*Bassarona khama curvifascia* (Tytler)	–	–	–	–	–	–	–	–	–	+
57.	*Bassarona patala taooana* (Moore)	–	–	–	–	–	–	–	–	–	–
58.	*Bassarona sahadeva nadaka* (Fruhstorfer)	–	–	–	–	–	–	–	–	–	–
59.	*Bassarona iva* (Moore)	–	–	–	–	–	–	–	–	–	–
	Tribe **Pseuderglini**										
60.	*Stibochiona nicea nicea* (Gray)	–	–	–	–	–	–	–	–	–	–
61.	*Pseudergolis wedah* (Kollar)	–	–	–	–	–	–	–	–	–	–
	Tribe **Apaturini**										
62.	*Eulaceura manipurensis* (Tytler)	–	+	–	–	–	–	–	–	–	–
63.	*Rohana parisitis parisitis* (Westwood)	–	–	–	–	–	–	–	–	–	–
64.	*Apatura chevana* (Moore)	–	–	–	–	–	–	–	–	–	–
65.	*Chitoria sordida sordida* (Moore)	–	–	–	+	–	–	–	–	–	–
66.	*Chitoria ulupi ulupi* (Doherty)	–	–	–	–	–	–	–	–	–	–
67.	*Sephisa chandra* (Moore)	–	–	–	–	–	–	–	–	+	–
68.	*Hestina nama* (Doubleday)	–	–	–	–	–	–	–	–	–	–

Sl. No	Name of Family species/subspecies	Bishnupur	Chandel	Churachandpur	Imphal	Senapati	Thoubal	Tameng	Ukhrul	Eastern Manipur Hills	Western Manipur Hills
	Subfamily CHARAXINAE										
69.	*Prothoe franck regalis* Butler	–	–	–	–	–	–	–	–	–	–
70.	*Charaxes polyxena hierax* Felder	–	–	–	–	–	–	–	–	–	–
71.	*Polyura athamas athamas* (Drury)	–	–	–	–	–	–	–	–	–	–
72.	*Polyura arja* (Felder & Felder)	–	–	–	–	–	–	–	–	–	–
73.	*Polyura delphis delphis* (Doubleday)	–	–	–	–	–	–	–	–	–	–
74.	*Polyura dolon magniplaga* (Fruhstorfer)	–	–	–	–	–	–	–	–	–	–
75.	*Polyura eudamippus eudamippus* (Doubleday)	–	–	–	+	–	–	–	–	–	–
	Family SATURNIIDAE										
76.	*Actias selene* (Huebner)	–	–	–	–	–	–	–	–	–	–
77.	*Antheraea helferi* Moore	–	–	–	–	–	–	–	–	–	–
78.	*Cricula andrei* Jordan	–	–	–	–	–	–	–	–	–	–
79.	*Samia cynthia* (Drury)	–	–	–	–	–	–	–	–	–	–
80.	*Attacus atlas* (Linnaeus)	–	–	–	–	–	–	–	–	–	–

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INSECTA : LEPIDOPTERA : PAPILIONOIDEA, BOMBYCOIDEA & NOCTUOIDEA

D. K. MONDAL & D.R. MAULIK
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The article gives a faunistic account of our families, viz., Papilionidae, danaine (Nymphalidae) (superfamily Papilionoidea), Lasiocampidae (superfamily Bombycoidea) and Lymantriidae (superfamily Noctuoidea) from the state of Manipur. Earlier, the Papilionidae was represented by 26 species in 6 genera, the danaine (Nymphalidae) by 10 species in 4 genera, the Lasiocampidae, by 3 species in 3 genera and the Lymantriidae, by 3 species in 2 genera from the state, while the taxal estimate from India and abroad, along with the mention of threats to survival, conservation, habits, habitats, general morphology, collection *cum* preservation methods, keys to most of the taxa, etc., for all the families, has already been briefed in the authors' earlier works on the group from West Bengal (Mondal and Maulik, 1997) and Meghalaya (Mondal & Maulik,1998).

The work is based on material which, other than those lying amidst the old collection, have been brought recently from several districts of the state by different parties from the Zoological Survey of India. The sumtotal of examined material consisting of 51 individuals in 22 species represent about 50% of the fauna known from the state.

The pioneering work on the group under study from Manipur dates back to Butler (1885) who dealt with Papilionidae (12 spp)., danaine (Nymphalidae) (10 spp.) and Lasiocampidae (one sp.). This was later on abridged by Tytler (1915) who studied mainly the Papilionid fauna of the state. All these were subsequently cross-referred to by Hampson (1892), Talbot (1939, 1947) and others as cited in the text.

The present paper incorporates systematic account of the state fauna covering the foregone families. Amongst the species examined, the Papilionidae comprises 10, danaine (Nymphalidae) 5 and Lymantriidae, 7, inclusive of nine new records for the state, as marked *under the families concerned in the Systematic Account. The remaining 31 elements of all these families, which are not available in the collection of state fauna under study, are appended on the basis of literature review.

SYSTEMATIC ACCOUNT

List of Taxa

(*, New for Manipur)

Order LEPIDOPTERA

Superfamily PAPILIONOIDEA

Family PAPILIONIDAE

Subfamily PAPILIONINAE

Genus ***Graphium*** Scopoli

1. *sarpedon* (Linnaeus)

Genus ***Atrophaneura*** Reakirt

*2. *varuna* (White)

3. *polyeuctes* (Doubleday)

4. *plutonius* (Oberthür)

Genus ***Princeps*** Hübner

5. *memnon* (Linnaeus)

6. *helenus* (Linnaeus)
7. *polytes* (Linnaeus)
*8. *nephelus* (Boisduval)
9. *elephenor* (Doubleday)
10. *arcturus* (Westwood)

Family NYMPHALIDAE

Subfamily DANAINAE

Genus ***Parantica*** Moore

11. *sita* (Kollar)

Genus ***Tirumala*** Moore

12. *limniace* (Cramer)

Genus ***Danaus*** Kluk

13. *chrysippus* (Linnaeus)

Genus ***Euploea*** Fabricius

14. *mulciber* (Cramer)
15. *doubiedayi* Felder & Felder

Superfamily NOCTUOIDEA

Family LYMANTRIIDAE

Genus ***Dasychira*** Stephens

*16. *complicata* Walker
*17. *bhana* Moore

Genus ***Lymantria*** Hübner

*18. *ampla* (Walker)

Genus ***Euproctis*** Hübner

*19. *divisa* (Walker)
20. *latifascia* (Walker)
*21. *quttata* (Walker)
*22. *plagiata* (Walker)

Order LEPIDOPTERA

Superfamily PAPILIONOIDEA

Family PAPILIONIDAE

Subfamily PAPILIONINAE

Genus ***Graphium*** Scopoli

1777. *Graphium* Scopoli, *Intr. Hist. Nat.*, 433.

1983. *Graphium* : Hancock, *Smithersia*, **2** : 21.

1. *Graphium sarpedon* (Linn.)

1758. *Papilio sarpedon* Linnaeus, *Syst. Nat.*, ed. **10** : 461.

1983. *Graphium sarpedon* : Hancock, *Smithersia*, **2** : 47.

Material examined : One ex., Kaibul Lamjao National Park, Churachandpur, 2.iv.1992, *D. K. Mondal* & party, coll. *Wing expanse :* 78 mm.

Distribution : India : Manipur (Churachandpur district); also extending to Jammu & Kashmir in the N.W. Himalaya as well as to the peninsular region of the mainland.

Elsewhere : South Japan and China as far as the solomon Islands.

Remarks : This is a widely distributed species with numerous geographical forms, of which only a couple, viz., *G.S. teredon* (Felder & Felder) from peninsular India and Sri Lanka and *G.S. luctatius* Fruhstorfer from J. & K. to Myanmar and Malayan subregion, occur in India. The specimen examined is referable to the ssp. *luctatius* (*vide* Mondal & Maulik, 1998).

Genus ***Atrophaneura*** Reakirt

1864. *Atrophaneura* Reakirt, *Proc. Ext. Soc. Phil.*, **3**. 45.

*2. *Atrophaneura varuna* (White)

1842. *Papilio asterion* Westwood, *Ann. Mag. Nat. Hist.*, **9**. 37.

1997. *Atrophaneura varuna asterion* Westwood: Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal.* Part **7** : 764.

Material examined : One ex., Saikot, Churachandpur, alt. *c* 800 m, 4.iv.1992, *D. K. Mondal* & party coll. *Wing expanse :* 95 mm.

Distribution : India : Manipur (Churachandpur district), West Bengal; Sikkim; Assam; Meghalaya; Arunachal Pradesh; Uttar Pradesh.

Elsewhere : Bhutan; Myanmar; Malayan.

Remarks : The specimen examined belongs to ssp. *astorion* (Westwood), the only known Indian representative of *A. varuna* (*cf.* Mondal & Moulik, 1997).

3. *Atrophaneura polyeuctes* (Doubleday)

1842. *Papilio polyeuctes* Doubleday, *in Gray's Zool. Misc.*, p. 74.

1983. *Atrophaneura polyeuctes* : Hancock, *Smithersia,* **2** : 47.

Material examined : One ex., saikot, Churachandpur, alt. *c* 800 m, 4.iv.1992, *D. K. Mondal* & party coll. *Wing expanse* : 150 mm.

Diagnosis : Hind wing elongate with tail spatulate and redtipped, discal spot large, white and submarginal red spots triple.

Distribution : India : Manipur (Churachandpur district); extending from N. W. Himalaya to China and Malay Peninsula through Nepal. Bhutan and Myanmar.

Remarks : This species after Hancock (1983) was earlier treated by Bingham (1907), Jordan (1910), Evans (1932), Talbot (1939) and Munroe (1961) as '*philoxenus* Gr.', which is now-a-days relegated to the status of subspecies from Kashmir to Nepal *interalia* ssp. *punchi* (Bang-Haas) from Western Kashmir and the nominate subspecies from Sikkim to Myanmar and also Yunnan, Thailand, Annam and Tonkin (*cf.* Talbot, *loc. cit.*). The specimen examined is referable to the last subspecies which differs from others by the absence of white spot above and below the large white discal spot of hind wing in male. Previously known to be locally common, the butterfly occurs in wooded districts at an altitude ranging between *c* 350 and 3400 metres during summer. The female is known to emit a highly obnoxious odour that persists long after death. Food plant belongs to *Nepenthes* species.

4. ***Atrophaneura plutonius*** (Oberthür)

1907. *Papilio plutonius* Oberthür, *Bull. Soc. Ent. Fr.,* p. 137.

1983. *Atrophaneura plutonius* : Hancock, *Smithersia,* **2** : 47.

Material examined : One ex., Manipur, *Old Colln.* (Other data not traceable). *Wing expanse* : 98 mm.

Diagnosis : Like the preceding species, but differing by hind wing without white discal spot, submarginal spots and tail black.

Distribution : India : Manipur (district unknown); Sikkim; Nagaland; Mizoram.

Elsewhere : South-western China; Nepal; Bhutan.

Remarks : This is a rare species of high elevations upto *c* 2200 m) and requires monitoring (*cf.* Collins & Morris, 1985). Out of a couple of subspecies from India, *A. P. tytleri* (Evans, 1923) (as *Byasa alcinous tytleri*) is from Manipur and the specimen examined is referable to that subspecies, which differs from its ally, *A. P. pembertoni* (Moore) from Sikkim to Bhutan, by the presence of a small red submarginal spot in Culb area of hind wing. Incidentally, the species *alcinous* (Klug) is a good species known from Sino-Japanese region.

Genus ***Princeps*** Hübner

1806-19 *Princeps* Hübner, *Samml. Exot. Schmett.,* **1** : pl. (116).

5. ***Princeps memnon*** (Linnaeus)

1758. *Papilio agenor* Linnaeus, Syst. Nat. ed. **10** : 460.

1997. *Princeps memnon agenor* (Linnaeus) : Mondal & Maulik, *State Fauna Series* 3 *: Fauna of West Bengal, Part* **7** : 770.

Material examined : One ex., Saikot, Churachandpur, alt. *c* 800 m, 4.iv.1992, *D. K. Mondal* & party coll.; 1 ex., (specific loc. in Manipur not traceable), *Old colln. Wing expanse* : 140-148 mm.

Distribution : India : Manipur (Churachandpur district); almost throughout the mainland except north-western and central sectors; Andaman & Nicobar Is.

Elsewhere : Nepal, Bangladesh, Myanmar, extending to Malayan, China, Japan and Ryukyu Is.

Remarks : Common especially since the cultivation of *Citrus,* this butterfly is inodorous, extremely mimetic and polyphenic in habit, out of as many as 13 subspecies, only one, i.e., ssp. *agenor* (Linn.), is known from India and the material examined is referable to that subspecies.

6. ***Princeps helenus*** (Linnaeus)

1758. *Papilio helenus* Linnaeus, *Syst. Nat.* ed., **10** : 459.

1997. *Princeps helenus helenus* (Linnaeus) : Mondal & Maulik, *State Fauna Series 3* : Fauna of West Bengal, Part 7 : 771.

Material examined : 2 exs., Turibari, *c* 1250 m, 5 kms. West of Kangpokpi, Senapati district, 11.iv.1992, *D. K. Mondal* & party coll.; 1 ex., specific locality not traceable, *Old Colln. Wing expanse :* 110-120 mm.

Distribution : India : Manipur (Senapati district); extending to the West Himalaya and peninsular belts.

Elsewhere : Nepal; Bhutan; Bangladesh; Myanmar; Sri Lanka; Indo-Malayan; China; Korea; Ryukyu Is.

Remarks : This is a common butterfly represented by two subspecies in India, viz., ssp. *helenus* (Linn.) from northern India and ssp. *daksha* (Hampson) from the Indian Peninsula; the material examined belong to the former subspecies.

7. ***Princeps polytes*** (Linnaeus)

1775. *Papilio romulus* Cramer, *Pap. Exot.*, **1** : 67. pl. 43

1997. *Princeps polytes romulus* (Cramer) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 771.

Material examined : One ex., Keithem Manbi, 1050 m, 14.i.1976, *A. K. Ghosh* & party coll.; 2 exs., Sikamri village, Mao, 20.vi.1993, *R. S. Barman* & party coll. *Wing expanse :* 90-95 mm.

Distribution : India : Manipur (Senapati district); almost throughout the rest of mainland; Andaman and Nicobar Is.; also Lakshadweep (*vide* Mondal 1991).

Elsewhere : Oriental Region; Ryukyu Is.

Remarks : This is a common mimetic and polyphenic butterfly represented by sixteen subspecies, of which three occur in India, viz., ssp. *romulus* (Cramer) from the Indian mainland and Lakshadweep, ssp. *sticioides* (Evans) from the Andaman Is. and ssp. *nikobarus* (Felder) from the Nicobar Is. The specimens examined belong to the first subspecies.

8. ***Princeps nephelus*** (Boisduval)

1845. *Papilio chaon* Westwood, *Arc. Entom.*, **2** : 97. pl. 72.

1997. *Princeps nephelus chaon* (Westwood) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 772.

Material examined : 2 exs., Iroishamb, Imphal, *c* 800 m, 12.iv.1992, *D. K. Mondal* & party coll. *Wing expanse :* 118-130 mm.

Distribution : India : Manipur (Imphal dist.); Sikkim; West Bengal; Assam; Meghalaya.

Elsewhere : Nepal; Bhutan; Myanmar; extending to Thailand; Sino-Malayan.

Remarks : This is a common butterfly with 11 subspecies, of which only one, i.e., ssp. *chaon* (Westwood) from Nepal to N. Myanmar, is known from India. The material examined is referable to ssp. *chaon.*

9. ***Princeps elephenor*** (Doubleday)

1845. *Papilio elephenor* Doubleday, *Ann. Mag. nat. Hist.*, **16** : 305.

1983. *Princeps elephenor :* Hancock, *Smithersia,* **2** : 48.

Material examined : One ex., Manipur (specific locality not traceable), *Old colln. Wing expanse :* 120 mm.

Diagnosis : Body and wings glossy metallic blue; hind wing without green or blue patch, nor any submarginal lunule, nor tail; abdomen laterally buff.

Distribution : India : Manipur; Assam; Meghalaya; Nagaland.

Elsewhere : Bangladesh; Myanmar; Northern Thailand.

Remarks : This is a very rare hilly butterfly of high aesthetic value. It elicits powerful flight at bright sunlight and prefers forest undergrowth at repose. Although status given as very rare. It seems marginal for threatened status. It is protected by law in India (*cf.* Ministry of Law and Justice, India, 1972). More information from the eastern part of its range is desirable. The butterfly is represented by 2 subspecies, of which only the

nominate one from India is referable for the material examined. The other subspecies, *i.e. schanus* (Jordan), earlier treated with *P. dialis* (Leech) by Talbot (1939), is from Myanmar.

10. ***Princeps arcturus*** (Westwood)

1882. *Papilio arcturus* Westwood, *Ann. Mag. Nat. Hist.*, **9** : 37

1997. *Princeps arcturus arcturus* (Westwood) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* **7** : 775.

Material examined : One ex., Manipur (specific locality not traceable), *Old Colln. Wing expanse* : 110 m,

Diagnosis : Forewing postdiscal band green; hindwing subterminal lunules claret-red and arranged in a prominent series.

Distribution : India : Manipur; Assam; West Bengal; Sikkim; extending to the North-West Himalaya.

Elsewhere : Nepal to Thailand through Myanmar; China.

Remarks : This is a common species occuring in paths and openings amidst woods. There are two subspecies known from India, viz., ssp. *arius* (Rothschild) from Jammu and Kashmir to Kumaon, and the nominate one, to the latter of which belongs the specimen examined.

Family NYMPHALIDAE

Subfamily DANAINAE

Genus ***Parantica*** Moore

1880a. *Parantica* Moor, *Lep. Ceylon*, **1** : 7.

*11. ***Parantica sita*** (Kollar)

1844. *Danaus sita* Kollar, In Hugels *Kasch. Reish. Sick.*, **4** : 424.

1998. *Parantica sita sita* (Kollar) : Mondal & Maulik, *State Fauna Series 10 : Fauna of Meghalaya.*

Material examined : One ex., Manipur (specific locality not traceable). *Old Colln. Wing expanse* : 110 mm.

Distribution : India : Manipur; Assam; Meghalaya; throughout the Himalaya.

Elsewhere : Bhutan, Myanmar to malay Peninsula; China inclduing Tibet.

Remarks : The material examined belongs to the nominate subspecies which is only known from India. The same is also referable to the form *tytia* (Gray) amongst three others in India.

Genus ***Tirumala*** Moore

1880a. *Tirumala* Moor, *Lep. Ceylon*, **1** : 4

12. ***Tirumala limniace*** (Cramer)

1866b. *Danaus limniace* ver *leopardus* Butler, *Proc. zool. Soc. London*, : 52.

1997. *Tirumal limniace leopardus* (Butler) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* **7** : 778.

Material examined : One ex., Sikamri village, Mao, 20.vi.1993, *R.S. Barman* & party coll. *Wing expanse :* 90 mm.

Distribution : India : Manipur (Senapati district); throughout the rest of mainland; Andaman & Nicobar Is.; also Lakshadweep (*vide* Mandal, 1991).

Elsewhere : Widespread in the Oriental Region (*vide* Mondal & Maulik, 1997).

Remarks : The locally common butterfly, earliar recorded from Manipur by Watson (1897), is referable to *T. l. leopardus* (Butler), the only known subspecies from India.

Genus ***Danaus*** Kluk

1802. *TDanaus* Kluk, *Zwizerzat Hist. Nat. Poez. Gaspod.*, **6** : 84.

13. ***Danaus chrysippus*** (Linnaeus)

1778. *Papilio chrysippus* Linnaeus, *Syst. Nat.* ed. **10** : 471.

1997. *Danaus chrysippus* (Linnaeus) : Mondal & Maulik, *State Fauna Series 3 :* Fauna of *West Bengal, Part* **7** : 781.

Material examined : 2 exs., Tipaimukt near Dam Area, 17.iv.1989, *Y. P. Sinha* & party coll.; 1 ex., Iraishamba, Imphal, 12.iv.1992, D. K. Mondal & party coll. *Wing expanse :* 75 mm.

Distribution : India : Manipur (Imphal district); rest of the mainland.

Elsewhere : Widespread in the Oriental and Palaearctic (Middle East; Far East); African and Australian.

Remarks : This is a common butterfly, being represented by the nominate subspecies in whole of India.

Genus ***Euploea*** Fabricius

1807. *Euoploea* Fabricius Magazin (Illiger) *Braumsneing.* **6** : 280.

14. ***Euploea mulciber*** (Cramer)

1777. *Papilio mulciber* Cramer, *Pap. Exot.*, **2** : 45. pl. figs. C.N.

1997. *Euploea mulciber mulciber* (Cramer) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* **7** : 783.

Material examined : One ex., Iroishamba, Imphal, 30.xi.1992, *P. H. Roy* & party coll.; 1 ex., Manipur, specific locality not traceable (Old Colln.) *Wing expanse :* 90 mm.

Distribution : India : Manipur (Imphal district); N.W. to East Himalaya and adjacent areas; Orissa; Eastern Ghats; Andaman & Nicobar Is.

Elsewhere : Nepal, China, Myanmar & Malayan.

Remarks : This common butterfly is represented by two subspecies from India, of which the nominate one is referable for the material examined. The other counterpart, i.e., ssp. *Kalinga* Doherty, is known from Orissa and E. Ghats.

15. ***Euploea doubleday*** Felder & Felder

1865. *Euploea doubleday :* Felder & Felder, *Reise Nov. Lep.*, **2** (2) : 337.

1984. *Euploea doubledayi :* Ackery & Vane-Wright, *Milkweed Butterflies*, p. 225.

Material examined : One ex., Manipur (specific locality not traceable), *Old Colln. Wing expanse :* 92 mm.

Diagnosis : Fore wing brand narrow; hind wing cell blackened and white streaks very long.

Distribution : India : Manipur; Sikkim; Assam; Nagaland.

Elsewhere : Bangladesh; Myanmar; Thailand; Malaya Peninsula.

Remarks : This is a locally common butterfly represented by the nominate subspecies in India and exhibits sexual dimorphism in that the fore wing in female has discal white spots and no brand. It is an exclusively continental species occuring in forest with a preference for open woodland up to *c* 600 m. It is observed at salt sources and mud. Adult attractants are *Xerospermum intermedium* at flowers). The butterfly was earlier reported from Manipur as *'E. alcathoe'* by Bingham (1905); but this is a good species not known from India (*cf.* Ackery & Vane-Wright, 1984).

Superfamily NOCTUOIDEA

Family LYMANTRIIDAE

Genus ***Dasychira*** Stephens

1829. *Dasychir* Stephens, *Syst. Cat. Ins.* **2** : 56.

*16. ***Dasychira complicata*** Walker

1855. *Dasychira complecata* Walker, *Cat. Lep. Het. Brit. Mus.*, **32** : 365.

1997. *Dasychira complecata* Walker : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* **7** : 656.

Material examined : One ex., Iroishamba, Imphal, 30.xi.1992, *P. H. Roy* & party coll. *Wing expanse :* 50 mm.

Diagnosis : Fore wing with a maculate band between subbasal waved black line and double antemedial lines; reniform spot black-edged; postmedial line curved and also followed by a maculate band; submarginal line waved. Hind Wing yellowish white, basally orange-tinged; a dark end-cell spot; post-medial band present. Abdomen orange.

Distribution : India : Manipur (Imphal district); West Bengal; Sikkim.

Remarks : This is primarily a hill species of

the eastern range, of which the habits are unknown. The specimen examined is male with wing expanse much smaller than that as cited by Hampson (1892). The female is known to be enormously larger than male.

*17. ***Dasychira bhana*** Moore

1965. *Dasychira bhana* Moor, *Proc. Zool. Soc. Lond.*, : 804.

1997. *Dasychira bhana* Moor : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 657.

Material examined : 1 ex. Sinadam Colony, Chandel, 24.iii.1992, *D. K. Mondal* & party coll.; 4 exs., Iroishamba, Imphal, 30.xi.1992, *P. H. Roy* & party coll.; 3 exs., Sikamari village, Mao, 20.vi.1993, *R. S. Barman* & party coll. *Wing expanse :* 40-45 mm.

Diagnosis : Forewing dark brown with 6 vestiged dark waved lines tinged purplish grey outwardly, submarginal series of dark lunules and one at end-cell. Hindwing fuscous. Sexes nearly identical.

Distribution : India : Manipur (Chandel, Imphal and Senapati districts); also Sikkim and West Bengal (*vide* Mondal & Moulik, 1997).

Remarks : The moth is locally and seasonally common in both the hill and plain districts of Manipur. It seems to be endemic in North-East India. Barlow (1982) stated under 'Taxonomic Appendix' that all the taxa listed by him are transferred from *Dasychira* to *Calliteara* Saalmüller. It cannot be ruled out that other names like those of this and the preceding species are available in the genus *Calliteara;* but a check made on these species from the work of Barlow (*loc. cit.*) did not reveal any of them under that genus. With this, both the aforesaid species are provisionally placed under the genus *Dasychira.*

Genus ***Lymantria*** Hübner

1818. *Lymantria* Hübner, *Verz. beck. Schmett.* p. 160.

*18. ***Lymantria ampla*** (Walker)

1855. *Enome ampla* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 883.

1997. *Lymantria ampla* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 669.

Material examined : One ex., Iroishamba, Imphal, 30.xi.1992, *P. H. Roy* & party coll. *Wing expanse :* 40 mm.

Distribution : India : Manipur (Imphal district); Sikkim; Gangetic West Bengal; Maharashtra.

Elsewhere : Myanmar; Sri Lanka; Yunnan.

Genus ***Euproctis*** Hübner

*19. ***Euproctis divisa*** (Walker)

1855. *Larna divisa* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 836.

1997. *Euproctis divisa* Walker : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 677.

Material examined : 6 exs., Lonkaitpat, Bishnupur, *c* 800 m., 7.vi.1992, *P. H. Roy* & party coll.; 2 exs., Loktak, *c* 800 m., 8.iv.1992, *D. K. Mondal* & party coll.; 4 exs., Sikamari village, Mao, 20.vi.1993, *R. S. Barman* & party coll. *Wing expanse :* 35 mm.

Distribution : India : Manipur (Bishnupur and Senapati districts); Meghalaya; W. Bengal; Nagaland; Sikkim; Punjab.

Elsewhere : Bangaladesh; Nepal; West China; Vietnam.

Remarks : The species is apparently common in status at Manipur.

20. ***Euproctis latifascia*** (Walker)

1855. *Leucoma latifascia* Walker, *Cat. Lep. Het. Brit. Mus.*, **4** : 831.

1997. *Euproctis latifascia* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 663.

Material examined : 2 exs., Saikat, Churachandpur, *c* 800 m, 28.vi.1992, *P. H. Roy* & party coll.; 1 ex., Iraishamba, Imphal, *c* 800 m., 12.iv.1992 *D. K. Mondal* & party coll. *Wing Expanse :* 36-44 mm.

Distribution : India : Manipur (Churachandpur

and Imphal districts); W. Bengal; Meghalaya; Jammu and Kashmir; Himachal Pradesh; Maharashtra.

Elsewhere : Nepal; Hongkong; Taiwan; Vietnam.

Remarks : The species was earlier known from Manipur (*vide* Bryk, 1934).

*21. ***Euproctis guttata*** (Walker)

1855. *Artaxa guttata* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 795.

1998. *Euproctis guttata* (Walker) : Mondal & Maulik, *State Fauna Series 10 : Fauna of Meghalaya.*

Material examined : One ex., Sikamari village, Mao, 20.vi.1992, *R. S. Barman* & party coll. *Wing expanse :* 35 mm.

Distribution : India : Manipur (Senapati district); Meghalaya; Karnataka.

Elsewhere : Sri Lanka; Myanmar.

*22. ***Euproctis plagiata*** (Walker)

1855. *Cispia plagiata* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 858.

1997. *Euproctis plagiata* (Walker) : Mondal & Maulik, *State Fauna Series 3 : Fauna of West Bengal, Part* 7 : 675.

Material examined : 2 exs., Sikamari village, Mao, 20.vi.1993, *R. S. Barman* & party coll. *Wing expanse :* 60 mm.

Distribution : India : Manipur (Senapati district); West Bengal.

Elsewhere : Nepal.

APPENDIX - A

(List of species from Manipur reviewed from literature)

I. Superfamily PAPILIONOIDEA

(A). Family PAPILIONIDAE

Subfamily PAPILIONINAE

1. *Teinopalpus imperialis* Hope
2. *Lampropteria meges indistincta* (Tytler)
3a. *Graphium aristeus anticrates* Doubleday
3b. *G. a. harmocrates* (Felder & Felder)
4. *G.antiphates* (Cramer)
5. *G. xenocles* (Doubleday)
6. *G. bathycles* (Zinken-Sommer)
7. *G. doson axion,* f. *acheron* Moore
8. *G. agamemnon* (Linnaeus)
9. *Atrophaneura latreillei kabrua* (Tytler)
10. *A. polla* (de Nicéville)
11. *A. crassipes* (Oberthür)
12a. *A. coon cacharensis* (Bulter)
12b. *A. c. doubledayi* (Wallace)
13. *Chilasa paradoxa telearchus,* f. *danisepa* (Bulter)
14. *C. slateri* (Hewitson)
15. *Princeps bootes mixta* (Tytler)
16. *P. janaka,* f. *kala* (Tytler)
17. *P. polyctor ganesa* (Doubleday)
18. *P. paris* (Linnaeus)
19. *P. krishna* (Moore)

(B) Family NYMPHALIDAE

Subfamily DANAINAE

20. *Parantica aglea melanoides* Moore
21. *P. melaneus* (Cramer)
22. *Tirumala septentrionis* (Bulter)
23. *Danaus genutia* (Cramer)
24. *Euploea midamus* (Linnaeus)
25. *E. radamanthus* (Fabricius)
26. *E. algea deione* (Westwood)

II. Superfamily BOMBYCOIDEA

(C) Family LASIOCAMPIDAE

27. *Crinocraspeda torrida* (Moore)
28. *Bhima undulosa* (Walker)
29. *Bharetta flammans* Hampson

III. Superfamily NOCTUOIDEA

(D) Family LYMANTRIIDAE

30. *Euproctis marginata,* f. *quadrangularis* (Moore)
31. *Mardara albostriata* Hampson

APPENDIX - B

[Hypothetical generic list giving the estimated figure of species of moth families under study that may occur with every possibility at least in the periphery of Manipur along the borders of Nagaland and Myanmar (*cf.* Bryk,1934; Coliier, 1936]

Family LASIOCAMPIDAE

1. *Malacosoma indica* Wlk.
2. *Trabala vishnou* Lef.
3. *Metanastria* (5 spp.) : *aconyta* Cr., *ampla* Wlk., *recta* Wlk., *repanda* Wlk., *subpurpurea* Butl.
4. *Taragama* (2 spp.) : *dorsalis* Wlk., *siva* Lef.
5. *Lebeda nobilis* Wlk.
6. *Arguda* (4 spp.) : *albiqutta* Wlk., *bheroba* Mrc., *erectilinea* Swinh., *flavovittata* Mre.
7. *Cosmotriche* (2 spp.) *divisa* Mre., *laeta decisa* Wlk.
8. *Lenodora signata fusca* Mre.

Family LYMANTRIIDAE

9. *Dasychira* (3 spp.) : *grotei* Mre., *horsfieldi* Str., *mendosa* Hbn.
10. *Laelia suffusa* Wlk.
11. *Stilpnotia cygna* Mre.
12. *Leucoma submarginata* Wlk.
13. *Kanchia subvitrea* Wlk.
14. *Pantana bicolar* Wlk.
15. *Casama vilis* Wlk.
16. *Daplasa irrorata* Mre.
17. *Himala argentea* Wlk.
18. *Lymantria* (6 spp.) : *mathura* Mre., *Obfuscata* Wlk., *serva* Fabr., *Concolor* Wlk., *incerta* Wlk., *grisea* Mre.
19. *Perina* (2 spp.) : *nuda* Fabr., *pura* Wlk.
20. *Porthesia* (4 spp.) : *scintillans* Wlk., *virguncula* Wlk., *stigmatifera* Hmps., *aurantica* Hamps.
21. *Euproctis* (10 spp.) : *flavinata* Wlk., *vitellina* Koll., *icilia* Stol., *varians* Wlk., *bimaculata* Wlk., *digramma* Guer., *endoplagia* Hmps., *signata* Blanch., *fraterna* Mre., *semisignata* Wlk.
22. *Aruta flavipes* Himps.

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INSECTA : LEPIDOPTERA : ZYGAENIDAE

D. P. BHATTACHARYA
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

The knowledge on the fauna of Zygaenidae of Manipur is very scarce. Out of nearly one hundred fifty species and subspecies known from India, eight species and subspecies are only recorded, so far, from the state. Butler (1855) and Tytler (1914-15) worked on the Butterfly fauna of Manipur and Nagaland. Hampson (1892) recorded only two species of *Zygaenidae, Philopator basimaculata* Moore and *Agalope hyalina* (Kollar) in his work on the *Fauna of British India.* He (1905) also described a new species, *Clelea refulgens* from Mao, Manipur, 6000 ft. (Doherty coll.), type in B. M. Jordan (1908) in Seitz's *Macrolepidoptera of the World, Indo-Australian Region* and Fletcher (1925) in *Catalogue of Indian Insects, Zygaenidae.* noted four species and subspecies from the state of Manipur.

Presently, four more species and subspecies, *Pidorus circe* (Herrich-Schaffer), *Chalcosia pectinicornis argentata* Moore, *Cyclosia papilionaris papilionaris* (Drury) and *Elcysma westwoodii dohertyi* Elwes have been added as new locality records from the state.

SYSTEMATIC ACCOUNT

Key to the Subfamilies

1. Mouth parts present 2
— Mouth parts wanting 3
2. Antennae not flabellate at tip ..... ZYGAENINAE
— Antennae flabellate at tip ..... CHALCOSIINAE
3. Hind wing with the outer margin produced into a long tail ..... HIMANTOPTERINAE
— Hind wing without the outer margin produced into a long tail ..... PHAUDINAE

Subfamily ZYGAENINAE

Genus *Clelea* Walker

1854. *Clelea* Walker, *Cat. Lep. Het. Brit. Mus.*, **2** : 465.

Eight species under the genus are known from India of which one is recorded from Manipur.

1. *Clelea rufulgens* Hampson

1904. *Clelea refulgens* Hampson, *J. Bombay Nat. Hist. Soc.*, **16** : 193, pl. D, fig. 3.

1925. *Clelea refulgens,* Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. 9 : 8.

Material examined : Material reviewed from literature.

Distribution : India : Manipur (6000 ft.), Meghalaya (Khasi) and Myanmar.

Remarks : Hampson (1905) described the species from Manipur, Mao, 6000' (Doherty coll.). Type in B.M.

Subfamily CHALCOSIINAE

Key to the Genera of CHALCOSIINAE

1. Wings uniformly semi-transparent 2
— Wings not uniformly semi-transparent 4

2. Hind wing produced into a long tail ..... ***Elcysma***

— Hind wing not produced into a long tail ...3

3. Fore wing R_1 anastomosing with Sc ..... ***Philopator***

— Fore wing R_1 not anastomosing with Sc..... ***Agalope***

4. Hind wing considerably longer ..... ***Pidorus***

— Hind wing not considerably longer 5

5. Fore wing R_1 anastomosing with Sc ..... ***Cyclosia***

— Fore wing R_1 not anastomosing with Sc..... ***Chalcosia***

Genus *Cyclosiai Hubner*

1822. *Cyclosia* Hubner, *Verz. bek. Schmett.*, p. 177.

Five species with subspecies under the genus are known from India of which one is recorded for the first time from Manipur.

2. *Cyclosia papilionaris papilionaris* (Drury)

1779. *Noctua pailionaris* Drury, *Ill. Exot. Ent.*, **2** (4), pl. 2, fig. 4.

1925. *Cyclosia papilionaris papilionaris*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 34.

Material examined : One ♀, Manipur, I.B. Mao, 12.ix.1975 and 1♂, Burma Border, Moreh, 24.ix.1975 (M.S. Shishodia and party coll.).

Diagnostic characters : Male, colour dark coppery-red and green. Fore wing also copper-red, nervures streaked with green; a short whitish maculate oblique band beyond the upper angle of the cell and two white spots between veins M_2, M_3, and M_3 and Cu1a. Hind wing blackish, inner area below the cell suffused with green; four whitish spots variable in size; sometimes obsolascent in the interspaces beyond the cell; cilia white. Underside, costa of fore wing streaked with green, a white streak in the interno-median interspace. Hind wing with a white streak in the cell and three below; a submarginal series of blue spots on both wings. Female, fore wing black with the costa bluish green, a pale yellow streak below the costa, two in the cell, three below it and four beyond the cell with the upper one trifid, a submarginal series of small white spots. Hind wing almost similar to fore wing but with the marginal black border wider. Wing exp. ♂ 46-56 mm, ♀ 70 mm.

Distribution : India : Manipur, Andamans, Assam, Kerala, Meghalaya, Nicobars, Nilgiris (Kerala and Tamil Nadu), Sikkim, South India; also Bhutan; China; Java; Malacca; Mergui; Myanmar and Sumatra.

Remarks : This is the first locality record of the species from the state of Manipur. Sexual dimorphism of the species is very prominent. Hampson (1892) descriped the male of the species as *Pintia ferrea,* while the female as *Cyclosia papilionaris.*

Genus *Agalope* Walker

1854. *Agalope* Walker *Cat. Lep. Het. Brit. Mus.*, **2** : 437.

Five species and subspecies under this genus are known from India, of which one species is recorded from Manipur.

3. *Agalope hyalina* (Kollar)

1844. *Chalcosia hyalina* Kollar, Hugel's *Kaschmir,* **4** (2) : 462.

1925. *Agalope hyalina,* Fletchar, *cat. Lep. Het. Brit. Mus.*, Xygaenidae, pt. **9** : 47-48.

Material examined : Material reviewed from literature.

Diagnostic characters : Antennae, head and abdomen black. Wings yellowish hyaline. Fore wing base orange, a fuscous band across the cell, apical marginal area fuscous, a pale spot between veins R_4 and R_5 and a larger one between M_3 and Cu_{1a}. Hind wing uniform yellowish hyaline. Wing exp. ♂ 42 mm, ♀ 50 mm.

Distribution : India : Manipur, Jammu and Kashmir; Himachal Pradesh, Uttar Pradesh to Sikkim, West Bengal (Darjiling); also Afghanistan; Bhutan and Myanmar.

Remarks : The distribution of the species is restricted to high altitudies (7000 to 8000 ft.).

Genus ***Elcysma*** Butler

1881. *Elcysma* Butler, *Trans. ent. Soc. Lond.*, p. 4.

One species and subspecies under this genus is known from India and is also recorded from Manipur for the first time.

4. ***Elcysma westwoodi dohertyi*** Elwes

1890. *Elcysma dohertyi* Elwes, *Proc. Zool. Soc. Lond.*, pp. 386-387, pl. 34, fig. 4.

1952. *Elcysma westwoodi dohertyi*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 49.

Material examined : One ex., Manipur, 3 kms. Moreh west, (alt. 2000 ft.); 28.ix.1975 (M.S. Shishodia and party coll.).

Diagnostic characters : Antennae, head, thorax and abdomen black. Wings fuscous hyaline with the veins darker. Fore wing with a small basal black patch, a broad subbasal orange band edged with fuscous. Hind wing with the outer margin produced into a long tail between veins Cu_{1a} and R_5. Wing exp. 72 mm.

Distribution : India : Manipur and Nagaland.

Remarks : This is the first record of the species from Manipur.

Genus ***Philopator*** Moore

1865. *Philopator* Moore, *Proc. zool. Soc. Lond.*, p. 800.

Two species under this genus are known from India and also recorded from Manipur.

Key to the species of *Philopator*

Wings longer and narrower; Hind wing with one black spot on the yellow basal patch and one in the end of cell ..... *basimaculata*

— Wings shorter and rounder. Hind wing with hardly a trace of the mark in the cell .... *rotunda*

5. ***Philopator basimaculata*** Moore

1865. *Philopator basimaculata* Moore, *Proc. zool. Soc. Lond.*, p. 800, pl. 42, fig. 6.

1925. *Philopator basimaculata*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 50.

Material examined : Material reviewed from the literature.

Diagnostic characters : Head, thorax and abdomen yellow. Fore wing base yellow edged with black and with two series of black spots on it, rest of the wing white; female with the veins and margins fuscous; two fuscous spots at the end of the cell and fuscous streaks in the marginal interspaces. Hind wing similar to fore wing except only one black spot on the yellow patch and one in the end of the cell. Male with the wings narrower and the outer half of both wings suffused with fuscous. Wing exp. ♂, 50 mm, ♀ 44-58 mm.

Distribution : India : Manipur, Meghalaya, Nagaland, Sikkim and West Bengal.

Remarks : The distribution of the species in India is restricted to the north eastern part only.

6. ***Philopator rotunda*** Hampson

1896. *Philopator rotunda* Hampson, *Fauna Brit. India*, Moths, **4** : 470.

1925. *Philopator rotunda*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 50.

Material examined : Material reviewed from the literature.

Diagnostic characters : Differs from *basimaculata* in the wings being much shorter and rounder. Fore wing with the streaks broader and filling almost the whole interspaces of the outer area. Hind wing with hardly a trace of the mark in the cell, the streaks more developed in outer area. Wing exp. ♂ 40 mm, ♀ 48 mm.

Distribution : India : Manipur, Meghalaya, Nagaland and Sikkim.

Remarks : The distribution of the species in India is restricted to the north eastern region only.

Genus ***Pidorus*** Walker

1854. *Pidorus* Walker, *Cat. Lep. Het. Brit. Mus.*, **2** : 424.

Seven species and subspecies under this genus are known from India of which one is recorded from Manipur for the first time.

7. ***Pidorus circe*** (Herrich-Schaffer)

1853. *Chalcosia circe* Herrich-Schaffer, *Aussereur Schmett.*, fig. 2.

1925. *Pidorus circe*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 68.

Material examined : Two exs., Manipur, No date, (Dudgeon's coll.).

Diagnostic characters : Head, collar, antennae, thorax and abdomen green or bronzy green. Fore wing bronzy green with a wide oblique ochreous band from the costa beyond the middle to the outer angle. Hind wing purplish brown with an ochreous spot on the costa below the apex and with greenish-blue border. Wing exp. 48 mm.

Distribution : India : Manipur, Assam, Meghalaya, Nagaland and Sikkim; also Bangladesh (Sylhet).

Remarks : This is the first record of the species from Manipur. The distribution of the species is restricted to the north-eastern region of India.

Genus ***Chalcosia*** Hubner

1822. *Chalcosia* Hubner, *Verz. bek. Schmett.*, p. 173.

Four species and subspecies are known under this genus from India of which one is recorded for the first time from Manipur.

8. ***Chalcosia pectinicornis argentata*** Moore

1879. *Chalcosia argentata* Moore, *Lep. Atk.*, pp. 17-18.

1925. *Chalcosia pectinicornis argentata*, Fletcher, *Cat. Indian Ins.*, Zygaenidae, pt. **9** : 74.

Material examined : One ex., Turibari, 5 kms. West of Kangpokpi, Senapati dist., Manipur, 8.xi.1992 (A.K. Mandal and party coll.).

Diagnostic characters : Antennae metallic blue, frons blue, head and collar crimson; thorax and abdomen blue green. Fore wing basal half blue-green or white, three black spots beyond it, one in the cell and two below it, and is followed by a broad white band form the centre of the costa to near the outer angle; apical and marginal areas black, veins metallic green, subapical band of white spots in the interspaces. Hind wing pale yellow; the black, apical marginal band sometimes entirely shot with blue. Wing exp. ♂ 60 mm, ♀ 72 mm.

Distribution : India : Manipur (Kangpokpi, Senapati dist.), Assam, Meghalaya and Sikkim, also (Hazara dist.).

Remarks : This is the first locality record of the species from Manipur. The distribution of the species is restricted to the north eastern region of India.

SUMMARY

The paper includes the systematic account, keys, diagnostic characters, distribution etc. of eight species and subspecies of Zygaenidae under seven genera of which four species and subspecies are new locality records for Manipur.

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INSECTA : TRICHOPTERA

MRIDULA MAJUMDAR
Zoological Survey of India, M-Block, New Alipore, Kolkata–700 053

INTRODUCTION

This paper deals with 114 species and two subspecies in 25 genera distributed over 13 families from the state of Manipur. Of these, material represented by only 16 species and one subspecies have been received identified as donation from Dr. F. Schmid, Canada. All these material have been checked up from literature and keyed. It is interesting to note that none of these 16 species were earlier provided with keys by Schmid (1970). The author, therefore, takes the opportunity of incorporating the foregone species keyed along with consolidation of all the remaining species from the state of Manipur (*vide* Appendix) on the basis of updated literature review (Kimmins, 1953; Higler, 1992; Ghosh & Chaudhury, 1992). The locality data of the material at hand have been provided by Schmid (1965, 1970), while their distribution, original and current references have already been cited by Ghosh and Chaudhury (1992, *In* press a, b). Amongst the material under study, ten species have been reported as endemic in the state of Manipur (*vide* Systematic list). The classification has been followed after Higler (*loc. cit.*).

SYSTEMATIC LIST

(*Endemic in the state of Manipur)

Order TRICHOPTERA

Superfamily RHYACOPHILOIDEA

Genus ***Rhyacephila*** Pictet

khimbarpa group

1. *Rhyacophila gyelbu* Schmid

gyamo group

*2. *Rhyacophila gyamoi Schmid*

anatina group

*3. *Rhyacophila yipung* Schmid

*4. *Rhyacophila manipuri* Schmid

chayulpa group

*5. *Rhyacophila tsona* Schmid

nigrocephala group

*6. *Rhyacophila chomoyuma* Schmid

*7. *Rhyacophila nakpo* Schmid

naviculata group

8. *Rhyacophila procliva* Kimmins

9. *Rhyacophila rongpa* Schmid

10. *Rhyacophila drokpa* Schmid

10a. *Rhyacophila drokpa drokpa* Schmid

kashongpa group

*11. *Rhyacophila kashongpa* Schmid

12. *Rhyacophila scissa* Morton

*12a. *Rhyacophila scissa niyampa* Schmid

obscura group

13. *Rhyacophila bidens* Kimmins

annulicornis group

*14. *Rhyacophila naga* Schmid

castanea group

15. *Rhyacophila gyaldzen* Schmid

Superfamily LIMNEPHILOIDEA

Family GOERIDAE

Genus ***Larcasia*** Navas

*16. *Larcasia assamica* Schmid

SYSTEMATIC ACCOUNT

Order TRICHOPTERA

Key to superfamilies of the order TRICHOPTERA

Maxillary palpi five segmented in both sexes. Female have a single anal vaginal opening ..... RHYACOPHILOIDEA

— Maxillary palpi five segmented in female, 3-4 segmented in male. Female have separated anal and vaginal opening ..... LIMNEPHILOIDEA

Superfamily RHYACOPHILOIDEA

Family RHYACOPHILIDAE

Genus ***Rhyacophila*** Pictet

1834. *Rhyacophila* Pictet, *Rech. Phrygan,* : 181.

Key to species groups of the genus *Rhyacophila* Pictet

1. Preanal appendages present 2
— Preanal appendages absent 6
2. Aedeagus divided into two branches 3
— Aedeagus undivided 5
3. Parameres absent ..... *khimbarpa* group
— Parameres present 4
4. Preanal appendages small and oval; 2nd segment of inferior appendages large ..... *gyamo* group
— Preanal appendages large and obtuse; 2nd segment of inferior appendages short ..... *anatina* group
5. Inferior appendages of normal size; parameres with hairs in apical part ..... *chayulpa* group
— Inferior appendages slender and as long as tergal band; parameres without hair ..... *nigrocephala* group
6. Phallus apparatus complex 7
— Phallus apparatus simple .... *naviculata* group
7. Aedeagus divided 8
— Aedeagus undivided 9
8. Inferior appendages triangular; anal sclerites large ..... *kashongpa* group
— Inferior appendages not triangular; anal sclerites minute ..... *scissa* group
9. Tergal band short ..... *obscura* group
— Tergal band very long 10
10. Ventral plate of aedeagus short ..... *annulicornis* group
— Ventral plate of aedeagus large ..... *castanea* group

1. ***Rhyacophila gyelbu*** Schmid

1970. *Rhyacophila gyelbu* Schmid, *Mem. ent. Soc. Can.,* No. **66** : 187.

1992. *Rhyacophila* gyelbu, Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 321.

Diagnostic characters : Body deep pink brown with concolours hairs; legs pink yellow; wings uniformly deep brown.

Material examined : 5 exs. India, Manipur, district Ukhrul, Sirochi Kashong, 6-7. vi. 1960 (coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district), Sikkim.

gyamo group

2. ***Rhyacophila gyamo*** Schmid

1970. *Rhyacophila gyamo* Schmid, *Mem. ent. Soc. Can.,* No. **66** : 180.

1992. *Rhyacophila gyamo,* Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 321.

Diagnostic characters : Body black brown with black hairs; femora and tibiae bright orange yellow; wings uniformly black.

Material examined : 1 ex. India, Manipur, district Ukhrul, Sirohi, Kashong, 6-7 vi. 1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

anatina group

Key to species of the group *anatina*

1. Parameres divided into two equal branches. Inferior appendages arched ..... *yipung* Schmid

— Parameres divided into unequal branches. Inferior appendages not arched ..... *manipuri* Schmid

3. ***Rhyacphila yipung*** Schmid

1970. *Rhyacophila yipung* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 142.

1992. *Rhyacophila yipung*, Ghosh & Chaudhury, *Rec. Zool. Surv. India* **92** (1-4) : 340.

Material examined : 1 ex., Manipur, Langkho, district unknown 20.vii.1970 (Coll. *F. Schmid*).

Distribution : India (Manipur).

4. ***Rhyacophila manipuri*** Schmid

1970. *Rhyacophila manipuri* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 140.

1992. *Rhyacophila manipuri*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 328.

Material examined : 2 exs. Manipur district Ukhurl, Tangkhul, Hungdang, 18.viii.1960, 1 ex. Pamlal, district unknown, 31.viii.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

chayulpa group

5. ***Rhyacophila tsona*** Schmid

1970. *Rhyacophila tsona* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 192.

1992. *Rhyacophila tsona*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 339.

Diagnostic characters : Body dorsally deep yellow brown with hairs; legs pink brown; forewing brown covered with golden spots.

Material examined : 4 exs. Manipur, District Ukhrul, Sirohi, Kashong, 6,7,8,10.vi.1960, 2 exs. district Unknown, Hkyambaum, 20-23.vi.1960, 2 exs. district Unknown, Pushing, 17.viii.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

nigrocephala group

Key to species of the group *nigrocephala*

Body and wings red brown. Anal sclerites very large and equally terminated into two lobes ..... *chomoyuma* Schmid

Body and wings black brown. Anal sclerites not large slightly bilobed ..... *nakpo* Schmid

6. ***Rhyacophila chomoyuma*** Schmid

1970. *Rhyacophila chomoyuma* Schmid, *Mem. ent. Soc. Can.* No. **66** : 162.

1992. *Rhyacophila chomoyuma*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 316.

Material examined : 2 exs: Manipur, district Unknown, Hkyamboum, 20-23.vi.1960 (Coll. *F. Schmid*).

Distribution : India (Manipur).

7. ***Rhyacophila nakpo*** Schmid

1970. *Rhyacophila nakpo* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 165.

1992. *Rhyacophila nakpo*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 330.

Material examined : 2 exs. Manipur, district unknown, Hkyamboum, 20-23.vi.1960 (Coll. F. Schmid).

Distribution : India (Manipur).

naviculata group

Key to species of the group *naviculata*

1. Wings bicolour, deep brown and golden. Inferior appendages not bifid; parameres absent 2

— Wings not bicolour. Inferior appendages bifid, parameres present ..... *procliva* Kimmins

2. Head dorsally yellow with silver hair; body ventrally pink brown. Aedeagus simple, cylindrical, strongly chitinised and recurved in the form of 'S' ..... *rongpa* Schmid

— Head brown without silver hair; body not pink brown, Aedeagus with ventral apical lobe in the from of a wide band, quite elongate,

a little widened at extremity which is truncate straight and form a small anterior apical claw .....*drokpa* Schmid

8. ***Rhyacophila procliva*** Kimmins

1953. *Rhyacophila procliva* Kimmins, *Ark. zool.*, Stockholm (N.S.), **4** : 542-544.

1992. *Rhyacophila procliva*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 333.

Material examined : 2 exs., Manipur, district Unknown, Hkyamboum, 20-23.vi.1960 (Coll. *F. Schmid*).

Distribution : India : (Manipur, Arunachal Pradesh). Birmanie Septentrionale.

9. ***Rhyacophila rongpa*** Schmid

1970. *Rhyacophila rongpa* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 222.

1992. *Rhyacophila rongpa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 334.

Material examined : 1 ex. Manipur, Chingsao, district unknown, 13.vi.1960 (Coll. *F. Schmid*).

Distribution : India (Manipur, Sikkim and Arunachal Pradesh).

10. ***Rhyacophila drokpa*** Schmid

1970. *Rhyacophila drokpa* schmid, *Mem. ent. Soc. Can.*, No. **66** : 132.

1992. *Rhyacophila drokpa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 319.

10a. ***Rhyacophila drokpa drokpa*** Schmid

1970. *Rhyacophila drokpa drokpa* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 220.

1992. *Rhyacophila drokpa drokpa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 319.

Material examined : 1 ex. Manipur, district Senapati, Mapum, 12.vi.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Senapati district) Arunachal Pradesh.

kashongpa group

11. ***Rhyacophila kashongpa*** Schmid

1970. *Rhyacophila kashongpa* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 148.

1992. *Rhyacophila kashongpa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 324.

Diagnostic characters : Head pink yellow with brown hair; thorax brown with a medial silver line; legs yellow; wings broad, forewing deep brown with indistinct golden spots.

Material examined : 1 ex. Manipur, Sirohi, Kashong, district Ukhrul, 6-7.vi.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

scissa group

12. ***Rhyacophila scissa*** Morton

1900. *Rhyacophila scissa* Morton, *Trans. ent. Soc. Lond.*, : 5, 5, pl. 1, fig. 15, 16.

1992. *Rhyacophila scissa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 334.

Diagnostic characters : Forewing deep brown with greenish shade and golden striae, but apical part with narrow dark zone.

Material examined : 15 exs: Manipur, Sirohi, Kashong district Ukhrul, 8,10.vi.1960, 3 exs; Chingsao, district unknown, 14,15.vvi.1960, 1 ex: Lau, 116.vi.1960, 1 ex: Hkyam boum, district unknown 20-23.vi.1960. (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district), Meghalaya; Sikkim; Arunachal Pradesh and Uttar Pradesh.

12a. ***Rhyacophila scissa niyampa*** Schmid

1970. *Rhyacophila scissa niyampa* Schmid, *Mem. ent. Soc. Can.*, No. **66** : 150.

1992. *Rhyacophila scissa niyampa*, Ghosh & Chaudhury, *Rec. zool. Surv. India*, **92** (1-4) : 334-335.

Diagnostic characters : 10th segment quite regularly quadrangular in lateral view and grooved with two median concavity, one open towards front, the other towards back and subequal.

Material examined : 2 exs: Manipur, Sirohi, Kashong, district Ukhrul, 11-13.vi.1960, 1 ex: Chingsao, district unknown 15.vi.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

obscura group

13. ***Rhyacophila bidens*** Kimmins

1970. *Rhyacophila bidens* Kimmins, *Ark. zool. Stockholm* (N.S.), **4** : 421.

1992. *Rhyacophila bidens,* Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 314.

Diagnostic characters : Body dark brown with fuscous and golden hairs. Antennae fuscous with narrow pale annulation around the joints near the base; legs dark fulvous with fuscous spurs; wings dark brown, forewing mottled with golden pubescence, white thyridial spot conspicuous.

Material examined : 2 exs: Manipur, Sirohi Kashong, district Ukhrul 11-13.vii.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district); Sikkim; Arunachal Pradesh; Uttar Pradesh and Myanmar.

annulicornis group

14. ***Rhyacophila naga*** Schmid

1970. *Rhyacophila naga* Schmid, *Mem. ent. Soc. Can.,* No. **66** : 155.

1992. *Rhyacophila naga,* Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 329.

Diagnostic characters : 10th segment of male genitalia with apical tips, superior tips little longer than the horizontal part of the 10th segment and shortly bifid, 2nd segment of inferior appendages higher than long, bearing a apical groove isolating two unequal and regularly lobes.

Material examined : 3 exs: Manipur, Hkyamboum, district unknown, 20-23.vi.1960 (Coll. *F. Schmid*).

Distribution : India (Manipur).

castanea Group

15. ***Rhyacophila gyaldzen*** Schmid

1970. *Rhyacophila gyaldzen* Schmid, *Mem. ent. Soc. Can.,* No. **66** : 144.

1992. *Rhycophila gyaldzen* Ghosh & Chaudhury, *Rec. zool. Surv. India,* **92** (1-4) : 321.

Diagnostic characters : Body deep pink brown with hairs, legs deep pink, forewing with prominent silver spots.

Material examined : 1 ex: Manipur, Hangaon, district Churachandpur, 31.vii.1960. 1 ex: Parbang, district unknown 5.ix.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Churachandpur district); Meghalaya.

Superfamily LIMNEPHILEIDEA

Family GOERIDAE

Genus ***Larcasis*** Navas

1917. *Larcasia* Navas, *Broteria* (Praga) **15** : 64-66.

16. ***Larcasia assamica*** Schmid

1965. *Larcasia assamica* Schmid, *Entomol. Ts. Arg.,* **86** (3-4) : 264.

1992. *Larcasia assamica,* Higher, *Oriental Insect.* **26** : 86

Diagnostic characters : Body entirely black, maxillary palpi of male long and two segmented, spurs 1-4-3. Forewing with fork one having a short distance and common with discoidal cell, fork two long and fork three shortly stalked, Male genitalia readilly recognised by three lobes of 10th segment of subequal in size.

Material examined : 15 exs: Manipur, Sirohi, Kashong, district Ukhrul 6-7.vi.1960, 11-13.vii.1960, 1 ex: Pushing, district unknown, 17.vii.1960 (Coll. *F. Schmid*).

Distribution : India : Manipur (Ukhrul district).

List of species reviewed from literature

I. Family RHYACOPHILIDAE

1. *Rhyacophila assimilis* Kimmins
2. *R. bicolor* Kimmins
3. *R. chenmo* Schmid
4. *R. chungse* Schmid
5. *R. curvata* Morton
6. *R. dongkyapa* Schmid
7. *R. kadampa* Schmid
8. *R. kando rengma* Schmid

9. *R. khasiorum* Schmid
10. *R. lhabu* Schmid
11. *R. muktepa* Schmid
12. *R. parva mukpo* Schmid
13. *R. pemba* Schmid
14. *R. putata temba* Schmid
15. *R. scissoides* Kimmins
16. *R. sumdopa* Schmid
17. *R. trashipa* Schmid
18. *R. yonggyapa* Schmid
19. *Himalopsyche lanceolata* Morton

II. Family STENOPSYCHIDAE

20. *Stenopsyche apiguna* Schmid
21. *S. griseipennis* McLachlan
22. *S. benaventi* Navas

III. Family UENOIDAE

23. *Uenoa hiberna* Kimmins

IV. Family MOLANNIDAE

24. *Indomolannodes falcifer* Wiggins
25. *I. excavatus* Wiggins
26. *I. decurvatus* Wiggins
27. *Molanna paramoesta* Wiggins
28. *Leptoceras aprachasta* Schmid
29. *L. atyudutta* Schmid
30. *L. manichyana* Schmid
31. *L. sarchtika* Schmid
32. *L. vakrita* Schmid
33. *Poecolepsyche dhristadyumna* Schmid
34. *P. duhchasana* Schmid
35. *P. durhyodhana* Schmid
36. *Setodes agrahita* Schmid
37. *S. apinchanga* Schmid
38. *S. argentifera* McLachlan
39. *S. atisubhaga* Schmid
40. *S. chandravarana* Schmid
41. *S. gutivriddha* Schmid
42. *S. kadrava* Schmid
43. *S. khechara* Schmid
44. *S. lineatus* Banks
45. *S. mahabichu* Schmid
46. *S. manimekhala* Schmid
47. *S. nirmala* Schmid
48. *S. parichkrita* Schmid
49. *S. parilaghu* Schmid
50. *S. sachrika* Schmid
51. *S. savibhrama* Schmid
52. *S. uddharcha* Schmid
53. *S. udhgona* Schmid
54. *Trichosetodes atibhadrata* Schmid
55. *T. atichayana* Schmid
56. *T. atisudhara* Schmid

V. Family PSYCHOMYIIDAE

57. *Eoneureclipsis akrichalakchmi* Schmid
58. *Lype dhumravarna* Schmid
59. *Tinodes lavidhara* Schmid
60. *T. prisatkayukta* Schmid
61. *T. pullalans* Navas

VI. Family HYDROBIOSIDAE

62. *Apsilochorema annandalei* Martynov
63. *A. hrasvam* Schmid
64. *A. tanum* Schmid
65. *A. utchtchunam* Schmid

VII. Family HYDROPTILIDAE

66. *Stactobia throhir* Schmid
67. *S. tuor* Schmid
68. *S. bofur* Schmid

VIII. Family GLOSSOSOMATIDAE

69. *Glossosoma caudatum fissum* Martynov
70. *G. confluens* Kimmins
71. *G. dentatum akhandam* Schmid
72. *G. hemantajam* Schmid
73. *G. varjakantakam* Schmid

IX. Family PHILOPOTAMIDAE

74. *Gunangiella dvitiya* Schmid
75. *G. navadach* Schmid
76. *G. navami* Schmid

77. *G. pantchadachi* Schmid
78. *G. tchatur clachi* Schmid
79. *G. tritiya* Schmid

X. Family XIPHOCENTRONIDAE

80. *Melanotrichia drupada* Schmid
81. *M. jamadagni* Schmid
82. *M. kachika* Schmid
83. *Drepanocentran druhyu* Schmid
84. *D. dvaravati* Schmid
85. *D. nahucha* Schmid
86. *D. sarmichta* Schmid
87. *D. turvasi* Schmid
88. *D. ugrasena* Schmid
89. *D. yayati* Schmid
90. *Abortia margaritifera* Schmid

XI. Family PHRYGANOPSYCHIDAE

91. *Phryganopsyche latipennis* Banks

XII. Family PHRYGAENIDAE

92. *Eubasilissa avalokhita naga* Schmid

XIII. Family LIMNEPHILIDAE

93. *Moropsyche chandrabuchita* Schmid
94. *M. gairichringiya* Schmid
95. *M. girikchit* Schmid
96. *M. urdhvakarni* Schmid

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INSECTA : HYMENOPTERA : FORMICIDAE

R. N. TIWARI, B. G. KUNDU, S. SHEELA AND S. N. GHOSH
Zoological Survey of India, 'M'-Block, New Alipore, Kolkata–700 053

INTRODUCTION

Ants are very highly developed social insects, belong to family Formicidae and widely distributed throughout the world, because of its cosmopolitan nature. They have got a specialised colonial habit with marked degree of division of labour amongst its various constituent castes. Hardly there is any land mass on earth surface which is devoid of ants. Actually ants have spread to various ecological niches and can survive very extreme climatic conditions. So ants are of great importance in the eco-system, considering their diversity and abundance in the tropics. Inspite of that, this tiny creature has remained totally neglected by the biologists till date.

Bingham (1903) published his valuable work on the" Ant Fauna of British India, including Ceylon and Burma", but has not recorded any species from the state of Manipur. Prior to this, Jerdon (1851, '54a, 'b), Rothney (1889) and Forel (1900a, 'b, 'c) also worked on Indian ants. Later on, Karawajew (1926, '27, '28), Mukherjee (1925, '30), Wheeler (1927, '28), Negi *et at.* (1930), Menozzi (1935), Donisthorpe (1942a, 'b, '43), Smith (1948), Chapman and Capco (1951), Brown Jr. (1954, '57, '59), Wilson (1964), Taylor (1966, '68), Bolton (1977), Baroni Urbani (1977a, 'b), Tiwari *et al.* (1977a, 'b, 'c, '86a, 'b, '94, '96, '98, '99), Mathew (1980, 2000), Datta and Raychaudhuri (1983) and Imai *et at.* (1984) have made valuable contributions to the Ant Fauna of India, but no one has exclusively studied the Ant Fauna of Manipur.

This is the first attempt by the present authors to consolidate the knowledge of ant fauna of Manipur. So the present work is based on the collection of ants from the different places of Manipur collected by the various survey parties, namely, A. K. Hazra and Party, 1992; D. K. Mondal and S. K. Ghosh and Party, 1992; D. K. Mondal and Party, 1993; S. K. Saha and Party, 1993 and P. H. Roy and Party, 1998 of Zoological Survey of India. Besides this, the material received from various Institutions of the state of Manipur, have also been included here. However, the data of the same has been incorporated in this paper, but the material of the same have been sent back to the senders as it is customary under Identification and Advisory services.

The present taxonomic paper of Ants of Manipur deals with 35 species, 19 genera spread over 6 subfamilies and they are all new records from the state of Manipur. Of these 35 reported species, some are identified here upto generic level due to lack of sufficient number of examples as well as insufficient literature. Of course, 2 of them under the genera *Myrmecina* and *Polyrhachis* respectively may be new to science. But they are not being described here at this stage upto specific level. In case, if the authors come across some more number of examples as well as sufficient literature, the specific identification would be done in due course.

TOPOGRAPHY

Manipur is one of the beautiful and small hilly states of India. It is situated at the north-east

border of India. Manipur lies between 23°47'N and 25°41'N latitude and 93°6'E and 94°48'E longitude. The state occupies an area of 25,356 sq. kms., which is divided into 8 districts. Imphal, one of the districts, is the capital of Manipur. The state Manipur is bounded by Nagaland on the north, by Burma on the east, by Mizoram on the south and by Assam on the west. Generally Manipur is surrounded by hills (except 10% of the plain land) running into North-Southern Territory parallel folds with altitudes varying from 850 m to 3000 m above the sea level. Thus the hills occupy over 9/10th area of its total area.

The climate is much cooler in winter in the hilly regions, like Mao, Ukhrul etc. than plain land. The maximum temperature was recorded in the central plain is 40°C, where the temperature never falls upto freezing point. The rainfall, both in plains and hills are profuse and well distributed. The average annual rainfall of Manipur is recorded between 1760-4250 mm, whereas the wet temperate forest having 3500 mm rainfall in a year. There are two major river systems—a) Ganga-Brahmaputra and b) Chindurin-Irrawadi. There are eight rivers in the state of Manipur. The western part of the state is covered by Barak river.

The forest coverage of the state is approximately 68% of the total area of the state. At present due to indiscriminate felling of trees and burning of forests, the crown density of forests are declining gradually. The forest of Manipur can be divided into 4 major types, *viz.*, Tropical wet ever-green forest, Tropical deciduous forest, Subtropical pine forest and Wet temperate forest.

The Loktak lake, an attractive lake to the visitors, is situated on the Indo-Burma Road in Manipur. It is biggest lake in North-East India. On the south-west side of Loktak lake, there is a floating National Park named "Keibul Lamjao National Park" Though Manipur is a small state in the North-East fringers of India, but she is rich with vast and varied fauna. Many of the species of animals are endemic in Manipur, and Sangai (*Cervus* sp.) is one of the best example of endemism from unique Wetland eco-system of this state. Besides this, another carnivorous mammals, *viz.*, Clouded Leopard and Golden Cat are the rare examples. The most deciduous forests in the Indo-Burma border areas in Manipur sustain a variety of rare flora. The economy of the state is mainly based on agriculture, cottage industry, tourism and forest.

MATERIAL AND METHOD

The specimens of ants were collected from the field by sweeping and picking up by hand with the help of brush and forceps soaked with spirit. At the same time, bait in the form of sugar and jaggery were used to attract the ants. Bigger specimens belonging to subfamilies Ponerinae, Dorylinae, Dolichoderinae and some of Formicinae may be preserved in insect packets and necessary preservatives applied, but most of the small ants belonging to Myrmicinae, Formicinae and other subfamilies are preferably preserved in 90% alcohol in small glass vials and brought to Headquarter for study. Then the specimens were set, pinned and labelled and kept in insects boxes for proper study. Smaller specimens were preserved in alcohol permanently with proper label after study. During study, mandibles and mouth-parts were dissected for scientific identification.

SYSTEMATIC ACCOUNT

The family Formicidae is one of the largest families, belongs to order Hymenoptera (Aculeata) under class Insecta. The family represents about 9538 species of ants under 296 genera, 16 subfamilies and 59 tribes till date from the world (Holldobler and Wilson, 1990). However, Bolton (1995a) analysed this number of species given by various authors and concluded that the figure 9538 of the world species of ants is correct assessment (upto 31 December, 1993). Of these, according to Bolton (1995a), altogether 2479 species have been reported from the Classical Oriental region, which includes Oriental and Indo-Australian regions (the splitted species, 770 in Oriental region and 1709 in Indo-Australian

region). Prior to this, Bingham (1903) also reported 498 species of ants under 79 genera and 5 subfamilies from India including Ceylon and Burma, but no species was exclusively recorded from the state of Manipur.

The present paper represents 35 species of ants under 19 genera and 6 subfamilies from the state of Manipur. All the species are recorded here for the first time from this state. Out of these, 4 species marked with single asterisk (*) in the taxa are exclusively reported here for the first time from India. The key to the Subfamilies, Genera and Species are provided here. But key to the species are not given, where the genus is represented by a single species. The abbreviation used in the text are M = Male, F = Female, W = Worker, W-maj. = Worker-major, W-min. = Worker-minor, S = Soldier, S-maj. = Soldier-major, S-min. = Soldier-minor.

Morphologically ants are at once distinguished from other Aculeate Hymenoptera by a remarkable modification of one or two segments of the abdomen immediately following the median segment of *propodium.* This modification of the anterior portion of the abdomen consists in the almost complete detachment of one or two segments from the rest of the abdomen to form a highly flexible *pedicel* composed of one or two nodes.

LIST OF TAXA INCORPORATED IN THE TEXT

Family FORMICIDAE

I. Subfamily DORYLINAE Forel

1. Genus ***Dorylus*** Fabricius, 1793

Subgenus ***Typhlopone*** Westwood, 1840

1. *Dorylus (Typhlopone) labiatus* Shuckard, 1840

II. Subfamily PONERINAE Lepeletier

2. Genus ***Odontoponera*** Mayr, 1862

2. *Odontoponera* sp.

III. Subfamily PSEUDOMYRMECINAE Emery

3. Genus ***Tetraponera*** Smith, 1852

3. *Tetraponera rufonigra* (Jerdon, 1851)

IV. Subfamily MYRMICINAE Lepeletier

4. Genus ***Myrmecina*** Curtis, 1829

4. *Myrmecina* sp.

5. Genus ***Monomorium*** Mayr, 1855

5. *Monomorium floricola* (Jerdon, 1851)

6. *Monomorium latinode* Mayr, 1872

6. Genus ***Solenopsis*** Westwood, 1841

7. *Solenopsis geminata* (Fabricius, 1804)

7. Genus ***Pheidologeton*** Mayr, 1862

8. *Pheidologeton affinis* (Jerdon, 1851)

8. Genus ***Meranoplus*** Smith, 1854

9. *Meranoplus bicolor* (Guerin, 1844)

9. Genus ***Pheidole*** Westwood, 1841

*10. *Pheidole horni* Emery, 1901

11. *Pheidole* sp.

10. Genus ***Crematogaster*** Lund, 1831

12. *Crematogaster buddhae* Forel, 1902

13. *Crematogaster rogenhoferi* Mayr, 1878

14. *Crematogaster himalayana* Forel, 1902

*15. *Crematogaster inflata* Smith, 1857

V. Subfamily FORMICINAE Lepeletier

11. Genus ***Oecophylla*** Smith, 1860

16. *Oecophylla smaragdina* (Fabricius, 1775)

12. Genus ***Camponotus*** Mayr, 1861

17. *Camponotus arrogans* (Smith, 1858)

18. *Camponotus basalis* Smith, 1878

19. *Camponotus compressus* (Fabricius, 1787)

20. *Camponotus oblongus* (Smith, 1858)

21. *Camponotus radiatus* Forel, 1892

22. *Camponotus sericeus* (Fabricius, 1798)

23. *Camponotus thoracicus* (Fabricius, 1804)

24. *Camponotus* sp.

13. Genus ***Polyrhachis*** Smith, 1857

25. *Polyrhachis punctillata* Roger, 1863

26. *Polyrhachis lacteipennis* Smith, 1858

27. *Polyrhachis* sp.

14. Genus ***Paratrechina*** Motschoulsky, 1863

28. *Paratrechina bourbonica* (Forel, 1886)

29. *Paratrechina longicornis* (Latreille, 1802)

15. Genus ***Prenolepis*** Mayr, 1861

*30. *Prenolepis melanogaster* Emery, 1894

16. Genus ***Lepisiota*** Santschi, 1926

31. *Lepisiota frauenfeldi* (Mayr, 1855)

17. Genus ***Anoplolepis*** Santschi, 1914

32. *Anoplolepis gracilipes* (Smith, 1857)

VI. Subfamily DOLICHODERINAE Forel

18. Genus ***Liometopum*** Mayr, 1861

33. *Liometopum* sp.

19. Genus ***Technomyrmex*** Mayr, 1872

34. *Technomyrmex elatior* Forel, 1902

*35. *Technomyrmex bicolor* Emery, 1893

Key to the Subfamilies of FORMICIDAE

1. Pedicel of abdomen with one node 2
– Pedicel of abdomen with two nodes 5
2. A more or less marked constriction between basal two segments of abdomen .... PONERINAE
– No constriction between basal two segments of abdomen 3
3. Opening at posterior end of gaster (acidopore) terminal, circular and usually surrounded by a fringe of hairs ..... FORMICINAE
– Opening at posterior end of gaster (acidopore) transverse, slit-like 4
4. Eyes never present, blind ..... DORYLINAE
– Eye always present .. DOLICHOIDERINAE
5. Elongate, often very slender; eyes very large and elongate; clypeus with a rounded upper margin; not prolonged upward between the frontal carinae; frontal carinae usually close together, usually narrow and not expanded laterally to cover the antennal insertions; antennae short .... PSEUDOMYRMECINAE
– Without these combination of characters; frontal carinae usually large, nearly always covering the antennal insertion .... MYRMICINAE

1. Subfamily DORYLINAE Forel

Members of this subfamily are known as "the army ants" and are sometimes referred to as legionary ants in the world. They are predaceous and are also known for their foraging expeditions. The army ants exhibit a number of morphological and biological peculiarities which are not common to most ants, such as, wasp-like males, wingless termite-like females, blind workers and their raiding and emigrating behaviour. Most of the army ants, however, are subterranean in habit, though the raiding columns of some may appear above ground. They have nomadic and statuary activity cycles where the entire colony moves from one area to another, a unique behaviour exhibited by this group of ants.

1. Genus ***Dorylus*** Fabricius

1793. *Dorylus* Fabricius, *Ent. Syst.*, **2** : 365, M.

Subgenus ***Typhlopone*** Westwood

1839. *Typhlopone* Westwood, *Introd. Class. Ins.*, **2** : 219.

Type-species : *Typhlopone fulva* Westwood, 1839.

1. ***Dorylus (Typhlopone) labiatus*** Shuckard

1840. *Dorylus labiatus* Shuckard, *Ann. Mag. Nat. Hist.*, **5** : 319, M.

1910. *Dorylus (Typhlopone) labiatus*, Emery, *Genera Insect.*, **102** : 15.

1998. *Dorylus (Typhlopone) labiatus*, Tiwari *et at.*, *State Fauna Series* 3 : *Fauna of West Bengal*, Part 8 : 228.

Material examined : India : Manipur : Mairang, 2 males, 31.iii.1992, coll. D. K. Mondal & S. K. Ghosh and Party.

Distribution : India : Manipur, Orissa, Sikkim, West Bengal, Maharasthra, Gujarat, H.P., U.P., Delhi and whole continent of India.

Remarks : Bingham (1903 : 2) recorded this species under the genus *Dorylus* alongwith some synonyms and mentioned its distribution as "the whole continent of India, not recorded from Ceylon or from countries east of Bay of Bengal" Later on, Wilson (1964 : 440) also reported this species under the genus *Dorylus (Typhlopone)* from Calcutta, Ahmedabad and Delhi.

II. Subfamily PONERINAE Lepeletier

This subfamily mostly represented by the primitive group of ants and thus can be treated as the ancestral stock in the phylogeny of ants. They are abundantly distributed all over the tropical regions of the world, but are even reported from some European and American countries. The cause of this migration is the introduction of commerce from one part of the world to the other.

The species of this subfamily are primarily characterised by a more or less marked constriction between basal two segments of abdomen, and by the unmodified powerful sting; the body more or less elongate and cylindrical, specially abdomen; mandibles powerful; antennae more or less massive; eyes generally present, absent in one or two genera; legs moderately long.

The ponerine ants are predaceous and carnivorous by their habits. They carry their prey or food underneath the body between the fore legs, a method of carrying food. The males and females of this group of ants, so far as they are known, are always winged. The nests of ponerinae, in small colonies of a few hundred individuals or less, are mostly found on soil or rotten wood.

2. Genus ***Odontoponera*** Mayr

1862. *Odontoponera* Mayr, *Verh. zool. -bot. Ges. Wien,* **12** : 717, W.

Type-species : *Ponera transversa* Smith, 1857 (= *Ponera denticulata* Smith, 1858).

2. ***Odontoponera*** sp.

Material examined : India : Manipur : Mairang, Keibul Lamjao Natioanl Park, 1 ex.', 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur.

III. Subfamily PSEUDOMYRMECINAE Emery

The species of this subfamily are most virulent, the sting being most painful and sometimes causing considerable inflammation. They are arborial in nature. They make their nests in the dead wood of trees and very often, in the clefts of the beams and posts of wooden houses. They are feroceous in nature by their habits, particularly *Tetraponera rufonigra* (Jerdon) is called "Lohari" in Northern India, meaning the Black-smith, this name has been given because of it's fierce nature.

3. Genus ***Tetraponera*** Smith

1852. *Tetraponera* (part) Smith, *Ann. Mag. Nat. Hist.*, (2) **9** : 44.

Type-species : *Eciton nigrum* Jerdon, 1851 (= *Tetraponera atrata* Smith, 1852).

3. ***Tetraponera rufonigra*** (Jerdon)

1851. *Eciton rufonigrum* Jerdon, *Madras J. Lit.* Sci., **17** : 111, W.

1903. *Sima rufonigra,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 108, W, F.

1921. *Sima (Sima) rufonigra,* Emery, *Genera Insect.,* **174A** : 23.

1951. *Tetraponera (Tetraponera) rufonigra,* Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), **1** : 81.

1995. *Tetraponera rufonigra,* Bolton, *A* New *Gent. Cat. Ants World, Harvard Univ. Press,* : 418.

Material examined : India : Manipur : Churachandpur, Christian vill., 1 ex., 21.iii.1993, coll. D. K. Mondal & S. K. Ghosh and Party; Mairang, Keibul Lamjao National Park, 2 exs., 14.iv.1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu, Karnataka, Kerala, Meghalaya and mostly throughout India.

Elsewhere : Myanmar, Sri Lanka, Cambodia, Singapore, China, Indonesia (Java, Sumatra).

Biological notes : It makes its nests in the dead wood of trees and also in the clefts of the beams and posts of the wooden Rest Houses, scattered over the country (Bingham, 1903).

Remarks : Bingham (1903) mentioned its distribution as "throughout our limits" Subsequently, Donisthorpe (1943) and Bolton (1995b) also reported this species under the genera *Sima* and *Tetraponera* respectively.

IV. Subfamily MYRMICINAE Lepeletier

This is the largest subfamily of ants and is found throughout the world. In the phylogeny of

ants, it stands at the top, i.e., it has adapted to the highest adaptation and as such the sizes appreciably reduced. The species of this subfamily are characterised by the pedicel being distinctly two-jointed in all sexes; antennae long, thick and massive, situated extremely close to the anterior margin of the head with their bases very close together; sting present, but not often exerted; pupae not enclosed in cocoons. No specific demarcation can be made for their habit and habitat, because they are found in almost all habitat except water.

Key to the Genera of MYRMICINAE

1. Antennae with less than 12 segments 2
- Antennae 12-segmented 6
2. Antennae II-segmented 3
- Antennae with less than 11 segments 5
3. Pedicel attached to dorsal surface of abdomen ..... ***Crematogaster*** Lund
- Pedicel attached to middle of front or to ventral surface of abdomen 4
4. Club of antennae formed of apical 2 segments of flagellum ..... ***Pheidologeton*** Mayr
- Club of antennae formed of apical 3 segments of flagellum ..... ***Myrmercina*** Curtis
5. Antennae 10-segmented .... ***Solenopsis*** Westwood
- Antennae 9-segmented.. ***Meranoplus*** Smith
6. Clypeus bicarinate ..... ***Monomorium*** Mayr
- Clypeus not bicarinate, occasionally with one carnia ..... ***Pheidole*** Westwood

4. Genus ***Myrmecina*** Curtis

1829. *Myrmecina* Curtis, *Brit. Ent.*, **4** : 226, M.

Type-species : *Formica graminicola* Latreille, 1802 (= *Myrmecina latreillei* Curtis. 1829).

4. ***Myrmecina*** sp.

Material examined : India : Manipur : Churachandpur, South Vaojans, 1 ex., 4.iv.I992, coll. A. K. Hazra and Party.

Distribution : India : Manipur.

Remarks : The specimen belongs to the little known genus *Myrmecina,* was identified upto generic level. Tiwari (1994) first reported this genus from India alongwith two new species, viz., *M. urbanii* and *M. vidyae.*

5. Genus ***Monomorium*** Mayr

1855. *Monomorium* Mayr, *Verh. zool.-bot. Ges. Wien,* **5** : 452.

Type-species : *Monomorium monomorium* Bolton, 1987 (= *Monomorium minutum* Mayr, 1855).

Key to the species of *Monomorium*

1. Length 1.5-2 mm; pilosity almost entirely wanting; 2nd node of pedicel very little broader than the 1st node .... *floricola* (Jerdon)
- Length 3-3.7 mm; pilosity moderate or sparse, fine and rather long; 2nd node of pedicel very much broader than the 1st node .... *latinode* Mayr

5. ***Monomorium floricola*** (Jerdon)

1851. *Atta floricola* Jerdon, *Madras J. lit. Sci.*, **17** : 107, W.

1903. *Monomorium floricola,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 211, W.

1922. *Monomorium (Monomorium) floricola,* Emery, *Genera Insect.*, **174B** : 172.

1999. *Monomoriumfloricola,* Tiwari, *Memoirs Zool. Surv. India,* **18** (4) : 54.

Material examined : India : Manipur : Mairang, 1 ex., 31.iii.1992, coll. D. K. Mondal & S. K. Ghosh and Party; Mairang, Keibul Lamjao National Park, 5 exs., 14. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu, Kerala, Andaman and Nicobar Is., Orissa, Meghalaya and spread throughout India.

Elsewhere: Sri Lanka, Australia, New Caledonia Is.

Biological notes : This is very small ant. One kind of individual of this group of ants was found in small numbers on flowers and leaves and it appeared to feed solely on vegetable secretions (Jerdon, 1851).

Remarks : Ettershank (1966 : 89), Taylor (1987 : 40, 41) and Bolton (1995b : 262) also recorded this species under the genus *Monomorium.*

6. ***Monomorium latinode*** Mayr

1872. *Monomorium latinode* Mayr, *Ann. Mus. Civ. Stor. Nat. Genova,* **2** : 152, W.

1922. *Monomorium (Monomorium) latinode,* Emery, *Genera Insect.,* **174B** : 171.

1999. *Monomorium latinode,* Tiwari, *Memoirs Zool. Surv. India,* **18** (4) : 54.

Material examined : India : Manipur : Imphal, Koirengei, 3 exs., 15. iii. 1993, coll. D. K. Mondal.

Distribution : India : Manipur, Orissa, West Bengal, Tamil Nadu and spread throughout India.

Elsewhere : Sri Lanka Myanmar, Indonesia (Borneo), Formosa.

Biological notes : This is also a house-ant in India and damages all sorts of material. It has been collected from soil under the withering seedlings of *Eucalyptus* sp. It's association, however, in the death of seedling could not be confirmed.

Remarks : Bingham (1903 : 211) recorded this species under the genus *Monomorium* and mentioned its distribution as "spread throughout India, Ceylon and Burma, extending to Borneo" Later on, Ettershank (1966 : 90), Bolton (1987 : 429 and 1995b : 263) and Tiwari *et al.* (1998 : 256) also reported this species under the same genus.

6. Genus ***Solenopsis*** Westwood

1841. *Solenopsis* Westwood, *Ann. Mag. Nat. Hist.,* **6** : 86.

Type-species : *Atta geminata* Fabricius, 1804 (= *Solenopsis mandibularis* Westwood, 1841).

7. ***Solenopsis geminata*** (Fabricius)

1804. *Atta geminata* Fabricius, *Syst. Piez.,* : 423, W.

1903. *Solenopsis geminata.* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 158, M, F, W, S.

1951. *Solenopsis geminata,* Chapman and Capco, *Monogr. Inst.* Sci. *Tech., Manila* (Check List Ants Asia), **1** : 168.

1999. *Solenopsis geminata,* Tiwari, *Memoirs Zool. Surv. India,* **18**(4) : 58.

Material examined : India : Manipur : Imphal, Sangoimang, 2 exs., 27.ii.1993, coll. S. K. Saha and Party; Churachandpur, Christian vill., 3 exs., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party; Mairang, Keibul Lamjao National Park, 3 exs., 12. iv. 1998, coll. P. H. Roy and Party.

Distribtuion : India : Manipur, Meghalaya, Sikkim, Orissa, Andaman and Nicobar Islands, West Bengal, Tamil Nadu, Kerala, Karnataka.

Elsewhere : Australia, America, New Caledonia and spread pretty nearly over the tropics of the two hemispheres.

Biological notes : This species is commonly known as "Brown Fire Ant" It has a severe sting. It makes its nest in soil and is reported to be injurious to seedling buds and leaves. It is also reported to be an important enemy of aphids, termites, bed bugs and moth larvae.

Jerdon (1851) also noted that *Atta rufa* was found in holes under ground, mud walls and often appeared in houses. It's favourite food is dead insects and other matter. It stings very severely, leaving a burning pain that lasts for several minutes.

Remarks : Bingham (1903) mentioned its distribtuion as "Throughout our limits, and spread pretty nearly over the tropics of the two hemispheres" Ettershank (1966) synonymised *Atta rufa* Jerdon, 1851 with this species. Subsequently, Taylor (1987) and Bolton (1995b) also reported this species under the genus *Solenopsis.* However, Bolton, *(op. cit.)* also mentioned that this species is the senior synonym of the type species of this genus, *Solenopis mandibularis* Westwood, 1841 and some other species which were synonymised by different scientists time to time.

7. Genus ***Pheidologeton*** Mayr

1862. *Pheidologeton* Mayr, *Verh. zool. -bot. Ges. Wien,* **12** : 750.

Type-species : *Ocodoma diversa* Jerdon, 1851.

8. ***Pheidologeton affinis*** (Jerdon)

1851. *Ocodoma affinis* Jerdon, *Madras J. Lit. Sci.,* **17** : 110, W, S.

1903. *Phidologiton affinis*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 164, M, F, W, S-maj., S-min.

1922. *Pheidologeton affinis*, Emery, *Genera Insect.*, **174C** : 212.

1999. *Pheidologeton affinis*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 60.

Material examined : India : Manipur : Churachandpur, 2 exs., 4. iv.1992, coll. A. K. Hazra and Party; Mairang, Keibul Lamjao National Park, 7 exs., 12.iv.1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu, Kerala, Andaman and Nicobar Islands, Maharashtra, Meghalaya, Assam.

Elsewhere : Sri Lanka, Myanmar.

Biological notes : Tiwari (1999) mentioned that this species was found in the dead stump of a soft wood and under stones.

Remarks : Chapman and Capco (1951), Ettershank (1966) and Bolton (1995b) also reported this species under the same genus *Pheidologeton*. Prior to this while reporting this species, Bingham (1903) mentioned its distribution as "Bengal; Western India from Poona to Travancore; Ceylon; Assam; Burma, Tenasserim"

8. Genus ***Meranoplus*** Smith

1854. *Meranoplus* Smith, *Trans. Ent. Soc. London*, (2) **2** : 224.

Type-species : *Cryptocerus bicolor* Guérin, 1844.

9. ***Meranoplus bicolor*** (Guérin)

1844. *Cryptocerus bicolor* Guérin, *Cuv. Iconog. Regn. Anim. Insect.*, : 425, W.

1903. *Meranoplus bicolor*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 168, M, F, W.

1999. *Meranoplus bicolor*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 61.

Material examined : India : Manipur : Moreh, Lairo River Bund, 2 exs., 12.iv.1992, coll. A. K. Hazra and Party.

Distribution : India : Manipur, 'West Bengal, Meghalaya, Pondicherry, Tamil Nadu, Karnataka, Kerala, Uttar Pradesh, Uttaranchal, Goa, Daman and Diu, Rajasthan, Maharashtra, Bihar, Orissa, Punjab, Delhi, Assam.

Elsewhere : Nepal, Pakistan, Sri Lanka, Bhutan, Myanmar, Thailand, Vietnam, China, Malaysia, Singapore, Indonesia.

Remarks : Schödl (1998) in his revisionary work on Oriental *Meranoplus* also reported this species alongwith some junior synonyms and mentioned its distribution from different places of India and abroad. He *(op. cit.)* noted, "*Meranoplus bicolor* is the most common species in the Oriental region. It is hardly to be confused with any other congener within the range of its occurrence. It is distinct by the long posteriorly directed spines and the unique pilosity, which are found in no other species"

Prior to this, this species was also reported under the same genus *Meranoplus* by different workers like, Emery (1922b), Chapman and Capco (1951) and Bolton (1995b).

9. Genus ***Pheidole*** Westwood

1841. *Pheidole* Westwood, *Ann. Mag. Nat. Hist.*, **6** : 87.

Type-species : *Atta providens* Sykes, 1835.

* 10. ***Pheidole horni*** Emery

1901. *Pheidole horni* Emery, Deutsch. ent. Zeitschr., : 118, S.

1903. *Phidole horni*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 251, S.

1951. *Pheidole (Pheidole) horni*, Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), **1** : 142.

1995. *Pheidole horni*, Bolton, *A New Gent. Cat. Ants World, Harvard Univ. Press*, : 323.

Material examined : India : Manipur : Imphal, Sangoimang, 1 soldier & 1 worker, 27.ii.1993, coll. S. K. Saha and Party; Churachandpur, Tuithapi vill., 2 soldiers & 3 workers, 21. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur.

Elsewhere : Sri Lanka.

Remarks : While reporting this species, Bingham (1903) mentioned its locality only

"Ceylon" So this species is recorded here for the first time from India.

11. ***Pheidole*** sp.

Material examined : India : Manipur : Churachandpur, Christian vill., 1 ex., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party.

Distribution : India : Manipur.

10. Genus ***Crematogaster*** Lund

1831. *Crematogaster* Lund, *Ann. Sci. Nat.*, **23** : 132.

Type-species : *Formica scutellaris* Oliv., 1792.

Key to the species of *Crematogaster*

1. Metathorax remarkably broad, massive and swollen; no metanotal spines....*inflata* Smith
– Metathorax not swollen; metanotum bispinous 2
2. Head smooth and shining, at most with a few half-obsolete striae anteriorly..... .....*buddhae* Forel
– Head not smooth, entirely sculptured 3
3. First flattened joint of pedicel as broad as long, sides angular in the middle..... .....*rogenhoferi* Mayr
– First flattened joint of pedicel distinctly longer than broad, sides nearly straight, slightly curved outwards .....*himalayana* Forel

12. ***Crematogaster buddhae*** Forel

1902. *Crematogaster buddhae* Forel, *Rev. Suisse Zool.*, **10** : 206, W.

1903. *Cremastogaster buddhae*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 132, W.

1951. *Crematogaster (Acrocoelia) buddhae*, Chapman and Capco, *Monogr. Inst.* Sci. *Tech., Manila* (Check List Ants Asia), **1** : 89.

1995. *Crematogaster buddhae*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*,.: 149.

Material examined : India : Manipur : Churachandpur, 1 ex., 4. vi. 1992, coll. A. K. Hazra and Party; Imphal, Koirengei, 1 ex., 15. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur, West Bengal, Sikkim, Andaman and Nicobar Islands and North-West Himalayas.

Remarks : Bingham (1903) mentioned its distribtuion as "N. W. Himalayas, 4000 ft., Sikkim, Calcutta"

13. ***Crematogaster rogenhoferi*** Mayr

1878. *Crematogaster rogenhoferi* Mayr, *Verh. zool.-bot. Ges. Wien*, **28** : 681 & 683, W.

1903. *Cremastogaster rogenhoferi*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 141, W.

1922. *Crematogaster (Acrocoelia) dohrni rogenhoferi*, Emery, *Genera Insect.*, **174B** : 150.

1999. *Crematogaster regenhoferi*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 43.

Material examined : India : Manipur : Imphal, Sangoimang, 2 exs., 27.ii.1993, coll. S. K. Saha and Party; Mairang, Keibul Lamjao National Park, 2 exs., 12.iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Assam, Meghalaya, Sikkim, Maharashtra, Tamil Nadu, Kerala, Andaman and Nicobar Islands.

Elsewhere : Myanmar, Sri Lanka, Indonesia (Sumatra).

Remarks : While reporting this species, Bingham (1903) noted its distribution as "Sikkim; Calcutta; Western India, from Bombay to Cochin; Ceylon; Assam; Burma" Tiwari (1999) recorded this species from different places of South India and mentioned that some of the specimens of this species were found in the nests on trees.

14. ***Crematogaster himalayana*** Forel

1902. *Crematogaster himalayana* Forel, *Rev. Suisse Zool.*, **10** : 202, W.

1903. *Cremastogaster himalayana*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 143, W.

1951. *Crematogaster (Acrocoelia) himalayana*, Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Aisa), **1** : 91.

1995. *Crematogaster himalayana*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 154.

Material examined : India : Manipur : Moreh, Lairo River Bund, 2 exs., 12.iv.1992, coll. A. K.

Hazra and Party; Imphal, Koirengei, 5 exs., 15. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur and North-West Himalayas.

Remarks : Bingham (1903) mentioned its distribution as "North-West Himalayas" But later on; Bolton (1995b) recorded its distribution in his world catalogue only "India"

*15. ***Crematogaster inflata*** Smith

1857. *Crematogaster inflata* Smith, *J. Proc. Linn. Soc. London, Zool.*, 2 : 76, pl. 2, figs. 2.

1903. *Cremastogaster inflata*, Bingham, *Fauna Brit. India, Hymenoptera*, 2 : 145, W.

1951. *Crematogaster (Physocrema) inflata*, Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), 1 : 103.

1995. *Crematogaster inflata*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 154.

Material examined : India : Manipur : Chandel, 1 ex., 22. x. 1985, coll. C. M. Devi; Imphal, Koirengei, 1 ex., 15. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur. *Elsewhere*: Myanmar, Indo-China, Indonesia (Java, Borneo), Singapore, Malacca.

Remarks : Bingham (1903) noted its distribution as "Tenasserim, from Mergui southwards, extending to Borneo, Malacca, Java" Whereas, Chapman and Capco (1951) recorded its distribution as "Indo-China and Borneo" But subsequently, it was mentioned as only "Singapore" by Bolton (1995b). So this species is recorded here for the first time from India.

V. Subfamily FORMICINAE Lepeletier

The species belonging to this subfamily are probably mentally and socially the most highly developed amongst all the ants. Structurally they are characterised by having a one-jointed pedicel with no constriction between the two basal segments of abdomen; presence of considerably modified type of poison glands and stings, the former being converted into a cushion of convolutions and the latter forming merely an orifice for the ejaculation of poison with considerable force *(Oecophylla);* the orifice of cloaca always circular and ciliated round the margin.

Key to the Genera of FORMICINAE

1. Antennae with 11 segments 2
– Antennae with 12 segments 3
2. Metanotum and \node of pedicel armed with pair of spines, teeth or tubercles .... ***Lepisiota*** Santschi
– Metanotum and node of pedicel without spines, teeth or tubercles ....***Anoplolepis*** Santschi
3. Antennal sockets situated close to the posterior clypeal margin 4
– Antennal sockets situated far behind the posterior clypeal margin 5
4. Eyes at or in front of the mid-length of the sides of head ... ***Paratrechina*** Motschoulsky
– Eyes distinctly behind the mid-length of the sides of *head*..... ***Prenolepis*** Mayr
5. Mandible with 10 or more teeth or denticles in total; petiole reduced to an elongate low node which allows the gaster to be bent forward over alitrunk..... ***Oecophylla*** Smith
– Mandible usually with 5-7 teeth at most; petiole and erect node or scale, gaster not capable of being bent forward over alitrunk 6
6. Tergite of first gastral segment large, accounting for at least half the length of the gaster in dorsal view or in profile; first tergite distinctly much longer than the second. Spines or teeth present on pronotum, propodeum, petiole, or on two or all of these .... ***Polyrhachis*** Smith
– Tergite of first gastral segment shorter, accounting for distinctly less than half the length of gaster in dorsal view or in profile; first tergite at most only slightly longer than

the second. Spines or teeth usually absent from pronotum, propodeum and petiole .... ***Camponotus*** Mayr

11. Genus *Oecophylla* Smith

1860. *Oecophylla* Smith, *J. Proc. Linn. Soc. London, Zool.*, **5** : 101,W,F.

Type-species : *Formica smaragdina* Fabricius, 1775 (= *Formica virescens* Fabr., 1775).

16. *Oecophylla smaragdina* (Fabricius)

1775. *Formica smaragdina* Fabricius, *Syst. Ent.*, : 828, F.

1903. *Oecophylla smaragdina*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 311, W-maj., W-min., F, M.

1999. *Oecophylla smaragdina*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 66.

Material examined : India : Manipur : Churachandpur, Christian vill., 5 exs., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party; Mairang, Keibul Lamjao National Park, 2 exs., 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, Meghalaya, West Bengal, Andaman and Nicobar Islands, Tamil Nadu, Karnataka, Kerala and mostly the whole of India, except desert and treeless tracts.

Elsewhere : Myanmar, Sri Lanka, S. China, Malaya, New Guinea, Australia.

Biological notes : This is the notorious and vicious 'Red-Ant' of India. It inhabits in trees and makes nest in leaves. It has of using its larvae to spin the silk with which its nest of leaves is constructed (Bingham, 1903).

The eggs of this species have been found to contain high protein, fat and as such it is used as a medicine to combat the condition of A-Vitaminosis, particularly in case of Marasemus condition. It is widely used for above purpose in tribal people and the eggs are sold in weeklymarket for the purpose (Tiwari, 1999).

Remarks : While recording this species under the genus *Oecophylla*, Bolton (1995b) only mentioned that *Formica virescens*, the type-species of the genus *Oecophylla* and some other species are the junior synonyms of this species.

12. Genus *Camponotus* Mayr

1861. *Camponotus* Mayr, *Europ. Formicid.*, : 35.

Type-species: *Formica ligniperda* Latreille, 1802.

Key to the species of *Camponotus*

1. Thorax, viewed from side, forming a regular arch 2
– Thorax, viewed from side, not forming a regular arch 6
2. Head, thorax and abdomen black .... ***compressus*** (Fabr.)
– Head, thorax and abdomen never all black or all yellow. 3
3. Tibiae of legs cylindrical ....***oblongus*** (Smith)
– Tibiae of legs compressed 4
4. Head, thorax and abdomen castaneous red .....***arrogans*** (Smith)
– Head and abdomen black or dark castaneous red; thorax yellow, wholly or in part 5
5. Head much broader posteriorly than in front .....***thoracicus*** (Fabr.)
– Head only as broad posteriorly as in front .....***basalis*** Smith
6. Regular arch of the thorax interrupted by the apex of metanotum being truncate .... ***radiatus*** Forel
– Regular arch of the thorax interrupted at meso-metanotal suture by metanotum forming an angle with mesonotum; basal portion of metanotum horizontal, flat or slightly concave; apical portion excavate ....***sericeus*** (Fabr.)

17. *Camponotus arrogans* (Smith)

1858. *Formica arrogans* Smith, *Cat. Hym. Brit. Mus.*, **6** : 23, W.

1903. *Camponotus arrogans*, Bingham. *Fauna Brit. India, Hymenoptera*, **2** : 357, W.

1951. *Camponotus (Tanaemyrmex) arrogans*, Chapman and Capco. *Monogr. Inst.* Sci. *Tech., Manila* (Check List Ants Asia), **1** : 243.

1995. *Camponotus arrogans*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 86.

Material examined : India : Manipur : Canchipur, 1 ex., 19. ix. 1985, coll. C. M. Devi; Churachandpur, 1 ex., 4. iv. 1992, coll. A. K. Hazra and Party.

Distribution : India : Manipur, Sikkim, West Bengal.

Elsewhere : Myanmar, Singapore, Malayan Peninsula.

Remarks : Bingham (1903) mentioned that this species is the senior synonym of *Formica maculata* Fabr., 1782, race *juncta* Forel, 1892 and its distribution as "Bengal, Burma and Malay peninsula" Subsequently, while recording this species, Bolton (1995b) noted that Forel (1914) and Emery (1925) also reported this species under different subgenera, i.e., *Camponotus (Myrmoturba)* and *Camponotus (Tanaemyrmex)* respectively.

18. *Camponotus basalis* Smith

1878. *Camponotus basalis* Smith, 2nd *Yark. Miss., Hym.*, : 9, pl., fig. 1, F.

1903. *Camponotus basalis*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 352, W-maj., W-minor.

1925. *Camponotus (Tanaemyrmex) basalis*, Emery, *Genera Insect.*, **183** ; 101.

1995. *Camponotus basalis*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 88.

Material examined : India : Manipur : Moreh, Lairo River Bund, 1 ex., 12. iv. 1992, coll. A. K. Hazra and Party; Mairang, Keibul Lamjao National Park, 2 exs., 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, Jammu and Kashmir.

Remarks : Bingham (1903) recorded its distribution as "So far only from Kashmir" and synonymised *Camponotus maculatus* (Fabr., 1782), race *lobinieri* Forel, 1902 with this species.

19. *Camponotus compressus* (Fabricius)

1787. *Formica compressa* Fabricius, *Mant. Insect.*, **1** : 307, W.

1892. *Camponotus maculatus* (Fabr., 1782), race *compressus* (Fabr., 1787), Forel, *J. Bombay Nat. Hist. Soc.*, **7** : 229 & 240.

1903. *Camponotus compressus*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 351, W-maj., W-min., M, F.

1925. *Camponotus (Tanaemyrmex) compressus*, Emery, *Genera Insect.*, **183** : 98.

1999. *Camponotus compressus*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 69.

Material examined : India : Manipur : Imphal, Golabati Basti, 2 exs., 30. iii. 1992, coll. A. K. Hazra and Party; Churachandpur, Christian vill., 2 exs., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party.

Distribution : India : Manipur, Orissa, West Bengal, Assam, Meghalaya, Andaman and Nicobar Islands, Tamil Nadu.

Elsewhere : Sri Lanka, Nepal, Myanmar, Philippines, Indonesia (Borneo), Arabia, Africa, U. S. S. R., Malayan subregion.

Biological notes : This is the common black ant in India. It bites rather severely, but the pain is quite momentary. It makes its nest in soil and heaps of earth are brought out in the form of small files. In South India, it was also found in trees. Its food is mainly vegetable secretions, sugar etc.

Remarks : Bolton (1995b) also recorded this species under the genus *Camponotus* and made a list of some junior synonyms and some other subspecies of this species in his Ants W orld Catalogue.

20. *Camponotus oblongus* (Smith)

1858. *Formica oblonga* Smith, *Cat. Hym. Brit. Mus.*, **6** : 21, W.

1903. *Camponotus oblongus*, Bingham, *fauna Brit. India, Hymenoptera*, **2** : 358, W.

1925. *Camponotus (Tanaemyrmex) oblongus*, Emery, *Genera Insect.*, **183** : 95.

1995. *Camponotus oblongus*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 114.

Material examined : India : Manipur : Imphal, 1 ex., coll. O. L. Singh; Churachandpur, 1 ex., 4. iv. 1992, coll. A. K. Hazra and Party.

Distribution : India : Manipur, West Bengal, Assam, Andaman and Nicobar Islands, Sikkim.

Elsewhere : Bhutan, Myanmar, Sri Lanka, Singapore.

Remarks : Chapman and Capco (1951) also reported this species under *Camponotus (Tanaemyrmex)* in their check list. But Bolton (1995b) mentioned that Forel (1914) reported this species under *Camponotus (Myrmoturba).*

21. ***Camponotus radiatus*** Forel

1892. *Camponotus radiatus* Foret, *J. Bombay Nat. Hist. Soc.*, **7** : 225 & 233, W.

1903. *Camponotus radiatus*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 371, W-min.

1920. *Camponotus (Myrmotrema) radiatus*, Emery, *Rev. Zool. Afr.*, **8** : 258.

1999. *Camponotus radiatus*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 74.

Material examined : India : Manipur : Wangkhei, 1 ex., 28. iv. 1986, coll. C. M. Devi; Mairang, Keibul Lamjao National Park, 1 ex., 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, Karnataka and Western India.

Remarks : Bingham (1903) mentioned its distribution as "Western India, Kanara" While recording this species under the' same genus, Bolton (1995b : 119) noted that it was also reported by Forel (1914) under *Camponotus (Camponotus)*

22. ***Camponotus sericeus*** (Fabricius)

1798. *Formica sericea* Fabricius, *Ent. Syst. Suppl.*, : 279.

1892. *Camponotus sericeus*, Foret, *J. Bombay Nat. Hist.* Soc., **7** : 223 & 231, W.

1925. *Camponotus (Orthonotomyrmex) sericeus*, Emery, *Genera Insect.*, **183** : 125.

1999. *Camponotus sericeus*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 69.

Material examined : India : Manipur : Imphathong River bank, Mahaballi Temple, 2 exs., 29. iii. 1992, coll. A. K. Hazra and Party; Churachandpur, Christian vill., 2 exs., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party.

Distribution : India : Manipur, Orissa, Delhi, West Bengal, Meghalaya, Tamil Nadu, Karnataka and more or less common throughout the country.

Elsewhere : Myanmar, Sri Lanka, Indo-China, Arabia, Egypt, West Africa, Senegal.

Remarks : Bingham (1903 : 376) also reported this species (Worker-maj., Worker-min. and Female) under the genus *Camponotus* and mentioned its distribution as "more or less common throughout our limits."

23. ***Camponotus thoracicus*** (Fabricius)

1804. *Formica thoracica* Fabricius, *Syst. Piez.*, : 397.

1995. *Camponotus thoracicus*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 127.

Material examined : India : Manipur : Imphal, Sangoimang, 1 ex., 27. ii. 1993, coll. S. K. Saha and Party; Mairang, Keibul Lamjao National Park, 1 ex., 14. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, Sikkim, West Bengal.

Elsewhere : North-West Africa.

Remarks : Bingham (1903 : 356) recorded the species *Camponotus dichrous* Forel, 1879 with its distribution as "The Himalayas to 6000 ft" Emery (1908) synonymised *dichrous* with the species *thoracicus* under the genus *Camponotus.* Subsequently, Chapman and Capco (1951) and Tiwari *et al.* (1998) also reported the species, *C. dichrous.* But Bolton (1995b) supported Emery's (1908) view and made a list of some species alongwith *dichrous* as junior synonyms of the species *thoracicus* under the genus *Camponotus.*

24. ***Camponotus*** sp.

Material examined : India : Manipur : Khonghampat, 1 ex., 4. v. 1986, coll. C. M. Devi.

Distribution : India : Manipur.

13. Genus *Polyrhachis* Smith

1857. *Polyrhachis* (Part) Smith, *J. Proc. Linn. Soc. London, Zool.*, **2** : 58.

1862. *Polyrhachis*, Mayr, *Verh. zool.-bot. Ges. Wien.* **12** : 677.

Type-species : *Formica bihamata* Drury, 1773.

Key to the species of *Polyrhachis*

1. Thorax more or less flat above, the sides margined along their whole length; node of pedicel quadridentate or quadrispinous, the spines typically subequal..... ..... *punctillata* Roger

– Thorax more or less rounded above, the sides not margined along their whole length; node of pedicel without median spines..... ..... *lacteipennis* Smith

25. *Polyrhachis punctillata* Roger

1863. *Polyrhachis punctillata* Roger, *Berl. ent. Zeit.*, **7** : 152, W, F.

1951. *Polyrhachis (Myrma) punctillata*, Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), **1** : 275.

1999. *Polyrhachis punctillata*, Tiwari, *Memoirs Zool. Surv. India*, **18** (4) : 77.

Material examined : India : Manipur : Churachandpur, 2 exs., 4.iv.1992, coll. A. K. Hazra and Party.

Distribution : India : Manipur, Meghalaya, Tamil Nadu, Karnataka and North-West Provinces.

Elsewhere : Myanmar, Sri Lanka, Indonesia (Java).

Remarks : While reporting this species under the same genus, Bingham (1903 : 409) considered one variety *smythiesi* Forel, 1894 and one race *fergusoni* Forel, 1902 of *P. punctillata* and one species *P. subpilosa* Emery, 1894 as junior synonyms of this species. But later on, Chapman and Capco (1951) treated *fergusoni* as a separate subspecies under the same species, which was again supported by Bolton (1995b). Then Bolton *(op. cit.)* considered both *smythiesii* and *fergusoni* as subspecies under this species, *P. punctillata.*

26. *Polyrhachis lacteipennis* Smith

1858. *Polyrhachis lacteipennis* Smith, *Cat. Hym. Brit. Mus.*, **6** : 60.

1925. *Polyrhachis (Myrmhopla) lacteipennis*, Emery, *Genera Insect.*, **183** : 204.

1995. *Polyrhachis lacteipennis*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 351.

Material examined : India : Manipur : Churachandpur, Christian vill., 1 worker, 22. iii. 1993, coll. D. K. Mandal and Party; Mairang, Keibul Lamjao National Park, 1 worker, 14. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu and also throughout the country.

Elsewhere : Myanmar, Sri Lanka.

Remarks : Bolton (1995b) noted that this species is the senior synonym of the species, *Polyrhachis simplex* Mayr, 1862 and also mentioned its distribution only "India" Prior to this, Bingham (1903 : 394) reported the species *simplex* under the same genus and noted that it was found throughout the limits, nearly the most common species of the genus. Subsequently, Tiwari (1999) overlooked Bolton's (1995b) view and also recorded *P. simplex* Mayr, 1862 as a separate species alongwith its distribution as "West Bengal, Tamil Nadu" etc. The present authors, however, agree with Bolton's (1995b) view.

27. *Polyrhachis* sp.

Material examined : India : Manipur : Imphal, Sangoimang, 1 ex., 27. ii. 1993, coll. S. K. Saha and Party.

Distribution : India : Manipur.

14. Genus *Paratrechina* Motschoulsky

1863. *Paratrechina* Motsch., *Bull. Soc. Nat. Moscou.*, **36** : 13.

Type-species : *Formica longicornis* Latreille, 1802 (= *Paratrechina currens* Motschoulsky, 1863).

Key to the species of *Paratrechina*

1. Scape of antennae remarkably long, extending beyond the top of head by more than half its

length; in worker, node of pedicel not so broad as high, rounded above .... *longicornis* (Latreille)

– Scape of antennae extending beyond the top of head by less than half its length; in worker, node of pedicel thick, quadrangular, transverse above ..... *bourbonica* (Forel)

28. *Paratrechina bourbonica* (Forel)

1886. *Prenolepis nodifera* Mayr, 1870, race *bourbonica* Forel, *Ann. Soc. Ent. Belg.*, **30** : 210, W, F, M.

1925. *Paratrechina (Nylanderia) bourbonica,* Emery, *Genera Insect.*, **183** : 219.

1951. *Nylanderia bourbonica,* Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), **1** : 214.

1967. *Paratrechina (Nylanderia) bourbonica,* Wilson and Taylor, *Pacific Ins. Monogr.*, **14** : 88.

1987. *Paratrechina bourbonica,* Taylor, *CSIRO Aust. Div. Entomol.*, Rep. No. **41** : 52.

1999. *Paratrechina bourbonica,* Tiwari, *Memoirs Zool. Surv. India,* **18** (4) : 80.

Material examined : India : Manipur : Pheidinga, 1 ex., 8. iii. 1985, coll. C. M. Devi; Moreh, Lairo River bund, 1 ex., 12. iv. 1992, coll. A. K. Hazra and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu.

Elsewhere : Myanmar, Seychelles, Pemba Is., Reunion Is., Hawaii, Easter Is., New Caledonia Is.

Remarks : Bolton (1995b) also reported this species under the genus *Paratrechina* and made a list of some junior synonyms of this species alongwith *bengalensis* Forel, 1894, which were synonymised by Wilson and Taylor (1967). Prior to this, Forel (1894) described *bengalensis* as a race under the species *Prenolepis bourbonica.* But Bingham (1903 : 328) gave *bengalensis* a species status under the genus *Prenolepis* and mentioned its distribution as "Bengal and Burma" Later on, Emery (1925) further placed *bengalensis* as a subspecies under *Paratrechina (Nylanderia) bourbonica.*

29. *Paratrechina longicornis* (Latreille)

1802. *Formica longicornis* Latreille, *Hist. Nat. Fourm.*, : 113, W.

1903. *Prenolepis longicornis,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 326, W, F, M.

1925. *Paratrechina (Paratrechina) longicornis,* Emery, *Genera Insect.*, **183** : 217.

1987. *Paratrechina longicornis,* Taylor, *CSIRO Aust. Div. Entomol.*, Rep. No. **41** : 52.

1999. *Paratrechina longicornis,* Tiwari, *Memoirs Zool. Surv. India,* **18** (4) : 80.

Material examined : India : Manipur : Mao, 1 ex., 8. ix. 1985, coll. C. M. Devi; Churachandpur, Tuithapi vill., 1 ex., 21. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur, West Bengal, Tamil Nadu, Karnataka, Orissa, Andaman and Nicobar Islands and mostly throughout the country.

Elsewhere : Australia, New Caledonia Is., Senegal, Sri Lanka, France.

Remarks : While reviewing "the Ants of the World", Bolton (1995b) also recorded this species under the genus *Paratrechina* and mentioned its locality as "Senegal" He, in the same publication, noted that this species is the senior synonym of the type-species of the genus *Paratrechina, P. currens* Motsch., 1863 and two other species of the genus *Formica,* viz., *F. vagans* Jerdon, 1851 and *F. gracilescens* Nylander, 1856 which were synonymised by different workers. But Tiwari (1999) overlooked Bolton's (1995b) view and listed *F. vagans* Jerdon, 1851 as a separate species in the fauna of South India. The present authors, however, accept Bolton's (1995b) review.

15. Genus *Prenolepis* Mayr

1861. *Prenolepis* Mayr, *Europ. Formicid.*, : 52.

Type-species : *Tapinoma nitens* Mayr, 1853.

*30. *Prenolepis melanogaster* Emery

1894. *Prenolepis melanogaster* Emery, *Ann. Mus. Civ. Stor. Nat. Genova,* **34** : 476, W.

1903. *Prenolepis melanogaster,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 327, W.

1995. *Prenolepis melanogaster*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 364.

Material examined : India : Manipur : Mao, 1 ex., 8. ix. 1985, coll. C. M. Devi; Imphal, Koriengei, 1 ex., 15. iii. 1993, coll. D. K. Mondal and Party.

Distribution : India : Manipur.

Elsewhere : Myanmar.

Remarks : According to Bingham (1903), this species was recorded from Upper Burma. Subsequently, Bolton (1995b) also mentioned its locality only "Burma" So this species is recorded here for the first time from India.

16. Genus ***Lepisiota*** Santschi

1926. *Lepisiota* Santschi, *Ann. Soc. Ent. France*, **95** : 15.

Type-species : *Plagiolepis rothneyi* Forel, 1894.

31. ***Lepisiota frauenfeldi*** (Mayr)

1855. *Hypoclinea frauenfeldi* Mayr, *Verh. zool.-bot. Ges. Wien*, **5** : 378, W.

1903. *Acantholepis frauenfeldi*, Bingham, *Fauna Brit. India, Hymenoptera*, **2** : 316, W, F.

1992. *Lepisiota frauenfeldi*, Baroni Urbani *et al.*, *Syst. Ent.*, **17** : 303.

1995. *Lepisiota frauenfeldi*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 227.

Material examined : India : Manipur : Churachandpur, 1 ex., 4. iv. 1992,. coll. A. K. Hazra and Party; Mairang, Keibul Lamjao National Park, 1 ex., 14. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Andhra Pradesh.

Elsewhere : East Europe (Yugoslavia), South Europe and Northern Africa.

Remarks : Bolton (1995b) noted in his catalogue of ants of the world that the genus *Acantholepis* Mayr, 1861 has already been transferred to the genus *Lepisiota* Santschi, 1926. According to this, he *(op. cit.)* recorded the species *frauenfeldi* under the genus *Lepisiota* and mentioned its distribution as "Yugoslavia" Though, Tiwari (1999) recorded this species under the genus *Acantholepis* from Andhra Pradesh, South India, but the present authors agree with Bolton's (1995b) view.

17. Genus ***Anoplolepis*** Santschi

1914. *Plagiolepis*, Subgen. *Anoplolepis* Santschi, *Voy. Alluand and Jeannel Afr. orient., Hym.*, : 123.

1925. *Anoplolepis*, Emery, *Genera Insect.*, **183** : 16.

Type-species : *Formica gracilipes* Smith, 1857 (= *Formica longipes* Jerdon, 1851).

32. ***Anoplolepis gracilipes*** (Smith)

1857. *Formica gracilipes* Smith, *J. Proc. Linn. Soc. London, Zool.*, **2** : 55, W.

1862. *Prenolepis gracilipes*, Mayr, *Verh. zool.-bot. Ges. Wien*, **12** : 698.

1867. *Plagiolepis gracilipes*, Mayr, *Tijdsch. v. Ent.*, (2) **2** : 73.

1995. *Anoplolepis gracilipes*, Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press*, : 67.

Material examined : India : Manipur : Moreh, Lairo River Bund, 1 ex., 12. iv. 1992, coll. A. K. Hazra and Party; Mairang, Keibul Lamjao National Park, 2 exs., 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur, West Bengal, Kerala and mostly throughout the country except, in the hot dry portions of the North-Western Provinces, the Punjab and parts of Central India.

Elsewhere : Sri Lanka, Myanmar, Singapore, Australia, New Caledonia Is.

Remarks : Jerdon (1851) described the species *Formica longipes* from South India. Subsequently, the species *longipes* was further reported from different places of India by Bingham (1903) and Chapman and Capco (1951) and placed the species under the genera *Plagiolepis* and *Anoplolepis* respectively. Tiwari (1999) also recorded the species *longipes* under the genus *Anoplolepis.* But prior to this, Bolton (1995b) in his catalogue of ants of the world mentioned that the species *Anoplolepis longipes* (Jerdon, 1851) now has been transferred to the species *Anoplolepis gracilipes* (Smith, 1857), as it is the first available replacement name of *F. longipes* Jerdon, 1851. The present authors accept Bolton's (1995b) view.

VI. Subfamily DOLICHODERINAE Forel

This subfamily can be distinguished at a glance from the subfamily Ponerinae on the one hand by there being no constriction between the 1st and 2nd segment of the abdomen, and on the other hand from the subfamily Formicinae by the anal aperture being transverse and neither circular nor ciliated.

The species of this subfamily are characterised by the head short and broad; thorax robust, metanotum often compressed and raised *(Dolichoderus)* or spinous *(Aneuretus);* pedicel one-jointed, the node placed closer to the abdomen than to the thorax, sometimes inclined anteriorly, and often impinging on the front of the abdomen, which has a hollow depression anteriorly for its reception; abdomen generally gibbous in front (except in *Liometopum),* broadly oval *(Dolichoderus, Iridomyrmex);* sting not modified, but only in one genus *(Aneuretus).* exerted; legs slender *(Aneuretus),* long and robust *(Iridomyrmex, Tapinoma),* but short and stout *(Bothriomyrmex, Technomyrmex).*

Key to the Genera of DOLICHODERINAE

1. Clypeus with oval side-processes overlapping the base of mandibles on each side .... ***Liometopum*** Mayr
- Clypeus without such side-processes .... ***Technomyrmex*** Mayr

18. Genus ***Liometopum*** Mayr

1861. *Liometopum* Mayr, *Europ. Formicid.*, : 38.

Type-species : *Formica microcephala* Panzer, 1798.

33. ***Liometopum*** sp.

Material examined : India : Manipur : Lilong, 1 ex., 1. i. 1985, coll. C. M. Devi; Mairang, Keibul Lamjao National Park, 1 ex., 12. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur.

19. Genus ***Technomyrmex*** Mayr

1872. *Technomyrmex* Mayr, *Ann. Mus. Civ. Stor. Nat. Genova,* **2** : 147, W, F.

Type-species : *Technomyrmex strenua* Mayr, 1872.

Key to the species of *Technomyrmex*

1. Anterior margin of clypeus with a deep crescentic emargination ..... *bicolor* Emery
- Anterior margin of clypeus very slightly and widely emarginate ..... *elatior* Forel

34. ***Technomyrmex elatior*** Forel

1902. *Technomyrmex modiglianii* Emery, 1900, race *elatior* Forel, *Ann. Soc. Ent. Belg.,* **46** : 293, W.

1903. *Technomyrmex elatior,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 302, W.

1951. *Technomyrmex modiglianii* subsp. *elatior,* Chapman and Capco, *Monogr. Inst. Sci. Tech., Manila* (Check List Ants Asia), **1** : 196.

1995. *Technomyrmex elatior,* Bolton, *A New Genl. Cat. Ants World, Harvard Univ. press,* : 402.

Material examined : India : Manipur : Imphal, 1 ex., 10.v.1986, coll. O. L. Singh; Churachandpur, Christian vill., 1 ex., 21. iii. 1993, coll. D. K. Mondal & S. K. Ghosh and Party.

Distribution : India : Manipur, Assam. *Elsewhere* : Sri Lanka, Myanmar.

Remarks : Bingham (1903) mentioned its distribution as "Assam; Upper Burma" Subsequently, Chapman and Capco (1951) also recorded it in their check list from "Assam, Burma, Ceylon"

*35. ***Technomyrmex bicolor*** Emery

1893. *Technomyrmex bicolor* Emery, *Ann. Soc. Ent. France,* **62** : 249, W.

1903. *Technomyrmex bicolor,* Bingham, *Fauna Brit. India, Hymenoptera,* **2** : 302, W.

1995. *Technomyrmex bicolor,* Bolton, *A New Genl. Cat. Ants World, Harvard Univ. Press,* : 402.

Material examined : India : Manipur : Moreh, Lairo River Bund, 2 exs., 12. iv. 1992, coll. A. K. Hazra and Party; Churachandpur, Tuithapi vill., 1 ex., 21. iii. 1993, coll. D. K. Mondal and Party; Mairang, Keibul Lamjao National Park, 1 ex., 14. iv. 1998, coll. P. H. Roy and Party.

Distribution : India : Manipur.

Elsewhere : Sri Lanka.

Remarks : While reporting this species, Bingham (1903) noted its distribution as "Ceylon" But Later on, Chapman and Capco (1951) and Bolton (1995b) also mentioned its locality only Sri Lanka (Formerly Ceylon). So this species is recorded here for the first time from India.

SUMMARY

This paper deals with the ants collected from different places of Manipur. Although several workers including Bingham (1903) have made valuable contributions to the ant fauna of India, but no one has exclusively studied the ant fauna of Manipur.

This is the first attempt by the present authors to consolidate the knowledge of ant fauna of Manipur. The present work is based on the collection of ants from different places of Manipur collected by various survey parties of Zoological Survey of India. Besides this, the material received from various Institutions of the state of Manipur, have also been included here.

The present paper represents 35 species of ants under 19 genera and 6 subfamilies from the state of Manipur. All the species are recorded here for the first time from this state. Out of these, 4 species marked with single .asterisk (*) in the taxa are exclusively reported here for the first time from India. The key to the subfamilies, genera and species are provided here. But key to the species are not given, where the genus is represented by a single species.

Out of 35 reported species, some are identified here upto generic level due to lack of sufficient number of examples as well as insufficient literature. Of course, 2 of them under the genera *Myrmecina* and *Polyrhachis* respectively may be new to science. But they are not being described here at this stage upto species level. In case if the authors come across more number of examples as well as sufficient literature, the specific identification would be. done in due course.

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