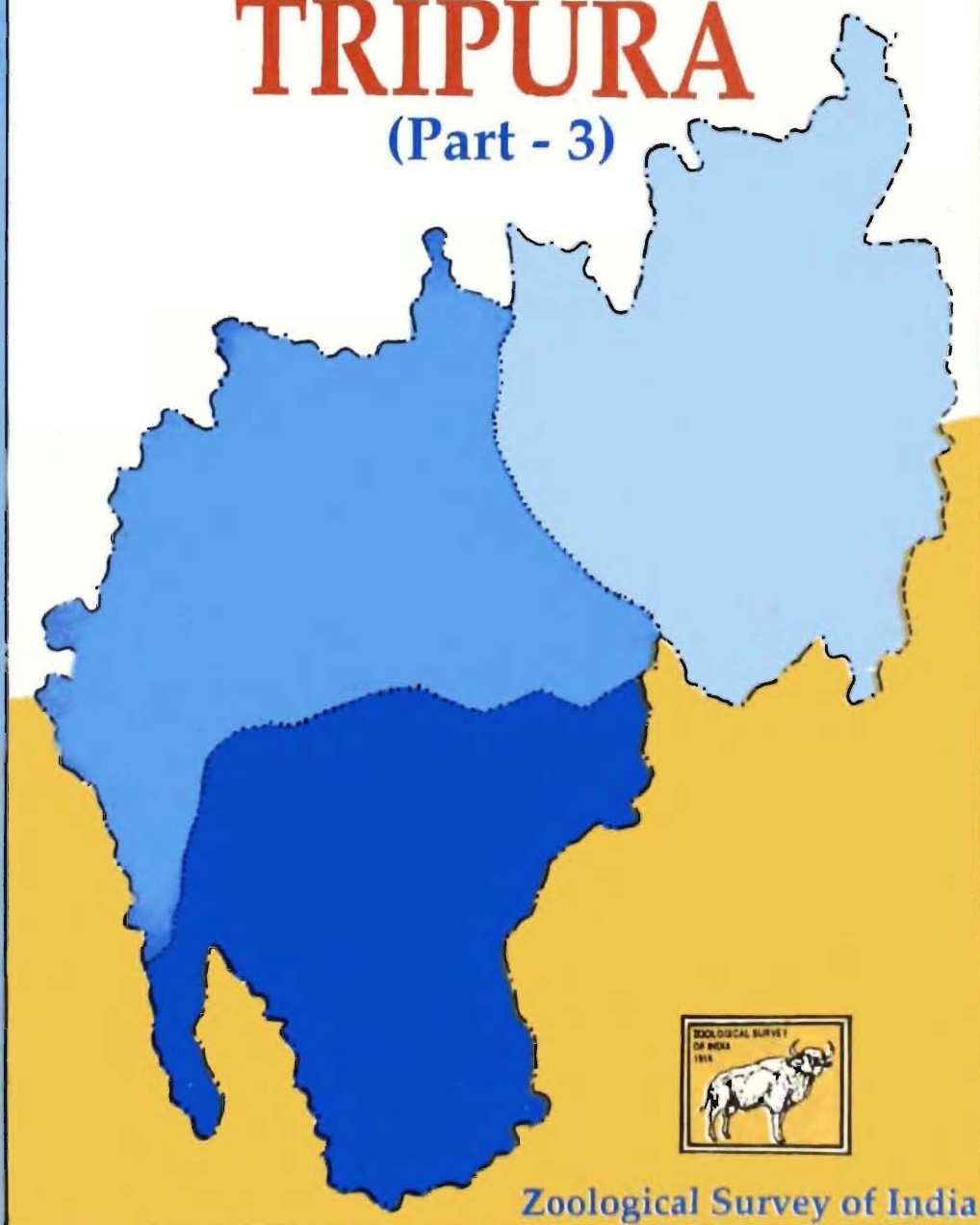


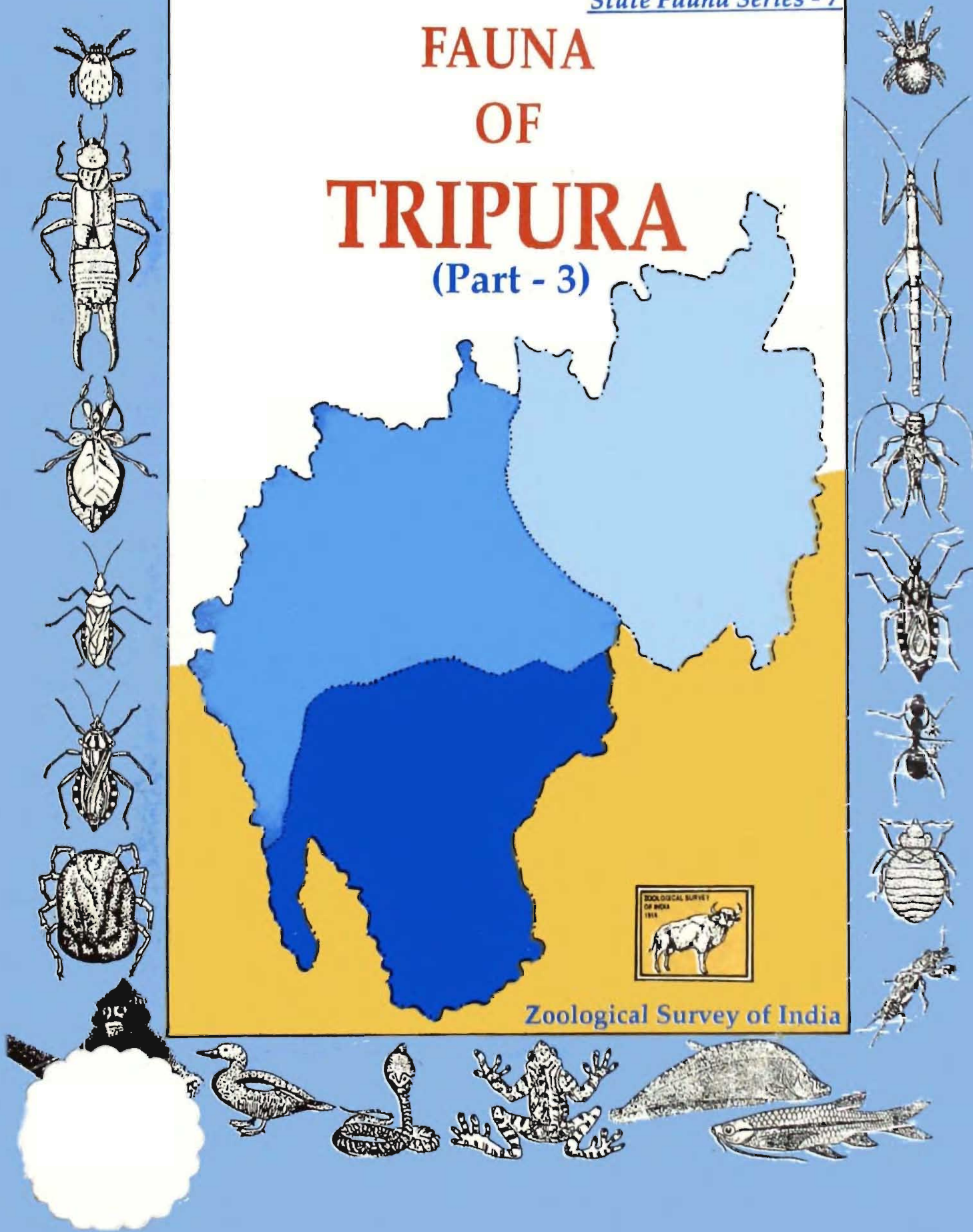
State Fauna Series - 7

FAUNA OF TRIPURA

(Part - 3)



Zoological Survey of India



State Fauna Series 7

FAUNA OF TRIPURA

**PART-3
(INSECTS)**

Edited by

**The Director
Zoological Survey of India, Calcutta**



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INSECTA : THYSANOPTERA

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INTRODUCTION

There was no report of Thysanoptera fauna of Tripura. Keeping this in view Dr. N. Muraleedharan undertook a survey to Tripura in the year 1977 for collection of thrips and based on this collection Muraleedharan and Sen (1981) recorded 21 species under 12 genera including 10 new species-*Crotonothrips longirostis*; *Gynaikothrips affinis*; *Liothrips clarus*; *Liothrips infrequens*; *Liothrips bournieri* (= *L. loranthi*); *Mesothrips acutus*; *Mesothrips ambasensis*; *Mesothrips latus*; *Mesothrips perlucidus* and *Stigmothrips okajimai*. Subsequently Muraleedharan and Sen (1981a) described another species-*Crotonothrips erraticus*. Sen, Pramanik and Sengupta (1988) in the "Thysanoptera Fauna of North-Eastern India" have added 5 more species under 5 genera.

The present monograph is the outcome of studies based on the following survey collections :-

- 1) Tripura Survey, 1973 (Dr. V. C. Agarwal)
- 2) Tripura Survey, 1974 (Dr. M. S. Shishodia)
- 3) Tripura Survey, 1977 (Dr. N. Muraleedharan)
- 4) Tripura Survey, 1978 (Dr. J. K. Jonathan)
- 5) Tripura Survey, 1988 (Dr. R. C. Basu)
- 6) Tripura Survey, 1992 (Dr. B. C. Das)
- 7) Tripura Survey, 1992 (Dr. B. Mitra)

Altogether 691 species pertaining to 5 families are recorded from India out of which 33 species pertaining to 20 genera under 3 families are represented in Tripura.

The terminology used in the key and descriptions of species conforms to the established and well accepted works (Mound et al, 1976; Ananthakrishnan and Sen, 1980; Palmer et al, 1989).

Key to the suborders, families and subfamilies; genera and species; description of species described from Tripura and short diagnostic characters in cases where single species represent a genus have been provided.

All measurements are in microns unless otherwise mentioned.

Key to the suborders, families and subfamilies of THYSANOPTERA from Tripura

1. Abdominal segment X tubular. Female without saw like ovipositor. Forewings without veins and setae.
(Suborder TUBULIFERA) Family PHLAEOTHIRIPIDAE
— Maxillary stylets uniformly thin, never broadened; narrower than labial palps.....
.....subfamily PHALAEOTHIRIPINAE
— Maxillary stylets thickened; bank-like; broadened at apex, broader than labial palps
.....subfamily IDOLOTHIRIPINAE
— Abdominal segment X rarely tubular. Female always with saw like ovipositor. Forewings with veins and cross-veins and setae on veins (suborder Terebrantia) 2
2. Ovipositor curved upwards. Forewings broad and rounded at apex and without fringe of long hairs. Antennae 9-segmented; segments 3

& 4 with elongated sensory areas.
.....Family AEOLOTHRIPIDAE

— Wings about parallel sided, sometimes slightly narrowed at basal half. Antennae more or less slender without rigid setae; terminal segments forming an unit
.....Subfamily AEOLOTHRIPINAE

— Ovipositor curved downwards, well developed. Wings more or less pointed at apex; foremargin with the fringe of hairs. Antennae 6-9 segmented; segments 3 & 4 with simple or forked sense cones Family THRIPIDAE

— Dorsum of body not polygonally reticulate, atmost with transverse striae. Terminal antennal segments normal, not long and thin
.....subfamily THRIPINAE

SYSTEMATIC ACCOUNT

Order : THYSANOPTERA

Suborder : TEREBRANTIA

Family : AEOLOTHRIPIDAE

Subfamily : AEOLOTHRIPINAE

Genus 1. *Aeolothrips* Haliday

1836. *Aeolothrips* Haliday, *Ent. Mag.*, 3 : 451.

Diagnosis : Forewings almost parallel sided with cross bars. Terminal antennal segments forming an unit; segments 3 & 4 with linear sensoria. Maxillary palpi 3-segmented; labial palpi 4-segmented. Abdominal sternite VII of female with 2 pairs of accessory setae close to mid line and no accessory setae laterally; sternites II-VI without accessory setae.

1. *Aeolothrips collaris* Priesner

1919. *Aeolothrips fasciatus collaris* Priesner, *Sitz. Ber. math. naturwiss. Kl. Akad. Wiss. Wien.* (1) 128(2-3) : 119.

1919. *Aeolothrips fulvicollis* Bagnall, *Ann. Mag. nat. Hist.*, (9)4 : 253-254.

1928. *Aeolothrips fulvicollis* : Ayyar, *Mem. Dept. Agri. India Ent. Ser.*, 10(7) : 247.

1964. *Aeolothrips collaris* : Bhatti, *Bull. Ent.*, 5 : 18.

1984. *Aeolothrips collaris* : zur Strassen & Harten, *Senckenbergiana biol* 65(1-2) : 78.

1988. *Aeolothrips collaris* : Sen et al, *Rec. zool. Surv. India Occ. Pap.* 100 : 3-4.

Diagnosis : General body colour dark; prothorax pale yellow; femora for the greater part yellow; abdomen mostly dark. Sensory area of antennal segment 3 & 4 long extending at least to the middle of the segment. Cross-bar on forewings short usually as long as broad.

Specimen studied : 5 FF (Z. S. I. Reg. Nos. 214-16/H₁₂; 394-95/H₁₂) Chailenya, 19. xii. 1973, coll. Dr. V. C. Agarwal.

Distribution : India : Widely distributed.

Elsewhere : Bangladesh, Egypt, Palestine, Cyprus, Yugoslavia.

Remarks : Sen et al (1988) recorded this species from Tripura.

2.2(a) Key to the genera of family THRIPIDAE from Tripura

1. Antennae 7-segmented, very rarely 8-segmented due to a secondary split of style. 2

— Antennae 8-segmented, style 2-segmented; segments normal, not elongate; sensecone on segments 3 & 4 moderately long. Antennae showing sexual dimorphism. Head with 2 pairs of anteocellars; cheeks parallel. postoculars in a single row*Megalurothrips* Karny

2. Spinula on meso-and metasternum absent or weakly developed in mesosternum only. Head with 1 pair of anteocellar setae, longer than interocellars. Maxillary palpi 3-segmented, rarely 2-segmented. Antennal segment 2 with mid-dorsal setae. Fringe cilia on posterior margin of wings wavy*Stenchaetothrips* Bagnall

— Spinula on mesosternum distinct absent on metasternum. Head wider to as long as wide; anteocellar only 1 pair; postoculars in one series and none of these specially developed. Antennae occasionally 8-segmented due to a

split of style. Pronotum with 2 long setae at each hind angle and mostly 3 pairs of setae present between the major angulars
.....*Thrips* Linnaeus

Family THIRIPIDAE

Subfamily THIRIPINAE

Genus 2. *Megalurothrips* Bagnall

1915. *Megalurothrips* Bagnall, *Ann. Mag. nat. Hist.* (8) 15 : 589.

1969. *Megalurothrips* : Bhatti, *Oriental Ins.*, 3(3) : 240.

2. *Megalurothrips distalis* (Karny)

1913. *Taeniothrips distalis* Karny, *Arch. Naturgesch* (A), 79(2) : 122-124.

1926. *Taeniothrips distalis* : Karny, *Mem. Dept. Agri. India Ent. Ser.*, 9(6) : 196.

1969. *Megalurothrips distalis* : Bhatti, *Oriental Ins.*, 3(3) : 241.

Diagnosis : Body uniformly brown; antennae brown, segment 3 yellow to light brown. Forewings brown with a clear distal area and with 12-21 (10-19 + 2) upper vein setae and 13-14 lower vein setae and 23-26 costal setae. Comb on abdominal tergite VIII complete.

Specimen studied : 3 FF (Z. S. I. Reg. Nos. 4619-4621/H₁₇) Ambasa, 5. 12. 1988, coll. Dr. R. C. Basu. 1 F (Z. S. I. Reg. No. 4622/H₁₇) Joyendranagar, 18. 12. 1988, coll. Dr. R. C. Basu.

Distribution : India : Widely distributed.

Elsewhere : Very widely distributed from Japan to Australia on one hand and South Asia on the other hand.

Remarks : This species is recorded for the first time from Tripura.

Genus 3. *Stenchaetothrips* Bagnall

1926. *Stenchaetothrips* Bagnall, *Ann. Mag. nat. Hist.*, (9) 18 : 107.

1982. *Stenchaetothrips* : Bhatti, *Oriental Ins.*, 16(4) : 385-391.

3. *Stenchaetothrips glandularis*
(Ananthakrishnan & Jagadish)

1967. *Chloethrips glandularis* Ananth. & Jagadish, *Zool. Anz.*, 178(5-6) : 379-381.

1970. *Baliothrips glandularis* : Bhatti, *Oriental Ins.*, 3(4) : 374.

1980. *Stenchaetothrips glandularis* : Bhatti & Mound, *Bull. Ent.*, 21(1-2) : 15.

1982. *Stenchaetothrips glandularis* : Bhatti, *Oriental Ins.*, 16(4) : 406.

Diagnosis : Antennal segmentes 3 & 4 much elongated. Cheeks highly convex with a constriction behind eyes. Forewings with 14-15 lower vein setae. Abdominal tergites II-VII of females without serrations, only males with serrations. Glandular area on abdominal sternites III-VII of male stout.

Specimen studied : 6 FF (Z. S. I. Reg. Nos. 4964-69/H₁₇) Teliamura, 21. 5. 1992, coll. Dr. B. C. Das.

Distribution : Tamil Nadu.

Remarks : This species is recorded for the first time from Tripura.

Genus 4. *Thrips* Linnaeus

1758. *Thrips* Linnaeus, *Systema Naturae*, Ed. 10 : 457.

1980. *Thrips* : Bhatti, *Syst. Ent.*, 5 : 112-113.

Key to species of *Thrips* from Tripura

1. Upper vein of forewings with an almost continuous row of setae. Metascutum with a number of distinct wrinkles among reticules. Legs dark brown except tarsi and foretibiae; forewings uniformly dark brown
.....*orientalis* (Bagnall)
- Upper vein of forewings without continuous row of setae and with 10(4 + 3 + 3) setae. Antennae mostly 7-segmented, occasionally 8-segmented due to split in segment 7; segment 3 pale yellow, 4-5 yellow at base brown distally, 6-7 brown. Interocellar setae placed within the ocellar triangle. Metascutum longitudinally striate, inner pair of setae placed back of anterior margin
.....*flavus* Schrank

4. *Thrips flavus* Schrank

1756. *Thrips flavus* Schrank, *Beitr. Zur. Natur* : 31-33.
 1928. *Thrips nilgiriensis* Ramakrishna, *Mem. Dept. Agri. India Ent. Ser.*, 10(7) : 262-263.
 1945. *Taeniothrips rhopalantennalis* Shumsher, *Indian J. Ent.*, 7 : 181-182.
 1969. *Thrips flavus* : Bhatti, *Oriental Ins.*, 3(4) : 381-382.
 1980. *Thrips flavus* : Bhatti, *Syst. Ent.*, 5 : 133-135.

Specimen studied : 1 F, 1 M, (Z. S. I. Reg. Nos. 4623-4624/H₁₇) Sepoyjola, Agartala, 18. xii. 1988, coll. Dr. R. C. Basu.

Distribution : India : Meghalaya; Sikkim, Punjab, West Bengal, Himachal Pradesh, Tamil Nadu and Jammu & Kashmir.

Elsewhere : Pakistan, Nepal, Korea, Japan, Europe, N. America, Malawi and Madeira.

Remarks : This species is recorded for the first time from Tripura.

5. *Thrips orientalis* (Begnall)

1915. *Isoneurothrips orientalis* Bagnall, *Ann. Mag. nat. Hist.*, (8) 15 : 593.
 1926. *Isoneurothrips orientalis* : Karny, *Mem. Dept. Agri. India, Ent. Ser.*, 9(6) : 197.
 1945. *Thrips (Isoneurothrips) orientalis* : Shumsher, *Indian J. Ent.*, 7(1-2) : 169.
 1963. *Thrips (Isothrips) orientalis* : Ananthakrishnan, *Treubia*, 26(2) : 86.
 1980. *Thrips orientalis* : Bhatti, *Syst. Ent.*, 5 : 150-151.

Specimen studied : 11 FF, 1 M, (Z. S. I. Reg. Nos. 4467-4478/H₁₇) Baramura, 22. v. 1978, coll. Dr. J. K. Jonathan.

Distribution : India : Tamil Nadu; Maharashtra; Punjab, Delhi and West Bengal.

Elsewhere : Malayasia, Thailand, China, Indonesia, Hawaii and Tanzania.

Remarks : This species is recorded for the first time from Tripura and very common on compositae flowers.

Key to the genera of family PHLAEORTHRIPIDAE from Tripura

1. Distance between hind coxae less than that between middle coxae. Anal setae rarely very long 3
- Distance between hind coxae greater than that between fore and mid coxae. Anal setae exceptionally long, several times longer than tube (Subfamily *Urothripinae*) 2
2. Antennae 5-segmented. Vertex of head with 4-6 prominent setae on emphasised tubercles. Fore and hind tarsi with a downwardly directed claw at tip *Stephanothrips* Trybom
3. Maxillary stylets slender, never broadened, narrower than labial palp (Subfamily *Phlaeothripinae*) 4
- Maxillary stylets broadened at apex, broader than labial palp (Subfamily *Idolothripinae*) 14
4. Sensecones on antennal segment 3 numerous, arranged in a ring. Forefemora with a stout tooth at base on inner margin in females; males with a strong tooth at base and another at apex. Forecoxae prolonged considerably in oedymorous males *Ecacanthothrips* Bagnall
- Sensecone on antennal segment 3 at most 2 or 3 in number 5
5. Intermediate antennal segments thin and long. Head longer than wide and distinctly longer than pronotum. Eyes large. Maxillary stylets well retracted. Pronotal setae well developed, dilated at tip. Foretarsi generally unarmed in both sexes, very rarely, with a small tooth in males. Wings comparatively narrow *Stigmothrips* Ananthakrishnan
- Intermediate antennal segments well developed and partly elongate 6
6. Cheeks warty bearing a few conspicuous setae. Mouthcone pointed, maxillary stylets retracted occlusally, meeting at middle. All prothoracic setae well developed, dilated at tip. Forefemora and foretibiae armed in males with two subapical femoral teeth and a basal, median and apical tibial teeth, strongly developed in oedymorous male *Hoplandrothrips* Hood

- Cheeks without warts and strong spines, atmost with small scattered setae or smooth 7
- 7. Head distinctly broader than long. Mouthcone broadly rounded. Epimeral setae about twice as long as postangular setae. Foretarsus with a tooth in both sexes. B₂ of abdominal segment IX short in both sexes*Crotonothrips* Anathakrishnan
- Head as broad as long or distinctly longer 8
- 8. Foretarsi unarmed in both sexes. Head 1.1-1.7 times as long as wide and almost twice as long as pronotum. Mouthcone elongate, pointed to narrowly rounded. Forefemora mostly thin*Liothrips* Uzel
- Foretarsi armed in both sexes or armed only in males 9
- 9. Pronotum with twisted striae. Postoculars usually one pair, occasionally two pairs. Mouthcone very broadly rounded*Gynaikothrips* Karny
- Pronotum without twisted striae, atmost with transverse striae 10
- 10. Forewings (Mesothripine) narrow from base to middle and parallel sided beyond middle. Head about as long as pronotum. Cheeks constricted at base and slightly spinose. Forefemora usually enlarged*Mesothrips* Zimmerman
- Forewings (Haplothripine) with a distinct constriction at middle 11
- 11. Forefemora, foretibiae and foretarsi variously armed 12
- Forefemora and foretibiae unarmed; foretarsi armed or unarmed 13
- 12. Forefemora in females with a blunt tooth or hump at base, often crenulate or roughened distally. Foretibiae with a flat scale at apex; tarsi armed*Androthrips* Karny
- Foretibiae with one or two distinct teeth. Forefemora sometimes with a hump at base*Podothrips* Hood
- 13. Hind femora usually enlarged; forefemora of females enlarged, reduced in gynaecoid males and more enlarged in oedymorous males. Antennal segment 3 almost symmetrical, segments 7 & 8 closely united, segment 8 broad at base. Tube setae long and fine about twice as long as tube*Karnyothrips* Watson
- Legs usually simple, not enlarged. Antennal segment 3 not very symmetrical. Forewings with or without double fringes*Haplothrips* Serville
- 14. Maxillary stylets moderately thick, a little thicker than the Phlaeothripines. Antennal segments 7 & 8 forming an unit, sometimes with an indistinct suture; segment 3 with 3 sensecones and segment 4 with 4 sensecones*Holothrips* Karny
- Maxillary stylets thick, atleast as thick as labial palps 15
- 15. Head distinctly produced 16
- Head not produced; broad to oval without conspicuous setae. Maxillary stylets broadly separate 'V' shaped. Metanotal median setae usually small. Foretarsal tooth present in male, lacking in females*Nesothrips* Kirkaldy
- 16. Mesothorax of male with a distinct forked process, lacking in gynaecoid males. Cheeks strongly setose in oedymorous male, weak in gynaecoids. Oedymorous males with very well developed forefemora and with strong setae; foretibiae with numerous denticles on inner margin and foretarsal tooth very strong*Dinothrips* Bagnall
- Mesothorax of males without process. Forefemora of males at apex on outermargin with a sickle like seta; foretarsal tooth well developed in males; reduced or absent in females. Antennal segments 3 & 4 in oedymorous males with strongly developed setae. General setae well developed*Elaphrothrips* Buffa

Suborder TUBULIFERA

Family PHLAEOTHIRIPIDAE

Subfamily PHLAEOTHIRIPINAE

Genus 5. *Androthrips* Karny

1911. *Androthrips* Karny, *Zentralbl. Bacteriol. Parasitenk.* (2) 30(21-24) : 560.

6. *Androthrips flavipes* Schmutz

1915. *Androthrips flavipes* Schmutz, *Sitz. Akad. Wiss. Wien.* 122 : 1031.
1926. *Androthrips flavipes* : Karny, *Mem. Dept. Agri. India Ent. Ser.*, 9(6) : 224.
1964. *Androthrips flavipes* : Ananthakrishnan, *Opusc. ent. Suppl.*, 25 : 28-29.
1981. *Androthrips flavipes* : Muraleedharan & Sen, *Rec. zool. Surv. India*, 79 : 205.

Diagnosis : Body pale to dark brown; all legs uniformly yellow; antennal segments 1, 2, 7 & 8 brown rest yellow except tip of 4 light brown. Head 1.2 times longer than broad. All major setae-postoculars, postangulars and epimerals very well developed. Foretibiae without scale.

Specimen studied : 2 ♂♂, (Z. S. I. Reg. Nos. 108-109/H₁₇) Kalirbazar, 1. x. 1977, coll. Dr. N. Muraleedharan. 1 ♀ (Z. S. I. Reg. No. 110/H₁₇) Sukanmara, Belonia, 28. ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : Tamil Nadu, Kerala, Tripura.

Elsewhere : Sri Lanka.

Remarks : Muraleedharan and Sen (1981) recorded this species from Tripura.

Genus 6. *Crotonothrips* Ananthakrishnan

1967. *Crotonothrips* Ananthakrishnan, *Oriental Ins.*, 1(1-2) : 189.
1969. *Phaeothrips* Ananthakrishnan, *Senckenbergiana biol.*, 50(3-4) : 189.
1976. *Crotonothrips* : Ananthakrishnan, *Oriental Ins.*, 10(3) : 411.

Key to the species of CROTONOTHRIPS from Tripura

1. Foretarsi unarmed in both sexes. B₂ of abdominal segment IX not short, almost subequal to B₁ & B₃. Maxillary stylets occluded, close at middle. Forewings infumate with 6-7 double fringes
.....*cacharensis* Muraleedharan & Sen
- Foretarsi armed in both sexes 2
2. Mouthcone pointed, very long, almost reaching base of prosternum. Maxillary stylets occluded, meeting at middle. Forewings infumate with 9-12 double fringes
.....*longirostris* Muraleedharan & Sen
- Mouthcone broad, not very long. Maxillary stylets retracted below the level of postoculars, close at middle. Forewings grey with 16-18 double fringes
.....*erraticus* Muraleedharan & Sen

7. *Crotonothrips (Inermothrips) cacharensis* Muraleedharan & Sen

1978. *Crotonothrips (Inermothrips) cacharensis* Muraleedharan & Sen, *Bull. zool. Surv. India*, 1(3) : 257-259.
1981. *Crotonothrips (Inermothrips) cacharensis* : Muraleedharan & Sen, *Rec. zool. Surv. India*, 79 : 206.
1988. *Crotonothrips (Inermothrips) cacharensis* : Sen et al, *Rec. zool. Surv. India. Occl. Pap.*, 100 : 44-45.

Female (Male) : General body colour brown; head, prothorax, abdominal segments V-IX and tube dark; antennal segment 1 brown, extreme base yellow, 2 yellow, brown at base and along margin, 3 & 4 yellow, 7 & 8 brown; forefemora yellow, brown at base, mid- and hindfemora brown, distal tip yellow, foretibiae yellow, mid- and hind-tibiae brown, all tarsi light brown; wings infumate. All setae dark brown and blunt.

Head broad, 180-192(176) long, 188-200(180) wide across eyes, 220-232(208) across cheeks and 224-248(216) across base; cheeks crenulate, slightly constricted at base; surface strongly reticulate. Eyes 72-80(72-76), 60(60) wide; all ocelli 24-28 wide, median ocellus over hanging

between base of the antennae. Postoculars short about half the length of eyes, 48-52(60) long. Antennal segments 3-7 pedicellate; 7 & 8 forming a close unit; antennal segments 1-8 length (width) :

	I	II	III	IV
<i>Female</i> :	40-44 (36-40)	52-60 (32-36)	60-64 (28-32)	56-60 (36)
<i>Male</i> :	32(36)	52(32-36)	60(28)	60(32)
	V	VI	VII	VIII
<i>Female</i> :	56-60 (32)	52 (28-32)	44-48 (24-28)	20 (12-16)
<i>Male</i> :	56(28)	52(24)	44(24)	28(16)

Mouthcone broad, 96-100(140) long, 140-144(180) wide at base and 92-96(104) at apex; maxillary stylets occluded, close at middle.

Prothorax about as long as head, 160-184(160) long, 260-280(272) wide at anterior margin and 360-400(380) at posterior margin. Prothoracic chaetotaxy; anteroangulars 28-36(28), anteromarginals 20-28(16), midlaterals 36-48(40), posteroangulars 72(60), and epimerals 100-112(96) long respectively; epimeral suture complete. Forefemora 84-100(92) wide, foretarsi with a hump. Pterothorax 380-400(380) long, 420-460(428) wide across meso- and 412-448(400) across metathorax. Forewings broad, 697-731(697-714) long, 76-96(72-88) wide with 6-7(6-7) double fringes; basal wing setae B_1 - B_3 : 56(56); 60(64) and 72(72) long respectively. Mesopraesternum complete, extremely thin at middle.

Abdomen 400-450(412) wide at base, 396-480(400) at middle, 300-340(252) across segment VIII and 166-232(160) across segment IX. Pelta roughly triangular with apex flat. B_1 - B_3 of segment IX : 120-144(144); 140-180(84) and 184-200(208) long respectively. Tube 180-204(180) long; anal setae 108-120(100) long.

Total body length : 1.79-2.13(1.9) mm.

Specimen studied : 6 FF, 2 MM (Z. S. I. Reg. Nos. 117-124/H₁₇) Suganmara, Belonia, ex. leaf gall, 29. ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : Assam; Tripura.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

8. *Crotonothrips erraticus* Muraleedharan & Sen

(Text fig. 1)

1981. *Crotonothrips erraticus* Muraleedharan & Sen, *Bull. zool. Surv. India*, 3(3) : 205-207.

1988. *Crotonothrips erraticus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, 100 : 46.

Female (Macropterous) : General body colour brown, terminal abdominal segments and tube darker; antennal segments 1, 2, 7 & 8 brown 3-6 golden yellow with brownish shade along margin, 3 brighter; all femora, mid- and hindtibiae brown with golden yellowish tinge, foretibiae golden yellow with brownish shade along margin, all tarsi golden yellow; forewings grey. All setae hyaline and blunt.

Head about as long to a very little broader, 224-232 long, 224-228 wide across eyes, 236-244 across cheeks, 232-236 across base; cheeks crenulate with 2-3 very minute setae; surface strongly reticulate. Eyes large 104-108 long, 68-72 wide, all ocelli 32 wide, median ocellus overhanging between the base of antennae. Postoculars well developed, 88-96 long. Antennal segments 3-7 subpedicellate, 7 & 8 forming an unit; segments 1-8 length (width); I; 54(38-46); II; 58(36-38); III; 76-84(38); IV; 76-80(42); V; 72-76(32-34); VI; 68-72(32); VII; 62-64(28); VIII; 38(16); sense cones moderately thick 30-34 long. Mouthcone broad, 148-168 long, 190-208 wide at the base and 106-114 at apex; maxillary stylets retracted below postoculars, close at middle.

Prothorax about as long as head, 220-228 long, 240-258 wide at anterior margin and 418-456 at posterior margin. Prothoracic chaetotaxy; anteroangulars 38-50, anteromarginals 24-28, midlaterals 46-52, posteroangulars 96 and epimerals 114 long respectively. Forefemora 284-304 long, 142 wide, foretarsal tooth straight, 46

long. Pterothorax 376-388 long, 524-540 wide across meso-and 518-560 across metathorax. Forewings broad, 1.05-1.15 mm. long, 106-134 wide with 16-18 double fringes; basal wing setae well developed, 72; 84 and 84-88 long respectively. Mesopraesternum complete; thin at middle.

Abdomen 564-594 wide at base, 526-532 at middle; 384-396 across segment VIII and 248-252 across segment IX. Pelta roughly bell shaped. B_1 - B_3 of segment IX; 152-172; 148-152 and 248-256 long respectively. Tube 266-278 long; anal setae 152-160 long.

Total body length : 2.75-2.79 mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 251/ H_{17}) Paratype F (Z. S. I. Reg. No. 252/ H_{17}), Teliamura, 19. ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981a) described this species from Tripura.

9. *Crotonothrips longirostris* Muraleedharan & Sen

(Text fig. 2)

1981. *Crotonothrips longirostris* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 207-209.

1988. *Crotonothrips longirostris* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 47-49.

Female (Male) : General body colour brown, tube and terminal abdominal segments darker; antennal segments 1-6 golden yellow, 7 & 8 brown; all femora golden yellow with brownish tinge at base, foretibiae golden yellow, mid- and hindtibiae golden yellow with brownish tinge; forewings infumate. All setae brown & blunt.

Head broader than long, 192-220(176-180) long, 200-212(192-200) wide across eyes, 240-264(216-220) wide across cheeks, 244-272(208-216) across base; cheeks crenulate with 2-4 minute setae; surface strongly reticulate. Eyes small, 72-76(64-72) long, 60-64(56-60) wide; all ocelli 24 wide, median ocellus overhanging between base

of antennae, paired ones placed above the middle of the eyes. Postoculars blunt 60-72(64-68) long, very close to eyes. Antennal segments 3-7 pedicellate; areola of segment 2 at extreme apex; 7 & 8 forming a close unit; segments 1-8 length (width).

	I	II	III	IV
<i>Female</i> :	44-52 (40)	60-64 (36)	64-68 (32-36)	60-68 (36-40)
<i>Male</i> :	36-44 (36-40)	52-56 (32-36)	60-64 (28-32)	64 (32)
	V	VI	VII	VIII
<i>Female</i> :	60-64 (32-36)	52-60 (28-32)	40-48 (24-28)	32-36 (16)
<i>Male</i> :	56-60 (28-32)	60 (28)	48-52 (24-28)	32 (16)

Mouthcone pointed, long, almost reaching the base of prosternum 208-232(180-192) long, 240-248(208) wide at base, 52-64(60) at apex. Maxillary stylets retracted up to eyes, meeting at middle.

Prothorax sculptured, 212-220(180-196) long, 320-380(240-280) wide at anterior margin, 416-424(376-392) wide at posterior margin. Prothoracic chaetotaxy; anteroangulars 44-48(40); anteromarginals 40-48(40-48), midlaterals 48-56(40-52), posteroangulars 68-72(60-68), epimerals 80-88(64-72) long respectively. Pterothorax 340-420(336-344) long, 460-528(420-460) wide across meso and 480-504(412-440) wide across metathorax. Forewings broad 714-765(646-714) long, 80-112(80-108) wide with 9-12(8-11) double fringes; basal wing setae; 48-52(32-40); 60-64(44-52) & 64-68(52-60) long respectively. Foretarsi with a straight dagger-like tooth, 32-36 long. Mesopraesternum complete, thin at middle.

Abdomen weakly sculptured, 496-520(440-448) wide at base, 480-500(420-428) at middle, 356-464(300-332) across segment VIII, 200-368(168-180) across segment IX. Pelta roughly triangular, apex flat. B_1 - B_3 of segment IX; 120(128-140); 120-124(64-80); 124-132(128-

148); long respectively. Tube 200-208(176-180) long; anal setae 100-128(96-104) long respectively.

Toal body length : 1.9-2.1 (1.7-1.8) mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 125/H₁₇) Allotype M (Z. S. I. Reg. No. 126/H₁₇) Paratypes 6 FF, 2 MM (Z. S. I. Reg. Nos. 127-134/H₁₇) Belonia, 28. ix. 1977, coll. Dr. N. Muraleedharan. Paratype 1 F (Z. S. I. Reg. No. 135/H₁₇) Kalirbazar, ex. leaf gall, 1. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

Genus 7. *Ecacanthothrips* Bagnall

1910. *Ecacanthothrips* Bagnall, *Ann. Soc. ent. Belg.*, **52** : 348.

1978. *Ecacanthothrips* : Palmer & Mound, *Bull. Br. Mus. nat. Hist. (Ent.)*, **37**(5) : 156-158.

10. *Ecacanthothrips tibialis* (Ashmead)

1905. *Idolothrips tibialis* Ashmead, *Ent. News*, **16** : 20.

1908. *Acanthothrips sanguineus* Bagnall, *Ann. Mag. nat. Hist.*, (8) **1** : 362.

1913. *Ecacanthothrips sanguineus* : Bagnall, *Rec. Indian Mus.*, **8**(3) : 201.

1978. *Ecacanthothrips tibialis* : Palmer & Mound, *Bull. Br. Mus. nat. Hist. (Ent.)*, **37**(5) : 161-162.

1981. *Ecacanthothrips tibialis* : Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 209.

1988. *Ecacanthothrips tibialis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 52-53.

Diagnosis : Body dark blackish brown; all femora dark brown, foretibiae yellow with brown at base, mid-and hind tibiae light brown, all tarsi yellow; antennal segments 1-4 dark blackish brown, 5-8 brown; forewings infunate except at base and with a median pale brown streak.

Head much longer than broad, narrow at base; surface with transverse striations. Postocular long but shorter than eyes. All prothoracic setae well developed, anteromarginals shorter than anteroangulars, postangulars much longer than

epimerals. Forefemora with basal and apical tooth much pronounced in oedymorous specimens. Forewing with double fringes.

Specimen studied : 2 FF, 2 MM (Z. S. I. Reg. Nos. 137-140/H₁₇) Chandrapur, 7. x. 1977, 4 FF, 2 MM (Z. S. I. Reg. Nos. 141-146/H₁₇) Belonia, 3. x. 1977, 3 FF, 1 M, (Z. S. I. Reg. Nos. 147-150/H₁₇) Maichera, Belonia, 27. ix. 1977, 2 FF, 1 M, (Z. S. I. Reg. Nos. 151-153/H₁₇) Amarpur, 12. x. 1977 (Coll. Dr. N. Muraleedharan).

Distribution : India : Tamil Nadu, Kerala, Tripura, Manipur, West Bengal, Meghalaya.

Elsewhere : Sri Lanka, Taiwan, China, Vietnam, Philippines, Borneo, Japan, New Guinea, Indonesia, Singapore, Mauritius, Tanzania, Australia.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

Genus 8. *Gynaikothrips* Karny

1915. *Gynaikothrips* Karny, *Zeit. F. Wiss. Ins.*, **10** : 324.

1974. *Gynaikothrips* : Ananthakrishnan & Muraleedharan, *Oriental Ins. Suppl.*, **4** : 5-7, figs. 1-7.

Key to the species of GYNAIKOTHRIPS from Tripura

1. Postsculars two pairs, outer as long as eyes and longer than inner. Prothoracic setae except anteromarginals well developed, long. Antennal segment 3 pale brown. Forewings faintly tinged yellow with 22-24 double fringes. Tube very long, 1.5 times longer than head*bengalensis* Ananthakrishnan
- Postocular setae one pair, shorter than eyes. Prothoracic setae except epimerals very much reduced. Mesopraesternum well developed with a median crest. All femora yellow; foretibiae with a basal brownish shade, mid-and hind tibiae brown with yellow apices, all tarsi yellow. Forewings clear with 14-15 double fringes*affinis* Muraleedharan & Sen

11. *Gynaikothrips affinis* Muraleedharan & Sen

(Text. fig. 3)

1981. *Gynaikothrips affinis* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 209-211.

1988. *Gynaikothrips affinis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 54-56.

Female (Male) : General body colour brown; antennal segment 1 brown, 2 brown apical half yellowish, 3-8 uniformly yellow, all femora yellow, foretibiae yellow with brownish shade basally, mid-and hind tibiae brown with apices yellow, all tarsi yellow; wings clear. All body setae hyaline and blunt.

Head 280-313(268-300) long, 216-224(204-212) wide across eyes, 228-236(216-220) across cheeks, 228-236(188-204) across base; cheeks crenulate. Eyes 112-120(104-108) long 72-80(64-72) wide; all ocelli 28-32(24-28) wide. Postoculars 88-100(56-80) long. Antennal segment 1.8 length (width).

	I	II	III	IV
Female :	40 (44)	52-60 (36)	84-104 (32-36)	92-100 (40)
Male :	28-40 (40)	48-52 (28-36)	88-92 (28-32)	84-88 (40)
	V	VI	VII	VIII
Female :	92-96 (36)	84-88 (32-36)	60-68 (28)	40 (16)
Male :	84-88 (36)	80-88 (32-36)	60 (24-28)	40 (16)

Mouthcone broad; maxillary stylets retracted to middle of head capsule, not close at middle.

Prothorax short 184-212(176-184) long in the median line, 252 (240-248) wide at anterior margin and 348-392(360) at posterior margin. All prothoracic setae except epimerals vestigial; epimerals 132-140 (132-136) long; epemeral suture incomplete. Forewings 940-1056(924-940) long, 96-100 (96-100) wide with 14-15 double fringes; basal wing setae B_1 - B_3 : 80-84(60-64); 80-84(68-80) and 84-116(68-72) long

respectively. Mesopraesternum well developed with a median crest.

Abdomen 412-462(396-412) wide at base, 346-379(313-330) at middle, 165(132-148) across segment IX. B_1 - B_3 of segment IX; 300-316(220-252); 240-260(88) and 348-360(260) long respectively. Tube 346-396(313-330) long, anal setae 260-320(198-268) long.

Total body length : 2.57-2.92(2.31-2.60) mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 163/ H_{17}), Allotype M (Z. S. I. Reg. No. 164/ H_{17}), Paratypes 3 FF, 1 M (Z. S. I. Reg. Nos. 165-168/ H_{17}) Sarashima, Belonia; 29. ix. 1977, ex. leaf folds of *Ficus*, coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

12. *Gynaikothrips bengalensis* Ananthakrishnan

1973. *Gynaikothrips bengalensis* Ananthakrishnan, *Oriental Ins.*, **7**(4) : 543-544.

1981. *Gynaikothrips bengalensis* : Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 211.

1984. *Gynaikothrips bengalensis* : Zur Strassen & Harten, *Senckenbergiana biol.*, **65**(1-2) : 89.

1988. *Gynaikothrips bengalensis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 56-57.

Specimen studied : 5 FF, 1 M, (Z. S. I. Reg. Nos. 169-174/ H_{17}) Sarashima, Belonia, 29. ix. 1977, 3 FF (Z. S. I. Reg. Nos. 175-177/ H_{17}) Hrishyamukh, ex. leaf gall of *Ficus benjamina*, 30. ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : Calcutta (West Bengal); Tripura.

Elsewhere : Bangladesh.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

Genus 9. *Haplothrips* Amyot & Serville

1843. *Haplothrips* Amyot & Serville, *Hist. nat. Ins. Hemipteres* : 640.

1976. *Haplothrips* : Pitkin, *Bull. Br. Mus. nat. Hist., (Ent.)*, **34**(4) : 244-245.

Key to the species of HAPLOTHRIPS from Tripura

1. Antennal segment 3 with 0 + 1 sensecone. Mid-and hind-tibiae entire brown, antennal segments 1-2 brown, 3 brownish yellow, 4-6 successively darker. Forewings with 5-8 double fringes. Median seta B₁ on abdominal segment IX blunt to slightly expanded
.....*ganglbaueri* Schmutz
- Antennal segment 3 with 1 + 1 sensecone, segment 3 of antennae very short, 1.1 times as long as wide, segments 3 & 4 yellowish, 5 more yellow than brown, segments 1-2 and 6-8 brown. Foretarsi with a small tubercle. Forewings with 5-8 double fringes. Median seta B₁ on abdominal segment IX pointed....
.....*gowdeyi* (Franklin)

13. *Haplothrips ganglbaueri* Schmutz

1913. *Haplothrips ganglbaueri* Schmutz, Sitz Akad. Wiss. Wien, **122** : 1034.
1976. *Haplothrips ganglbaueri* : Pitkin, Bull. Br. Mus. nat. Hist. (Ent.), **34**(4) : 249-250.
1984. *Haplothrips ganglbaueri* : Zur Strassen & Harten, Senckeneriana biol., **65**(1-2) : 89-90.
1988. *Haplothrips ganglbaueri* : Sen et al., Rec. zool. Surv. India, Occl. Pap., **100** : 58-59.

Specimen studied : 12 FF (Z. S. I. Reg. Nos. 303-305/H₁₂; 345-359/H₁₂) Udaipur, 7. 11. 1974, 5 FF (Z. S. I. Reg. Nos. 306-308/H₁₂; 343-344/H₁₂) Ambassa, 18. xi. 1974. 14 FF (Z. S. I. Reg. Nos. 246-253/H₁₂; 309-311/H₁₂) Teliamura, 14. xi. 1974 (Coll. Dr. M. S. Shishodia).

Distribution : India : Widely distributed.

Elsewhere : Bangladesh, Sri Lanka, Pakistan, Java, Solomon Is. Philippines.

Remarks : Sen et al (1988) recorded this species from Tripura.

14. *Haplothrips gowdeyi* Franklin

1908. *Anthothrips gowdeyi* Franklin, Proc. U. S. nat. Mus., **33** : 724.
1921. *Haplothrips gowdeyi* : Watson, Fla. Ent., **4** : 38.

1939. *Haplothrips gowdeyi* : Ramakrishna & Margabandhu, Indian J. Ent., **1**(3) : 47-48.

1976. *Haplothrips gowdeyi* : Pitkin, Bull. Br. Mus. nat. Hist. (Ent.), **34**(4) : 250-252.

Specimen studied : 2 FF, 1 M (Z. S. I. Reg. Nos. 4923-4925/H₁₇) Agartala, 8. v. 1992, coll. Dr. B. C. Das.

Distribution : India : Tamil Nadu; Rajasthan; Meghalaya, Andaman Is., West Bengal, Tripura.

Elsewhere : Sri Lanka, Bangladesh.

Remarks : This species is recorded for the first time from Tripura.

Genus 10. *Hoplandrothrips* Hood

1912. *Hoplandrothrips* Hood, Proc. ent. Soc. Wash., **14** : 145.
1973. *Hoplandrothrips* : Ananthakrishnan, Occl. Publ., **2**, Ent. Res. Unit, Loyola College, Madras : 32.

15. *Hoplandrothrips flavipes* Bagnall

1923. *Hoplandrothrips flavipes* Bagnall, Ann. Mag. nat. Hist., (9)**12** : 628-629.
1939. *Phlaeothrips indicus* Ramkrishna & Margabandhu, Indian J. Ent., **1** : 43-44.
1968. *Hoplandrothrips flavipes* : Mound, Bull. Br. Mus. nat. Hist. (Ent.) Suppl., **11** : 120.
1981. *Hoplandrothrips flavipes* : Muraleedharan & Sen, Rec. zool. Surv. India, **79** : 211-212.

Diagnosis : Body brown; all tibiae yellow. Antennal segment 3 with 4 short, stout sensecones. Forewings with only 8-10 double fringes.

Specimen studied : 2 FF (Z. S. I. Reg. Nos. 111-112/H₁₇) Amarpur, 12. x. 1977; 1 M (Z. S. I. Reg. No. 113/H₁₇) Chandrapur, 8. x. 1977; 3 FF (Z. S. I. Reg. Nos. 114-116/H₁₇) Amarpur 12. x. 1977; 1 F, (Z. S. I. Reg. No. 1329/H₁₇) Gobindadila, 14. x. 1977 (Coll. Dr. N. Muraleedharan).

Distribution : India : Kerala, Karnataka, Tamil Nadu, Manipur, Meghalaya, Tripura.

Elsewhere : Kenya.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

Genus 11. *Karnyothrips* Watson

1922. *Karnyia* Watson, *Fla. Ent.*, 6(1) : 6.
 1924. *Karnyothrips* Watson, *Univ. Fla. Agri. Exp. Stn., Bull.*, 168 : 23.

16. *Karnyothrips fungulus* Ananthakrishnan

1973. *Karnyothrips fungulus* Ananthakrishnan, *Occl. Publ.*, 2, *Ent. Res. Unit, Loyola College, Madras* : 38.
 1988. *Karnyothrips fungulus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, 100 : 64.

Diagnosis : General body colour brown; antennae brown, segment 3 paler. Wings transparent. Head longer than broad; mouthcone broad; maxillary stylets retracted oculad, not meeting. Prothoracic anteromarginals vestigial and other prothoracic setae well developed. Foretarsi unarmed. Forewing with 3-4 double fringes and basal wing setae B_1 and B_2 equal. Setae on abdominal segment IX, B_1 knobbed and B_2 and B_3 pointed.

Specimen studied : 1 F (Z. S. I. Reg. No. 1774/H₁₇) Chandrapur, 7. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tamil Nadu, Andhra Pradesh, Kerala, U. P., Tripura, Meghalaya.

Remarks : Sen et al (1988) recorded this species from Tripura.

Genus 12. *Liothrips* Uzel

1895. *Liothrips* Uzel, *Mon. Ord. Thys.* : 261.

Key to the species of LIOTHRIPS from Tripura

1. Mesopraesternum complete. Postoculars long, subequal to eyes. All setae light brown, blunt to little dilated at tip. Antennal segments 3-6 yellow. Foretibiae proximal half brown, distally yellow; mid-and hind tibiae dark brown, extreme tip yellow. Forewings transparent with 12 double fringes
*bourrieri* Muraleedharan & Sen
 — Mesopraesternum incomplete 2

2. Setae on abdominal segment IX longer than tube. Head 1.1 times as long as wide. Postoculars moderately long. Mouthcone pointed; maxillary stylets retracted below the postoculars and close at middle. Forewings clear with 10-11 double fringes
*infrequens* Muraleedharan & Sen

- Setae on abdominal segment IX shorter than tube. Postoculars about as long as eyes. Antennal segments 1 & 2 brown, rest yellow. Maxillary stylets short, retracted to 1/3 of head and wide apart. All prothoracic setae well developed. Forewings with 20 double fringes. Body setae blunt
*clarus* Muraleedharan & Sen

17. *Liothrips bourrieri* Muraleedharan & Sen

(Text-fig. 4)

1981. *Liothrips loranthe* Muraleedharan & Sen, *Rec. zool. Surv. India*, 79 : 215-217.
 1984. *Liothrips bourrieri* : Sen, *Bull. zool. Surv. India*, 6(1-3) : 305.
 1988. *Liothrips bourrieri* : Sen et al, *Rec. zool. Surv. India, Occl., Pap.*, 100 : 71-72.

Female (Male) : General body colour blackish brown; antennal segment 1 concolourous with head, 2 dark brown at base and margin, 3-6 yellow, 7 & 8 light brown; all femora, mid-and hindtibiae dark brown extreme apex yellow, foretibiae with proximal half brown, yellow beyond, all tarsi yellow; forewings transparent, extreme base faint grey. All setae light brown, blunt to little dilated at apex.

Head very little longer than broad, 236-240(212) long, 210-214(190) wide across eyes, 228-236(208) across cheeks, 224-232(196) across base; cheeks finely crenulate; surface reticulate. Eyes 84-92(72) long, 64-68(62) wide; all ocelli 32-34 wide, median ocellus overhanging, paired ones placed much above the middle of eyes, almost at extremity. Postoculars 84-92(66) long. Antennal segments 3-6 subpedicellate and elongate; antennal segments 1.8 length (width).

	I	II	III	IV
<i>Female</i> :	42-46 (38-42)	58 (32-36)	68-72 (32-36)	72-76 (38-40)
<i>Male</i> :	34 (36)	50 (32)	62 (28)	62 (32-34)
	V	VI	VII	VIII
<i>Female</i> :	66 (36-38)	62 (36)	54 (28)	32 (16)
<i>Male</i> :	66 (32)	58 (32)	46 (24)	38 (16)

Mouthcone long and pointed, 138(134) long, 172(156) wide at base, 42(40) at apex, maxillary stylets oculad, close at middle.

Prothorax short and reticulate 164(156) long, 248(216) wide at anterior margin, 350(292) at posterior margin. Prothoracic chaetotaxy; anteroangulars 38(34); anteromarginals 50(38), midlaterals 58(58), posteroangulars 88(66) and epimerals 92(76) long respectively; epimeral suture complete with an accessory seta 28 long. Pterothorax 424(308) long 416(360) wide across meso- and 424(348) across metathorax. Mesopraesternum complete, narrow at middle. Forewings 792-808(765) long, 76-96(68-80) wide with 12(12) double fringes; basal wing setae B_2 & B_3 equal, B_1 - B_3 ; 56(50); 62-76(56) & 62-76(58) long respectively.

Abdomen 418(368) wide at base, 398(304) at middle, 314(244) across segment VIII and 232(156) across segment IX. Pelta roughly bell shaped. B_1 - B_3 of segment IX : 184(152); 152(48) and 170(156) long respectively. Tube 202(168) long and anal setae 190(152) long.

Total body length : 2.17-2.28(1.9) mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 182/H₁₇) Allotype M (Z. S. I. Reg. No. 183/H₁₇) Paratypes 4 FF (Z. S. I. Reg. Nos. 184-187/H₁₇) Sotagum, Hrishyamukh, ex. galls of *Loranthus* sp., 30. x. 1977 coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

18. *Liothrips clarus* Muraleedharan & Sen

(Text fig. 5)

1981. *Liothrips clarus* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 212-214.

1988. *Liothrips clarus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 73-74.

Female (Male) : General body colour brown; antennal segments 1 & 2 brown, rest yellow; all femora brown, foretibiae yellow with brownish tinge, mid- and hindtibiae brown, all tarsi yellow; wings a little cloudy with a dark brown median streak. All setae brown and blunt.

Head 1.3 times as long as wide, 313(330) long, 248(220) wide across eyes, 240(212) across cheeks, 212(180) across base; cheeks crenulate with a few minute setae. Eyes 124(120) long, 84(68) wide; all ocelli 32(28) wide, postoculars 116(92) long. Antennal segments elongate, segments 1-8 length (width) :

	I	II	III	IV
<i>Female</i> :	40(40)	64(36)	112(36)	112(44)
<i>Male</i> :	24(40)	60(32)	104(32)	108(40)
	V	VI	VII	VIII
<i>Female</i> :	104(36)	96(36)	72(28)	40(16)
<i>Male</i> :	100(32)	80(28)	68(28)	40(16)

Mouthcone roughly pointed, 156(140) long, 208(208) wide at base and 100(80) at apex; maxillary stylets retracted to 1/3 of head capsule.

Prothorax short with transverse striations, 172(168) in the median line, 228(200) wide at anterior margin and 388(340) at posterior margin. Prothoracic chaetotaxy; anteroangulars 64(48); anteromarginals 52(32); midlaterals 100(80), posteroangulars 128(96) and epimerals 148(120) long respectively. Pterothorax 496(446) long 512(412) wide at meso- and 462(396) at metathorax. Mesopraesternum incomplete. Forewings 1089(973) long 104(96) wide with 20(14) double fringes, B_1 - B_3 of abdominal segment IX : 300(280); 336(64) and 280(300) long respectively. Tube 300(300) long, and setae 280(220) long.

Total body length : 3.22 (2.74) mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 178/H₁₇) Hrishyamukh, *ex.* leaf galls of *Ficus* sp., 30. ix. 1977. Allotype M (Z. S. I. Reg. No. 179/H₁₇) Sarashima, *ex.* leaf galls of *Ficus* sp., 29. ix. 1977 (*Coll.* Dr. N. Muraleedharan).

Distribution : Tripura

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

19. *Liothrips infrequens* Muraleedharan & Sen
(Text. fig. 6)

1981. *Liothrips infrequens* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 214-215.

1988. *Liothrips infrequens* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 76-77.

Male (Macropterous) : General body colour brown; antennal segments 1 & 2 brown, 3, 4 & 5 yellow, 6 yellow with a brownish tinge at apex, 7 & 8 pale brown, foretibiae and all tarsi yellow, mid-and hindtibiae brown; wings clear. All setae brown and pointed.

Head 1.1 times as long as broad, 260-280 long, 228 wide across eyes, 224-228 wide across cheeks, 196-204 across base; cheeks finely crenulate with 1-2 minute setae. Eyes 92-100 long and 80 wide; all ocelli 32 wide. Postoculars 76-80 long. Antennal segments 1-8 length (width); I : 40(44); II : 56(28-32); III : 80-84(28-36); IV : 80-88(40); V : 76-84(28-32); VI 68-72(28-32); VII : 56-60(24); VIII : 36-40(12); sensecones 40 long. Mouthcone pointed, 140-152 long, 200 wide at base and 60-64 at apex; maxillary stylets retracted upto the postoculars, close at middle.

Prothorax short, 124-140 long in the median line, 216-248 wide at anterior margin and 300-348 at posterior margin. Prothoracic chaetotaxy anteroangulars 40-44, anteromarginals 40-48, midlaterals 64-88, posteroangulars 80-100 and eipmerals 88-96 long respectively. Pterothorax 330-396 long, 363-412 wide across meso-and 330-396 across metathorax. Mesopraesternum incomplete. Forewings 743-907 long; 68-76 wide

with 10-11 double fringes; basal wing setae B₁-B₃ : 68-84; 80-92 & 88-96 long respectively.

Abdomen 346-412 wide at base, 330-346 at middle and 165 across segment IX. B₁-B₃ of segment IX : 248-272; 52-72 & 248 long respectively.

Total body length : 1.68-2.33 mm.

Specimen studied : Holotype M (Z. S. I. Reg. No. 180/H₁₇) Paratype 1M (Z. S. I. Reg. No. 181/H₁₇) Garmartilla, Teliamura, *ex.* leaf gall, 19. 10. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

Genus 13. *Mesothrips* Zimmerman

1900. *Mesothrips* Zimmerman, *Bull. Inst. bol. Buit.*, **7** : 16.

1976. *Mesothrips* : Ananthakrishnan, *Oriental Ins.*, **10**(1) : 185-191.

Key to the species of MESOTHRIPS from
Tripura

1. Forewings uniformly clouded. Head elongate, cheeks with strong setae; mouthcone broadly rounded. Postoculars much shorter than eyes. Prothoracic anteroangulars shorter than anteromarginals. Tube as long as head and setae on abdominal segment IX shorter than tube *jordani* Zimmerman
- Forewings clear to faint yellow 2
2. Forewings clear. Maxillary stylets very short, retracted just above the mouthcone and wide apart. Antennal segment 3 and proximal half of 4-6 yellow, rest brown. Postoculars long. Mesopraesternum incomplete, restricted to two lateral plates. Pelta hat shaped *latus* Muraleedharan & Sen
- Forewings clear to faint yellow 3
3. Forewings clear to very faint yellow with 12 double fringes. Head 1.3-1.4 times as long as broad. Maxillary stylets very short and wide apart. Antennal segment 2 at distal third and

3-6 golden yellow, rest brown. Pelta roughly triangular

.....*perlucidus* Muraleedharan & Sen

— Forewings faint yellow with 12-18 double fringes. Head comparatively short. Maxillary stylets short, retracted below half the length of head. Antennal segment 3 and proximal half of 4-6 yellow, rest brown. Pelta roughly triangular with apex flat

.....*ambasensis* Muraleedharan and Sen

20. *Mesothrips acutus* Muraleedharan & Sen

(Text-fig. 7)

1981. *Mesothrips acutus* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 218-220.

1988. *Mesothrips acutus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 81-83.

Female (Male) : General body color brown; basal half and margin of tube blackish brown : antennal segments 1, 2, 7 & 8 brown, 3 yellow, 4-6 proximal half yellow, brown distally; all femora brown, foretibiae yellow with brownish shade, mid-and hindtibiae brown except extreme apex yellow, all tarsi yellow; forewings clear. All setae hyaline and blunt.

Head very little longer than broad, 220-228(206) long, 180-190(176) wide across eyes, 206-214(190) across cheeks, 190-206(186) across base; cheeks finely crenulate with spines; surface strongly striate. Eyes 92-96(80) long; all ocelli 24-28(28) wide. Postoculars 80-88(72) long. Antennal segments 3-6 pedicellate, segments 1-8 length (width).

	I	II	III	IV
Female :	38-42 (38)	48-53 (30-32)	72-76 (38)	72-76 (38)
Male :	38 (38-40)	46 (30)	64 (34)	62 (34)
	V	VI	VII	VIII
Female :	58 (28)	54-56 (24)	42 (20)	32 (16)
Male :	54 (28)	46 (24)	38 (20)	32 (12)

Sensecone long, 50(38-40) long. Mouthcone long, broadly pointed, 114-118 long, 164-172 wide at base, 60-68 at apex; maxillary stylets oculad, close at middle.

Prothorax, shorter than head, slightly sculptured, 164-172(176) long, 212-232(190) wide at anterior margin, 312-328(308) at posterior margin. Prothoracic chaetotaxy; anteroangulars 54-58(38), anteromarginals 32-34(28), midlaterals 60(52), posteroangulars 92-94(78) and eipmerals 76-80(64) long respectively; epimeral suture complete with 2 minute accessory setae. Forefemora 216-224(242) long, 96-98(100) wide; foratarsal tooth 16-20(20) long. Pterothorax 338-344(300) long, 384-388(404) wide across meso- and 406-410(380) across metathorax. Forewings 833-850(760) long; 72-108(58-76) wide with 7-10(9) double fringes; basal wing setae B_1-B_3 ; 68-70(52), 76-80(56) and 118-134(96) long respectively. Mesopraesternum incomplete, restricted to two lateral sclerites.

Abdomen 376-400(360) wide at base, 356-362(332) at middle. 244-248(190) across segments VIII and 156-160(130) across segment IX. Pelta pyramyd shaped. B_1-B_3 of segment IX; 176-180(152); 152-156(90) and 168-176(144) long respectively. Tube 176-180(160) long and anal setae 152-168(156) long.

Total body length : 2.21-2.25 (2.04) mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 188/H₁₇) Allotype M (Z. S. I. Reg. No. 189/H₁₇) Paratypes 2 FF (Z. S. I. Reg. Nos. 190-191/H₁₇) Ballamukha, Belonia, 28. ix. 1977. Paratypes 3 FF (Z. S. I. Reg. Nos. 192-194/H₁₇) Suganmara, Belonia, ex. leaf gall, 28. ix. 1977. Paratype 1 M (Z. S. I. Reg. No. 195/H₁₇) Kalirbazar, ex. leaf gall, 1. x. 1977 (Coll. Dr. N. Muraleedharan).

Disribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

21. *Mesothrips ambasensis* Muraleedharan & Sen

(Text-fig. 8.)

1981. *Mesothrips ambasensis* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 220-222.
1988. *Mesothrips ambasensis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 83-85.

Female : (Male) : General body colour blackish brown; antennal segments 1, 2 dark brown, 3 yellow, 4-6 yellow in proximal half and brown distally, 7-8 brown; all femora, mid- and hindtibiae dark brown except extreme tip lighter, foretibiae brown with yellowish shade, all tarsi light brown; forewings faint yellow. All setae brown and blunt.

Head longer than broad, 276-292(272) long, 228-236(212) wide across eyes, 236-244(220) across cheeks and 188-200(172) across base; cheeks with 6-8 moderately stout setae; surface strongly striate. Eyes large, 100-120(100) long, 68-80(68-72) wide; all ocelli 32-36 wide, median ocellus overhanging between base of antennae. Postoculars short, about half the length of eyes, 40-48(56-60) long. Antennal segments 3-6 pedicellate; segments 1-8 length (width).

	I	II	III	IV
Female :	48 (44-52)	60-68 (40-44)	84-92 (48-52)	100-104 (48-52)
Male :	40 (40-44)	60 (36)	84-88 (44)	92 (44-48)
	V	VI	VII	VIII
Female :	80-84 (36-40)	68-72 (28-32)	56-60 (24-28)	36 (16)
Male :	76 (36)	60 (28)	48 (24)	36 (12)

Sensecones long, 48-56(44-48) long. Mouthcone broadly pointed, 112(124) long, 200-220(160) wide at base, 104(84) at apex; maxillary stylets short, retracted below half the length of head capsule and wide apart.

Prothorax 280-300(208) long, 260-280(228) wide at anterior margin and 400-440(352) at

posterior margin. Prothoracic chaetotaxy : anteroangulars 40, anteromarginals 32-38(36), midlaterals 60-76(52), posteroangulars 120, and epimerals 80-92(68-76) long respectively. Forefemora 280-320(236) long, 140-176(112) wide, foretarsal tooth 32-44(16) long. Pterothorax 460-540(400) long, 508-560(428) wide across meso- and 516-600(436) across metathorax. Forewings 1.15-1.27 mm. (1.02 mm) long, 60-140 wide with 12-18(12) double fringes; basal wing setae B₁-B₃; 72-100(80); 112-120(96) and 164-180(108) long respectively.

Mesopraesternum incomplete, restricted as two lateral sclerites.

Abdomen 520-544(432) wide at base, 484-510(360) at middle, 320(248) across segment VIII and 236-240(180) across segment IX. Pelta roughly triangular with apex flat, B₁-B₃ of segment IX; 288-300(220); 260(112) and 280-320(280) long respectively. Tube 276-300(228) long.

Total body length : 3.14-3.43(2.25) mm.

Specimen studied : *Holotype* F (Z. S. I. Reg. No. 196/H₁₇) *Allotype* M (Z. S. I. Reg. No. 197/H₁₇) *Paratypes* 2 FF (Z. S. I. Reg. Nos. 198-199/H₁₇) Ambasa, ex. leaf galls, 27. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

22. *Mesothrips jordani* Zimmerman

1900. *Mesothrips jordani* Zimmerman, *Bull. Inst. bot. Buitenz.*, **7** : 16.
1965. *Mesothrips jordani* : Ananthakrishnan & Ramamurthi, *J. Bombay nat. Hist. Soc.*, **62** :
1969. *Mesothrips jordani* : Ananthakrishnan & Jagadish, *Marcellia*, **36**(1-2) : 60-61.
1981. *Mesothrips jordani* : Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 222.
1988. *Mesothrips jordani* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 86.

Specimen studied : 3 FF (Z. S. I. Reg. Nos. 200-202/H₁₇) Sarashima, Belonia, 29. ix. 1977. 4 FF, 2 MM (Z. S. I. Reg. Nos. 203-208/H₁₇)

Hrishyamukh *ex. leaf galls of Ficus*, 30. ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : Karnataka, Tamil Nadu, West Bengal, Tripura.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

23. *Mesothrips latus* Muraleedharan & Sen (Text-fig. 9)

1981. *Mesothrips latus* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 222-224.

1988. *Mesothrips latus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 86-88.

Female (Male) : General body colour dark brown, males little darker; antennal segments 1, 2, 7 & 8 brown, 3 yellow, 4-6 yellow in proximal half, distal half brown and segments successively darker; all femora, mid-and hind tibiae brown except at extreme tip yellow, foretibiae yellow with brownish shade, all tarsi yellow; forewings clear. All setae hyaline to brown and blunt.

Head 240-260(252-260) long, 224-232(200-216) wide across eyes, 240-260(216-224) across cheeks and 232-244(184-200) across base; cheeks finely crenulate with 3-4 moderately stout setae; surface strongly striate. Eyes 88-100(92-96) long, 68-76(64-68) wide; all ocelli very close, 36 wide. Postoculars long, 84-96(68-76) long. Antennal segments 1-8 length (width).

	I	II	III	IV
<i>Female</i> :	40 (48)	56-60 (40)	84-88 (44-48)	80-84 (48)
<i>Male</i> :	40 (40-44)	56-60 (32-36)	76-80 (40)	76 (40-44)
	V	VI	VII	VIII
<i>Female</i> :	72-76 (40)	60 (32)	56-60 (28)	40 (12)
<i>Male</i> :	72 (32)	52-56 (40-44)	48-52 (24-28)	36 (16)

Senseconae 36-40(32-36) long. Mouthcone short and broad, 132-140(112-120) long, 224-

232(172-188) wide at base and 120-124(100-112) at apex; maxillary stylets very short, retracted just above the mouthcone and wide apart.

Prothorax 220-240(200-216) long, 260-268(200-240) wide at anterior margin and 380-388(360-372) at posterior margin. Prothoracic chaetotaxy; anteroangulars 40-44(32-36), anteromarginals 32-36(24-32), midlaterals 56-60(56) posteroangulars 94-106(80) and eipmerals 80-92(68-76) long respectively. Forefemora 296-308 (232-240) long, 160(80-156) wide; foratarsal tooth (12-24) long. Pterothorax 412-520(400-420) long, 460-512(420-440) wide at meso- and 488-504(420-452) across metathorax. Forewings 1.02-1.05 mm. (935-969) long, 60-120(48-100) wide with 10-13(11) double fringes; basal wing setae B₁-B₃; 72-76(48-72); 80-84(64) and 120-124(80) long respectively. Mesopraesternum incomplete, restricted to two lateral sclerites.

Abdomen 464-480(420-440) wide at base, 428-456(360) at middle, 288-300(240) across segment VIII and 200-204(160-168) across segment IX. Pelta hat shaped, B₁-B₃ of segment IX; 272-276(200-220); 212-240(40-56) and 280-288(200-208) long respectively. Tube 248-260(212-220) long and anal setae 180-200(200-216) long.

Total body length : 2.39-2.48(2.21-2.34) mm.

Specimen studied : *Holotype* F (Z. S. I. Reg. No. 209/H₁₇) *Allotype* M (Z. S. I. Reg. No. 210/H₁₇) *Paratypes* 9 FF, 1 M, (Z. S. I. Reg. Nos. 211-220/H₁₇) Suganmara, Belonia, 28. ix. 1977. *Paratypes* 5 FF, 1 M, (Z. S. I. Reg. Nos. 221-226/H₁₇) Arya Colony, Belonia, *ex. leaf galls*, 3. x. 1977 *Paratypes* 5 FF, 1 M, (Z. S. I. Reg. Nos. 227-232/H₁₇) Hrishyamukh, *ex. leaf galls* 30. ix. 1977 (Coll Dr. N. Muraleedharan.)

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

24. *Mesothrips perlucidus* Muraleedharan & Sen (Text fig. 10)

1981. *Mesothrips perlucidus* Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 225-227.

1988. *Mesothrips perlucidus* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 88-90.

Female (Male) : General body colour brown, terminal abdominal segments and tube darker; antennal segments 1, 7 & 8 brown, 2 brown at proximal third golden yellow beyond, 3-6 golden yellow; all femora, mid-and hindtibiae brown, foretibiae brown at base and margin rest golden yellow, all tarsi golden yellow; forewings clear to very faint yellow. All setae brown and blunt.

Head 1.3-1.4 times as long as broad, 340-344(288-304) long, 232-256(208-220) wide across eyes, 228-264(200-204) across cheeks, 180-216(168) across base; cheeks strongly constricted at base with 5-7 stout setae; surface strongly reticulate. Eyes large 120-124(100-104) long, 80-84(80) wide; all ocelli large and very closely set, 32-36 wide. Postoculars 68-76(80-88) long. Antennal segments 3-6 pedicellate, segments 1-8 length (width).

	I	II	III	IV
Female :	40-44 (44-48)	56-60 (36-40)	100-104 (48-52)	112 (48-52)
Male :	40-44 (44-48)	60-64 (36)	96-100 (40-44)	100-108 (40-48)
	V	VI	VII	VIII
Female :	88-96 (40)	68-76 (32-36)	56-60 (24-28)	36-40 (16)
Male :	84-96 (36-40)	60-68 (28-32)	56-60 (24)	32 (16)

Sensecones elongate 40-44 long. Mouthcone broadly pointed, 140(100-108) long, 160-220(148-164) wide at base, 92(80-100) at apex.

Prothorax 248-300(212-240) long, 200-252(160-200) wide at anterior margin and 368-444(320-344) at posterior margin. Prothoracic chaetotaxy; anteroangulars 44-48(28), anteromarginals 36-44(44-48) midlaterals 80-92(68-80), posteroangular 124(104-120) and epimerals 120(80-96) long respectively. Forefemora 380-440(260-292) long, 180-208(132-140) wide; foretarsal tooth 36(24-32) long. Pterothorax 500-508(380-460) long, 520-540(380-

452) wide across meso-and 512-520(372-460) across metathorax. Forewings 1.22-1.27 mm. (1.02-1.05 mm.) long, 80-120 wide with 12(10-12) double fringes; basal wing setae B₁-B₃; 100-120(76-88); 132-140(96-104) and 168-200(140) long respectively. Mesopraesternum incomplete, restricted to two lateral sclerites.

Abdomen 388-440(320-388) wide at base, 260-328(200-328) at middle, 260-264(196-220) across segment VIII and 180-184(140-160) across segment IX. Pelta roughly triangular, B₁-B₃ of segment IX; 300-320(248-260); 240(108-128) and 340(272-280) long respectively. Tube 304-320(240-284) long; anal setae 280(260-280) long.

Total body length : 2.9-3.2(2.3-2.5) mm.

Specimen studied : *Holotype* F (Z. S. I. Reg. No. 233/H₁₇) *Allotype* M (Z. S. I. Reg. No. 234/H₁₇) *Paratypes* 2 FF, 1 M, (Z. S. I. Reg. Nos. 235-237/H₁₇) Sarashima, *ex. Ficus* leaf galls, 29. ix. 1977, *coll.* Dr. N. Muraleedharan:

Distribution : Tripura.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

Gunes 14. *Podothrips* Hood

1913. *Podothrips* Hood, *Insec. Inscit. menstr.*, **1** : 67-70.
1974. *Podothrips* : Ritchie, *J. Ent. (B)*, **43**(2) : 261-282.

25. *Podothrips lucasseni* (Kruger)

1890. *Phloethrips lucasseni* Kruger, *Ber. Vers. Stn. Zuck. Rohr. W. Java*, **1** : 105.
1938. *Podothrips (Kentronothrips) lucasseni* : Priesner *Bull. Soc. ent. Egypt.*, **21** : 68.
1938. *Podothrips oryzae* Priesner, *Bull. Soc. ent. Egypte*, **21** : 72-75.
1954. *Podothrips oryzae* : Ananthakrishnan, *J. zool. Soc. India*, **6**(2) : 104.
1974. *Podothrips lucasseni* : Ritchie, *J. Ent. (B)*, **43**(2) : 273-274.
1988. *Podothrips lucasseni* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 97.

Diagnosis : General body colour brown. Head longer than broad. Antennal segment 3 with only one (0 + 1) sensecone. Forefemora with a basal

hump. Forewing without double fringes. Setae on abdominal segment IX, B₁ pointed.

Specimen studied : 1 F (Z. S. I. Reg. No. 302/H₁₂) Garjee, Udaipur, 7. ix. 1974, coll. Dr. M. S. Shishodia.

Distribution : India : Tamil Nadu; Andhra Pradesh; West Bengal; Tripura.

Elsewhere : Bangladesh, Java, Malay, Thailand.

Remarks : Sen et al (1988) recorded this species from Tripura.

Genus 15. *Stephanothrips* Trybom

1912. *Stephanothrips* Trybom, Arkiv. f. zool., 7(33) : 42

26. *Stephanothrips occidentalis* Hood & Williams

1925. *Stephanothrips occidentalis* Hood & Williams, Psyche, 32 : 69.

1967. *Stephanothrips occidentalis* : Ananthakrishnan, Ann. Soc. ent. Fr. (N. S.), 3 (1) : 237.

1973. *Stephanothrips occidentalis* : Ananthakrishnan, Occl. Publ., 2, Ent. Res. Unit, Loyola College, Madras : 75.

1981. *Stephanothrips occidentalis* : Muraleedharan & Sen, Rec. zool. Surv. India, 79 : 227.

Diagnosis : Head and prothorax dark brown; antennal segment 4 & 5 dark brown; forefemora except tip dark brown; foretibiae, mid-and hind femora dark brown at middle. Head 1.13 times as long as wide. Antennal segments 3 & 5 short.

Specimen studied : 11 FF (Z. S. I. Reg. Nos. 238-39/H₁₇; 955-63/H₁₇) Teliamura, 21. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : Tripura; Tamil Nadu; Andhra Pradesh; Kalimpong (West Bengal); Manipur.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

Genus 16. *Stigmothrips* Ananthakrishnan

1964. *Stigmothrips*, Ent. Ts. Arg., 83 (3-4) : 231.

Key to species of *Stigmothrips* from Tripura

1. Basal wing setae B₁ & B₂ of forewings equal, dilated at tip and with only 4-5 double fringes. Head shorter very little longer than broad. Maxillary stylets occluded, more or less close at middle. Mesopraesternum parallel sided expanded laterally. Body setae hyaline, knobbed to dilated at tip
.....*okajimai* Muraleedharan & Sen
- Basal wing setae B₁ & B₂ of forewings not equal and with 7 double fringes. Head moderately long. Body setae grey. All prothoracic setae well developed
.....*consimilis* Ananthakrishnan

27. *Stigmothrips consimilis* Ananthakrishnan

1969. *Stigmothrips consimilis* Ananthakrishnan, Indian Forester, 95 (3) : 178.

1971. *Stigmothrips consimilis* : Ananthakrishnan, J. zool. Soc. India, 23 (2) : 176.

1973. *Stigmothrips consimilis* : Ananthakrishnan, Occl. Publ., 2, Ent. Res. Unit, Loyola College, Madras : 63.

1981. *Stigmothrips consimilis* : Muraleedharan & Sen, Rec. zool. Surv. India, 79 : 227.

Specimen studied : 1 F (Z.S.I. Reg. No. 240/H₁₇) Chandrapur, 7. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : Kerala; Karnataka; Tripura.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

28. *Stigmothrips okazimai* Muraleedharan & Sen (Text-fig. II)

1981. *Stigmothrips okazimai* Muraleedharan & Sen, Rec. zool. Surv. India, 79 : 227-229.

1982. *Stigmothrips okazimai* : Muraleedharan, Rec. zool. Surv. India, 79 : 381.

1988. *Stigmothrips okazimai* Sen et al, Rec. zool. Surv. India, Occl. Pap., 100 : 99-101.

Female (Macropterous) : General body colour light brown with plenty of red pigmentation; head, thorax and tube darker; antennal segments

1, 2, 7 & 8 brown, 4 & 5 bicoloured pale in proximal third and rest brown, 6 pale yellow with faint brown shade in distal third ; all femora golden yellow with brownish shade, fore- and hind tibiae yellow, midtibiae yellow with shaded brown, all tarsi whitish yellow ; forewings faint grey with a median streak in basal half. All setae hyaline, knobbed to dilated at tip.

Head very little longer than broad, 168-176 long, 140-148 wide across eyes, 156-170 across cheeks, 152-160 across base, cheeks finely crenulate with 2-3 spines; surface reticulate ; vertex sub-conial. Eyes 76-78 long, 48-50 wide, all ocelli 24-28 wide, very close to each other. Postoculars 36-38 long, dilated at tip. Antennal segments 3-6 subpedicellate, segments 1-8 length (width) : I : 24-28 (32) ; II : 42 (24-28) ; III : 56-58 (26-28) ; IV : 52-56 (24) ; V : 52-58 (20) ; VI : 46-50 (20) ; VII : 40-42 (16) ; VIII : 28 (12) ; sense cones 24-28 long. Mouthcone very short and broad, 54-60 long, 114-118 wide at base, 64-68 at apex ; maxillary stylets occluded, somewhat close and parallel sided.

Prothorax weakly sculptured, about half as long as head, 95-120 long, 172-176 wide at anterior margin, 202-206 at posterior margin. Anteroangulars 38, anteromarginals 24-32, midlaterals 36-38, posteroangulars 38 and epimerals 46 long respectively; epimeral suture incomplete. Pterothorax 228-248 long, 240-256 wide across meso- and 250-260 across metathorax. Forewings narrow 600-610 long, 32-54 wide with 4-5 double fringes ; basal wing setae B_1 - B_2 equal and dilated at tip, B_3 blunt—38; 38 & 62 long respectively Mesopraesternum parallel sided, expanded laterally.

Abdomen 240-244 wide at base, 222-228 at middle, 164-172 across segment VIII, 114-116 across segment IX, Pelta bell shaped, B_1 - B_3 of segment IX short : 54 ; 46 and 64-76 long respectively. Tube 100-104 long, anal setae 76-80 long.

Total body length : 1.56-1.65 mm.

Specimen studied : Holotype F (Z. S. I. Reg. No. 241/H₁₇) Paratypes 5 FF (Z.S.I. Reg. Nos.

242-246/H₁₇) Kalirbazar, ex. dry leaves, 1. x. 1977. Paratype 1 F (Z.S.I. Reg. No. 247/H₁₇) Chandrapur, ex. dry twigs 7. x. 1977 (Coll. Dr. N. Muraleedharan) 2 FF, (Z.S.I. Reg. Nos. 964-965/H₁₇) Gobindadila, Amarapur, 21. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : Tripura ; Meghalaya ; Manipur.

Remarks : Muraleedharan & Sen (1981) described this species from Tripura.

Subfamily IDOLOTHRIPINAE

Genus 17. *Dinothrips* Bagnall

1908. *Dinothrips* Bagnall, *Trans. nat. Hist. Northumb.*, 3 : 190.
1983. *Dinothrips* : Mound & Palmer, *Bull. Brit. Mus. nat. Hist. (Ent.)*, 46 (1) : 64.

29. *Dinothrips sumatrensis* Bagnall

1908. *Dinothrips sumatrensis* Bagnall, *Trans. nat. Hist. Northumb.*, 3 : 191.
1926. *Dinothrips sumatrensis* : Karny, *Mem. Dept. Agri. India, Ent. Ser.*, 9 (6) : 239.
1964. *Dinothrips sumatrensis* : Ananthakrishnan, *Opusc. ent. Suppl.*, 25 : 88-90.
1981. *Dinothrips sumatrensis* : Muraleedharan & Sen, *Rec. zool. Surv. India*, 79 : 209.
1988. *Dinothrips sumatrensis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, 100 : 109-110.

Diagnosis : Body dark brown including legs ; antennal segments 1, 2, 4-8 brown, segment 3 yellow and brownish at extreme base and distally; wings weakly infumate with a median dark longitudinal band. All setae hyaline.

Head a little produced ; longer than broad. Cheek setae very long in oedymorous males. Eyes large, postoculars shorter than eyes. Forked process of mesothorax of oedymorous males long and absent in gynaecoid males. Forefemora stout, very much pronounced in oedymorous males ; foretarsal tooth of oedymorous very strong. Forewings with double fringes and basal wing setae B_1 much shorter than B_2 and B_3 . Tube longer than head.

Specimen studied : 1 F (Z.S.I. Reg. No. 136/H₁₇) Chandrapur, Paratia, 8.10.1977, coll. Dr. N. Muraleedharan.

Distribution : India : Tamil Nadu ; Karanataka, Kerala, Tripura, Assam, Arunachal Pradesh , Meghalaya.

Elsewhere : Sumatra, Sri Lanka, Bhutan, Malaya, Java, Borneo.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

Genus 18. *Elaphrothrips* Buffa

1909. *Elaphrothrips* Buffa, *Redia*, 5 : 162-163.

1973. *Elaphrothrips* : Ananthakrishnan, *Pacific Insects*, 15 : 273.

1978. *Elaphrothrips* : Palmer & Mound, *Bull. Brit. Mus. nat. Hist. (Ent.)*, 37 (5) : 171-174.

Key to species of Elaphrothrips from Tripura

1. Cephalic production pronounced about 0.9-1.2 times long as wide. Oedymorous males without sickle like setae at the apex of forefemora ; all tibiae basally more brownish and yellow beyond middle. Antennal segment 3 yellow with a tinge of brown at apex; 4 & 5 yellow at proximal half and brown beyond*denticollis* (Bagnall)
- Cephalic production much shorter, distinctly wider than long, almost 0.5 times as long as wide. Foretarsi armed in both sexes. Antennal segment 3 brown with the distal tip yellow; 4 & 5 proximal half yellow and brown distally; all tibiae uniformly brownish. Body setae brown*procer* Schmutz

30. *Elaphrothrips denticollis* (Bagnall)

1909. *Dicaiothrips denticollis* Bagnall, *Trans. nat. Hist. Soc. Northumb.*, 3 : 527.

1934. *Elaphrothrips beesoni* Ramakrishna, *Indian For. Rec.*, 20 (4) : 7.

1973. *Elaphrothrips beesoni* : Ananthakrishnan, *Pacific Insects*, 15 (2) : 278-280.

1935. *Elaphrothrips productus* Priesner, *Konowia*, 14 : 170.

1978. *Elaphrothrips denticollis* : Palmer & Mound, *Bull. Br. Mus. nat. Hist. (Ent.)*, 37 (5) : 179-180.

1981. *Elaphrothrips denticollis* : Muraleedharan & Sen, *Rec. zool. Surv. India*, 79 : 209.

1988. *Elaphrothrips denticollis* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, 100 : 173.

Specimen studied : 4 FF (Z.S.I. Reg. Nos. 186-188/H₁₂ & 295-296/H₁₂) Kumarghat, 28.xii. 1972, coll. Dr. V. C. Agarwal. 4 FF (Z.S.I. Reg. Nos. 154-157/H₁₇) Sukanmara, Belonia, 28.ix. 1977, coll. Dr. N. Muraleedharan. 3 FF (Z.S.I. Reg. Nos. 158-160/H₁₇) Ballamukha, Belonia, 28. ix. 1977, coll. Dr. N. Muraleedharan. 2 FF (Z.S.I. Reg. Nos. 161-162/H₁₇) Maichera, Belonia, 27.ix. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : Kerala; Tamil Nadu; Karnataka; Tripura; Assam; Meghalaya; Sikkim.

Elsewhere : Sri Lanka; Burma; Malaya; Java; Nias; Suba; Borneo.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

31. *Elaphrothrips procer* (Schmutz)

1913. *Dicaiothrips procer* Schmutz, *Sitz. Akad. Wiss. Wien*, 122 : 1063.

1968. *Elaphrothrips procer* : Mound, *Bull. Brit. Mus. nat. Hist. (Ent.) Suppl.*, 11 : 98.

1973. *Elaphrothrips procer* : Ananthakrishnan, *Pacific Insects*, 15 (2) : 281.

1978. *Elaphrothrips procer* : Palmer & Mound, *Bull. Brit. Mus. nat. Hist. (Ent.)* 37 (5) : 183.

Specimen studied : 3 FF (Z.S.I. Reg. Nos. 4907-4909/H₁₇) Chorbari, 27. v. 1992, coll. Dr. B. Mitra.

Distribution : India : Kerala; Karnataka; Tamil Nadu; Maharashtra; Manipur; Sikkim; Meghalaya; West Bengal.

Elsewhere : Sri Lanka; Laos

Remarks : This species is recorded for the first time from Tripura.

Genus 19. *Holothrips* Karny

1911. *Holothrips* Karny, *Zool. Anz.*, 38 : 502.

1956. *Agnostothrips (Erythrinothrips)* Ananthakrishnan, *Indian J. Ent.*, 17 : 341.

1969. *Stinothrips* Ananthakrishnan, C.S.I.R., *Zool. Monogr.* **1** : 55 & 148.
1983. *Holothrips* : Mound & Palmer, *Bull. Brit. Mus. nat. Hist. (Ent.)*, **46** (1) : 92-93.
1987. *Holothrips* : Okajima, *Bull. Br. Mus. nat. Hist. (Ent.)*, **54** (1) : 1-74.

32. *Holothrips ananthakrishnani* Okajima

1937. *Polyphemothrips minor* Hood, *Rev. d. Ent. Rio de Janeiro*, **6** : 513-517.
1969. *Polyphemothrips minor* : Ananthakrishnan, *Oriental Ins.*, **3** (3) : 306-307.
1983. *Holothrips minor* : Mound & Palmer, *Bull. Brit. Mus. nat. Hist. (Ent.)*, **46** (1) : 94.
1987. *Holothrips ananthakrishnani* Okajima, *Bull. Brit. Mus. nat. Hist. (Ent.)*, **54** (1) : 13.
1988. *Holothrips minor* : Sen et al, *Rec. zool. Surv. India, Occl. Pap.* **100** : 116.

Diagnosis : General body colour dark brown; antennal segments 1, 6 & 7 brown; 2-4 yellow, 5 yellow at basal two fifth and brown beyond; wings faintly infumate; body setae hyaline. Head about 1.1 times as long as broad. Antennal segments 3 & 4 subequal and suture between segment 7 & 8 complete. Postocular setae moderately long expanded at tip. Mouthcone long and pointed. Pelta roughly bell shaped. Tube almost straight.

Specimen studied : 2 FF (Z.S.I. Reg. Nos. 966-967/H₁₇) Teliamura, 21. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : Tamil Nadu ; Kerala ; Tripura.

Elsewhere : PERU.

Remarks : Sen et al (1988) recorded this species from Tripura.

Genus 20. *Nesothrips* Kirkaldy

1907. *Nesothrips* Kirkaldy, *Proc. Hawaii Ent. Soc.*, **1** : 103.
1913. *Rhaebothrips* Karny, *H. Sauter's Formosa—Ausbeute Suppl. Ent.*, **2** : 128.
1983. *Nesothrips* : Mound & Palmer, *Bull. Br. Mus. nat. Hist. (Ent.)*, **46** (1) : 47.

33. *Nesothrips lativentris* (Karny)

1913. *Rhaebothrips lativentris* Karny, *H. Sauter's Formosa—Ausbeute. Suppl. ent.*, **2** : 129-130.
1971. *Rhaebothrips lativentris* : Sakimura, *Pacific Insects*, **13** (2) : 393-390.
1973. *Rhaebothrips lativentris* : Ananthakrishnan, *Occl. Publ.*, **2** : *Ent. Res. Unit, Loyola College, Madras* : 127-128.
1981. *Rhaebothrips lativentris* : Muraleedharan & Sen, *Rec. zool. Surv. India*, **79** : 227.
1983. *Nesothrips lativentris* : Mound & Palmer, *Bull. Br. Mus. nat. Hist. (Ent.)*, **46** (1) : 48.
1988. *Nesothrips lativentris* Sen et al, *Rec. zool. Surv. India, Occl. Pap.*, **100** : 118-119.

Diagnosis : General body colour dark brown; foretibiae light brown, extreme base and apices of all tibiae lighter brown, all tarsi yellowish brown; antennal segments 1, 6-8 dark greyish brown distally lighter, 3-5 yellowish brown, distal fourth of 4 weakly brown and distal half to two-third of 5 dark grey brown; wings pale brownish with a longitudinal brown streak; extreme tip of tube lighter brown. All setae brownish yellow and pointed.

Head about 1.5 times as long as broad, more slender in oedymorous males. Postoculars very long about 1.5 times longer than eyes.

Prothorax of females and gynaeoid males half as long as head and in oedymorous two-third as long as head. All prothoracic setae except anteromarginals well developed. Forefemora of oedymorous male strongly bent inwards; foretarsi of female without tooth and armed in males, tooth longer in oedymorous. Forewings with 13-21 double fringes. Pelta hat shaped.

Specimen studied : 4 FF, 3 MM (Z.S.I. Reg. Nos. 255-261/H₁₇) Paratia, Chandrapur, 7. x. 1977, coll. Dr. N. Muraleedharan.

Distribution : India : West Bengal; Arunachal Pradesh; Meghalaya; Tripura.

Elsewhere : Mauritius; Philippines; Japan; Guam; Queensland; Hawaii; Jamaica; Virgin Is.

Remarks : Muraleedharan & Sen (1981) recorded this species from Tripura.

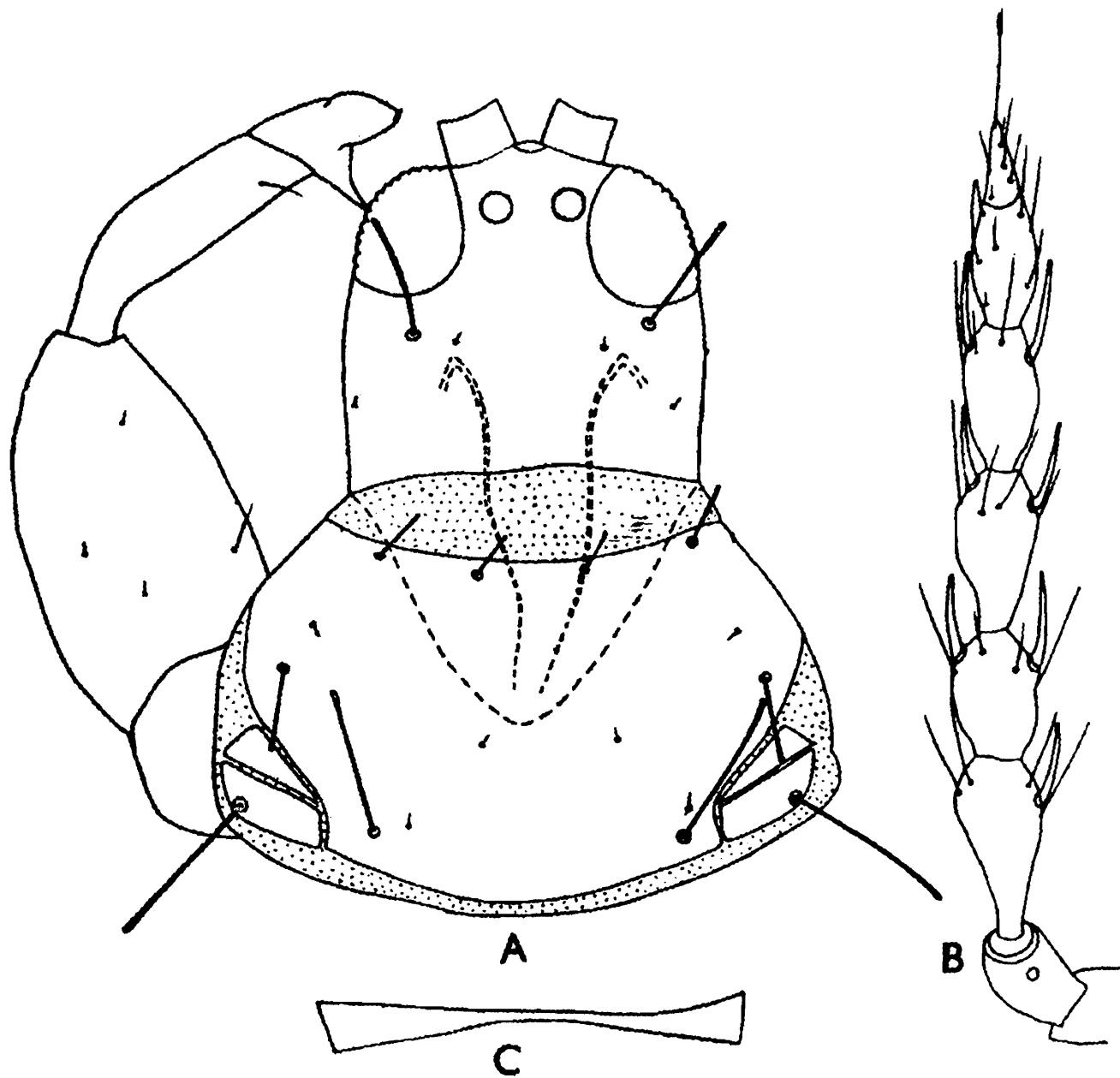


Fig. 1 : *Crotonothrips erraticus* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

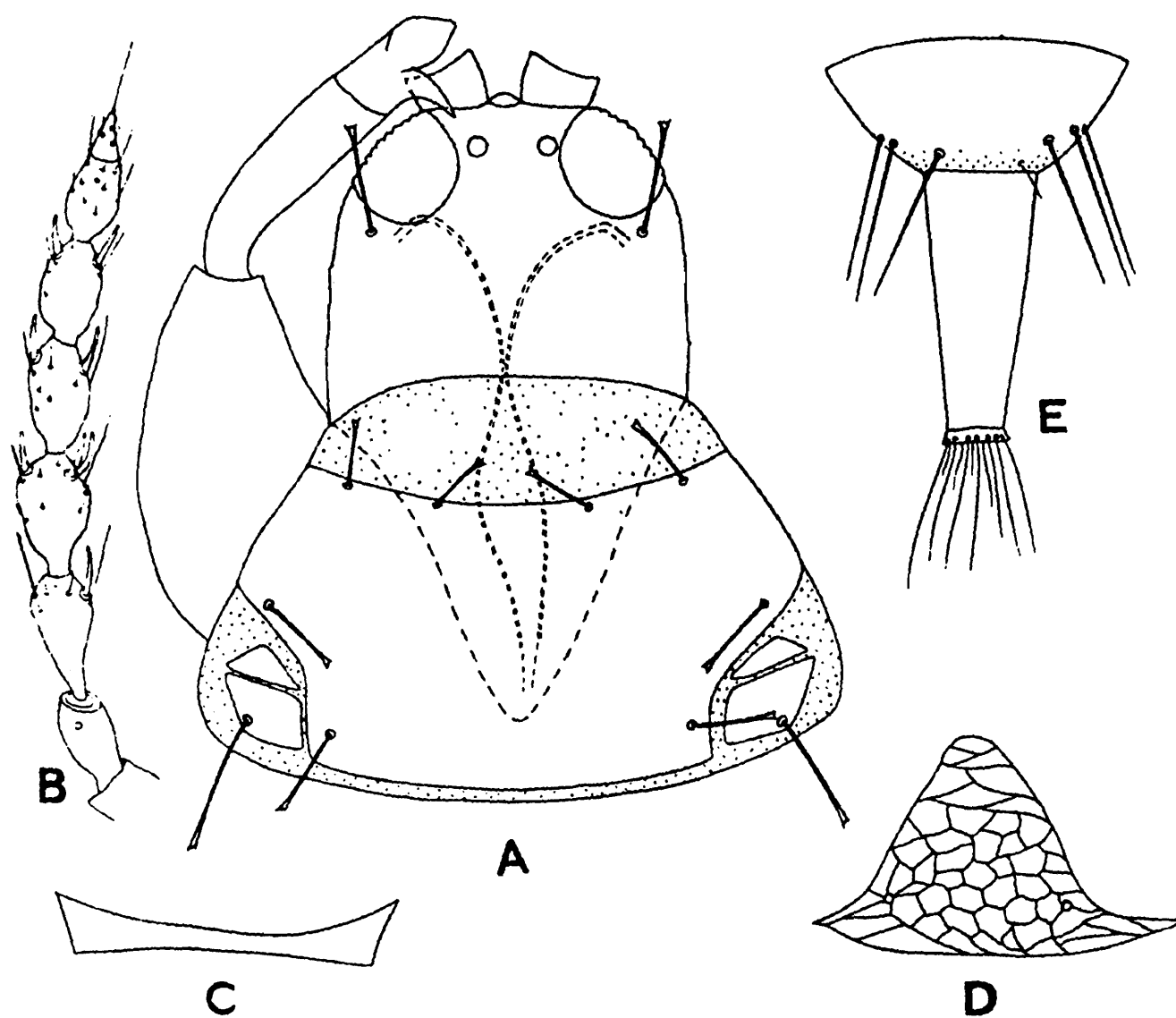


Fig. 2 : *Crotonothrips longirostris* Muraleedharan & Sen

A. Head and pronotum. B. Antenna. C. Mesopraesternum D. Pelta. E. Segment IX of abdomen and tube of females.

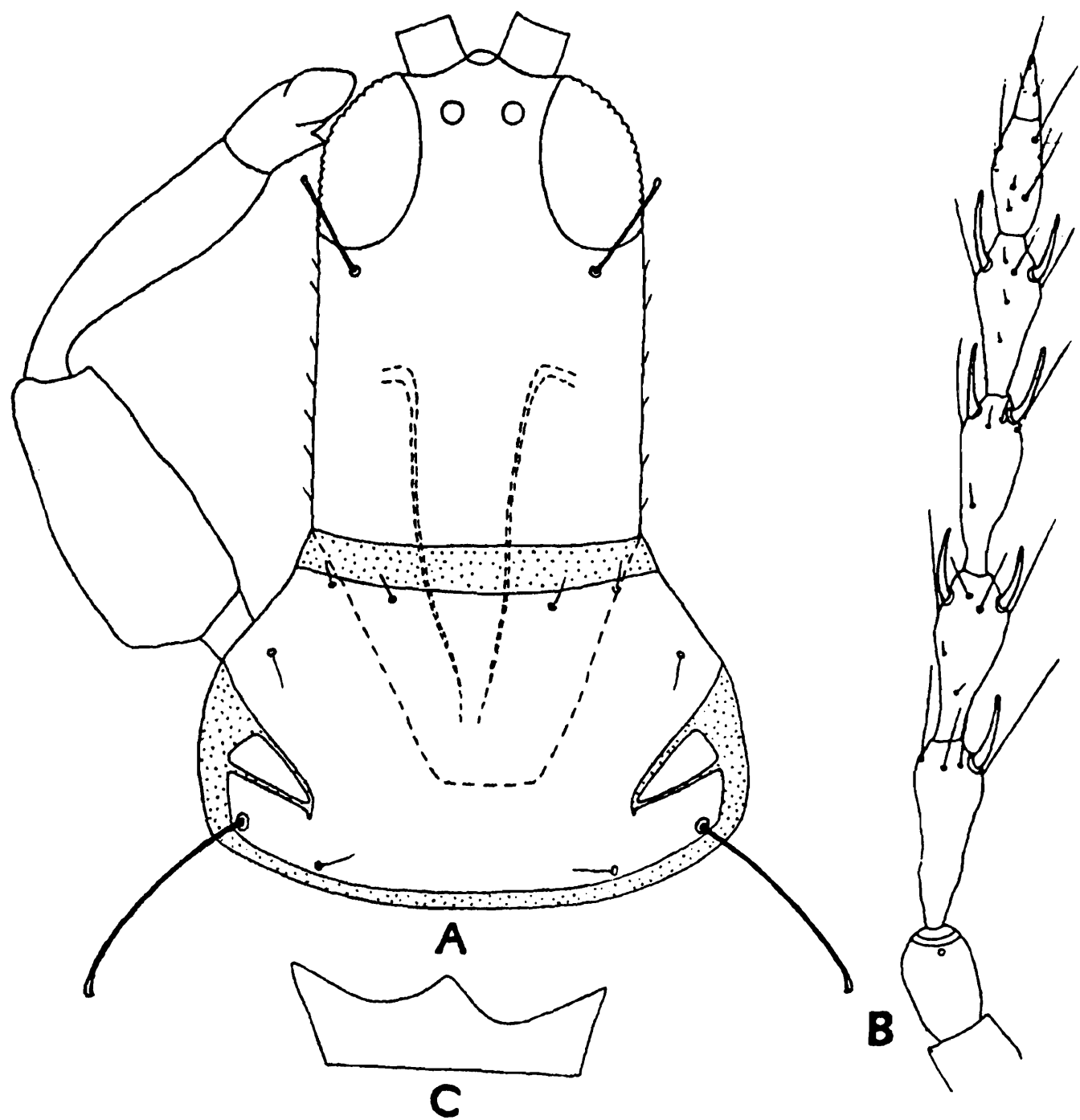


Fig. 3 : *Gynaikothrips affinis* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

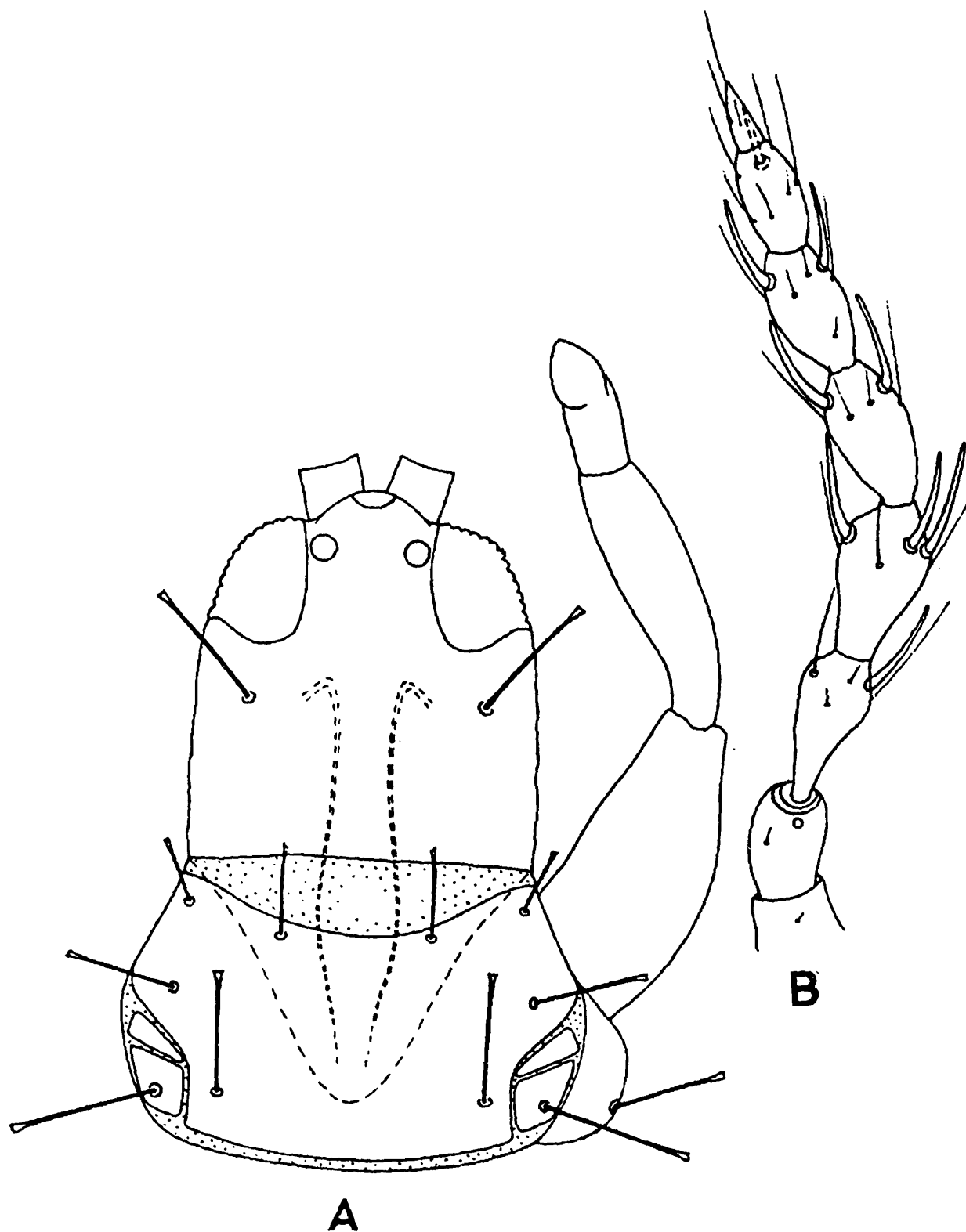


Fig. 4 : *Liothrips bournieri* Muraleedharan & Sen
A. Head and Pronotum. B. Antenna.

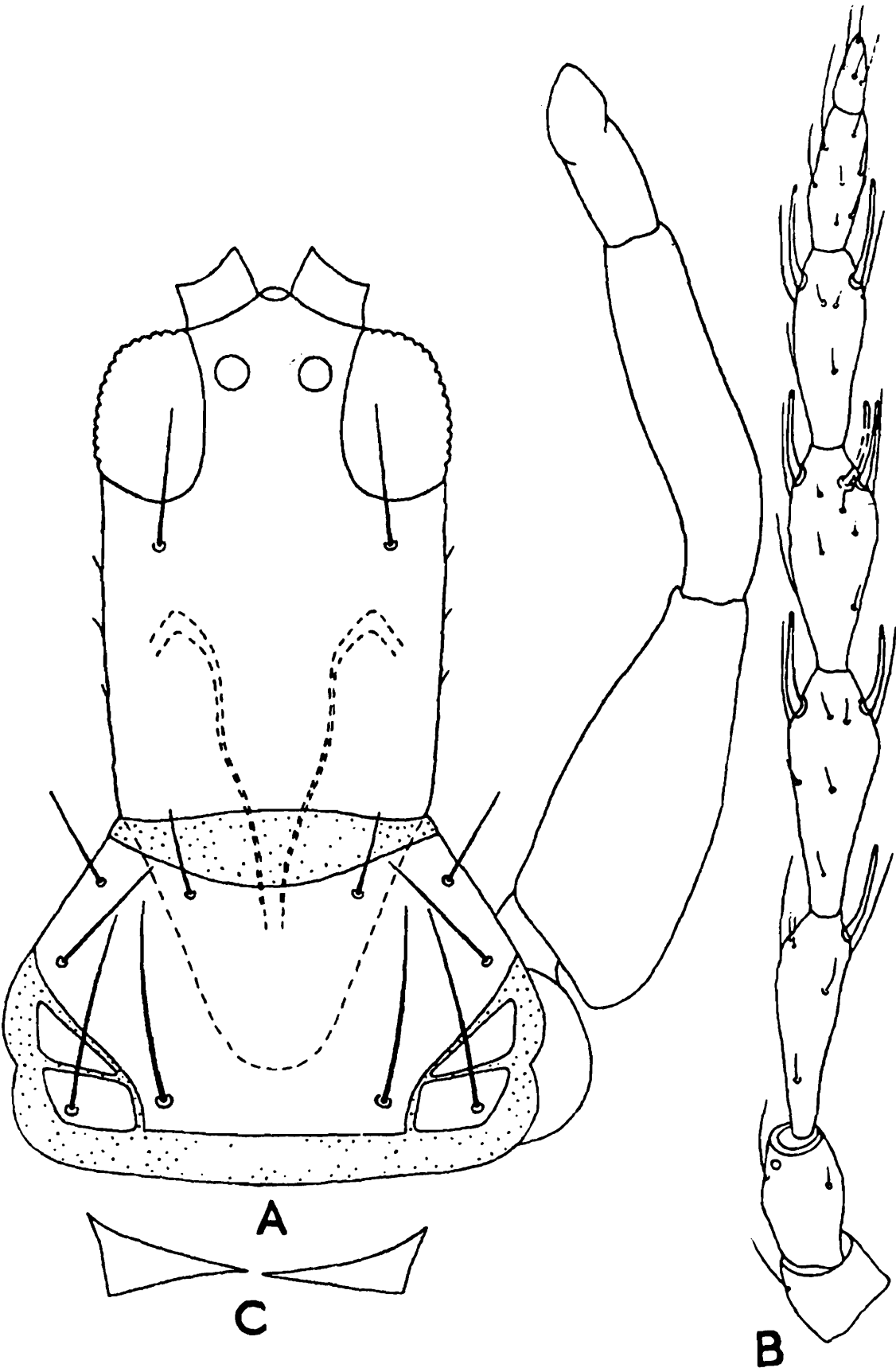


Fig. 5 : *Liothrips clarus* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

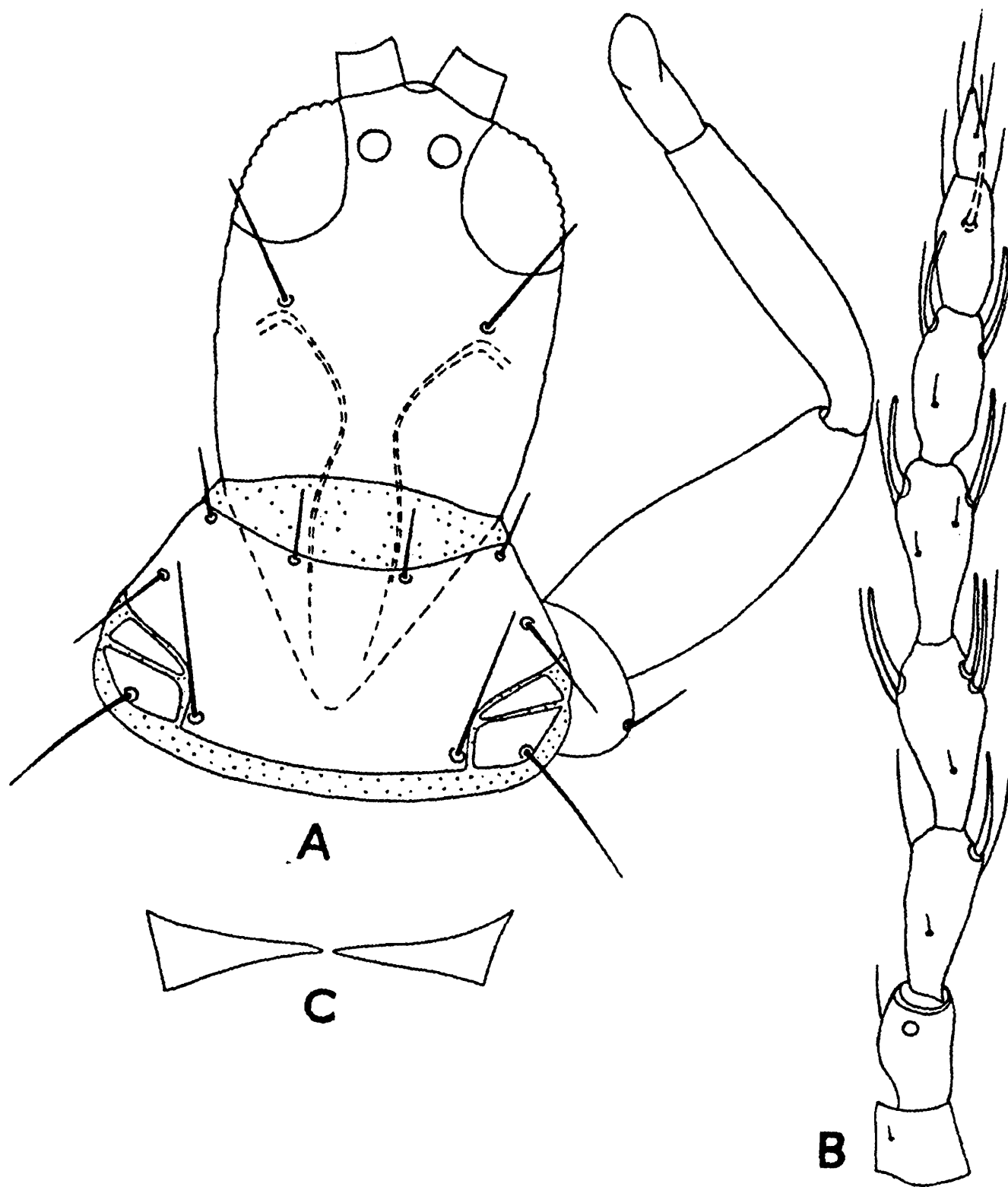


Fig. 6 : *Liothrips infrequens* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

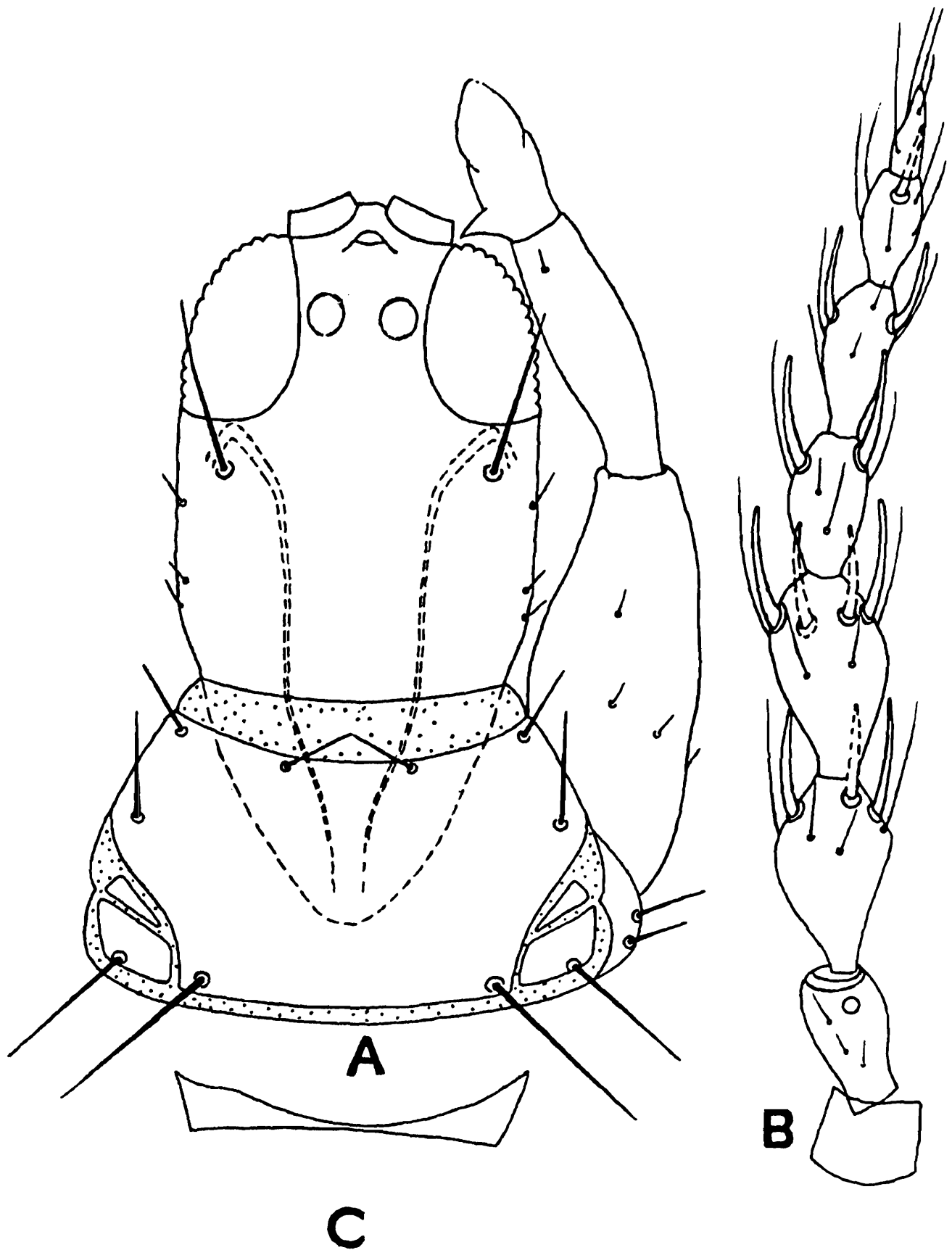


Fig. 7 : *Mesothrips acutus* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

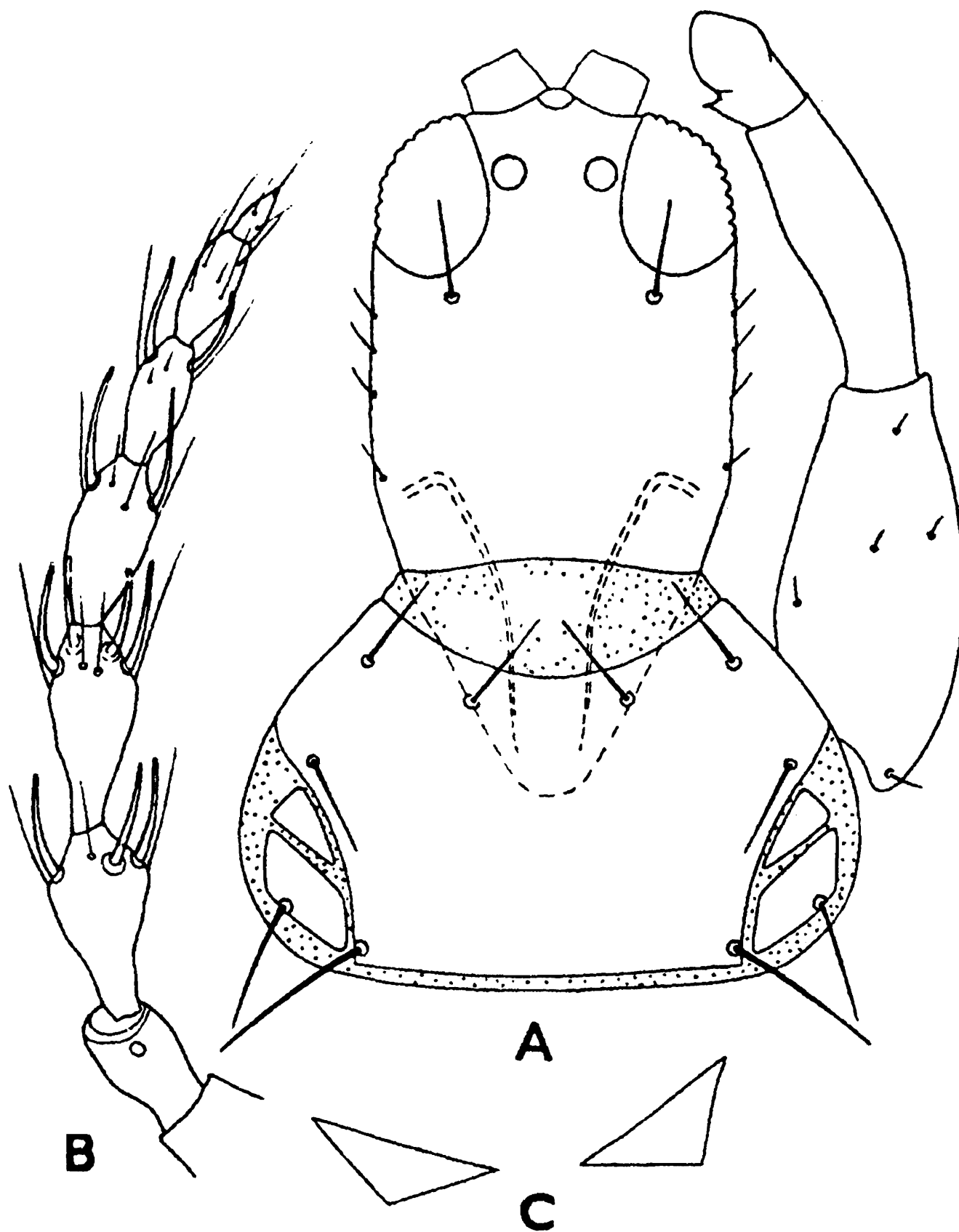


Fig. 8 : *Mesothrips ambasensis* Muraleedharan & Sen
A. Head and pronotum. B. Antenna. C. Mesopraesternum.

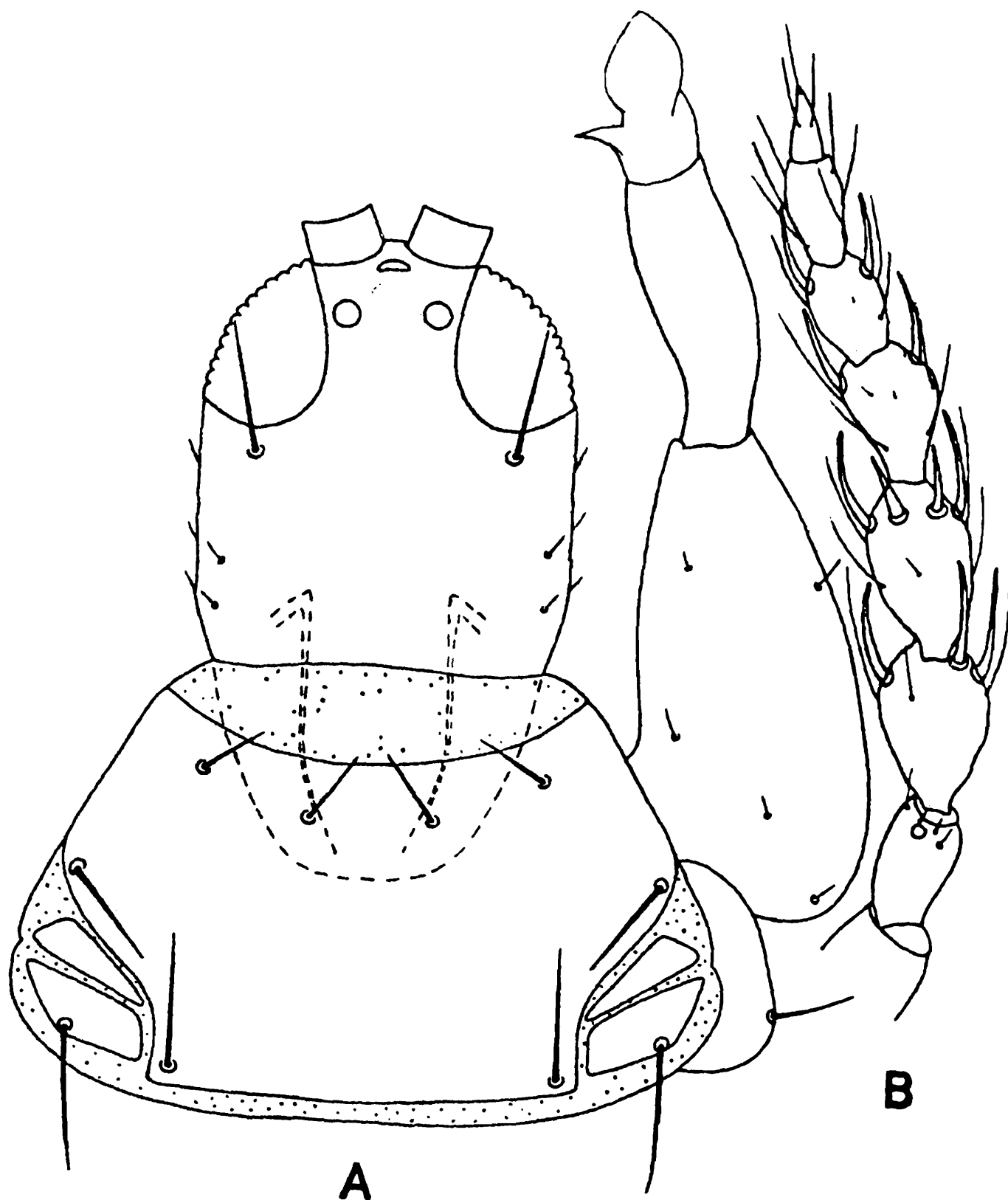


Fig. 9 : *Mesothrips latus* Muraleedharan & Sen
A. Head and pronotum. B. Antenna.

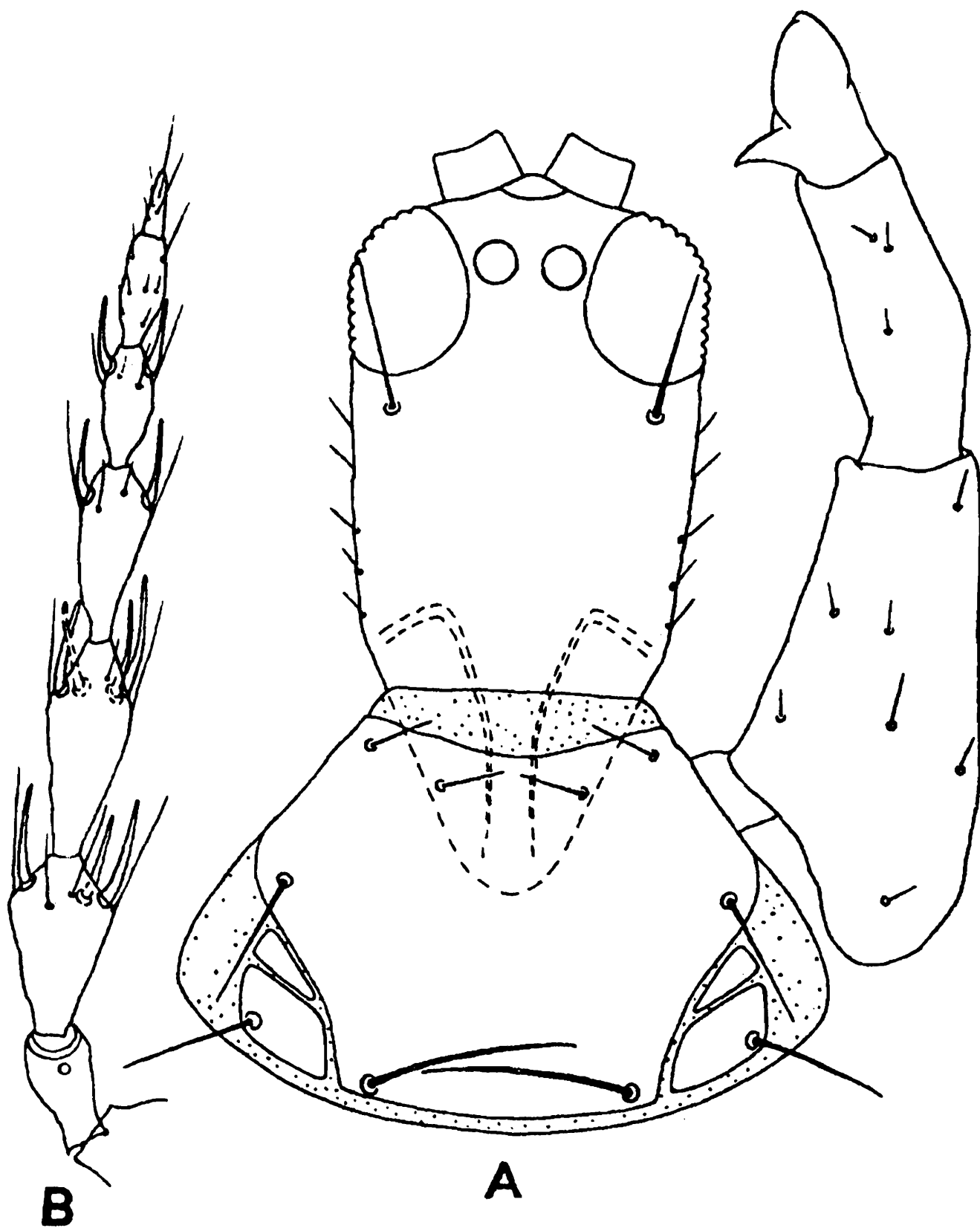


Fig. 10 : *Mesothrips perlucidus* Muraleedharan & Sen
A. Head and pronotum. B. Antenna.

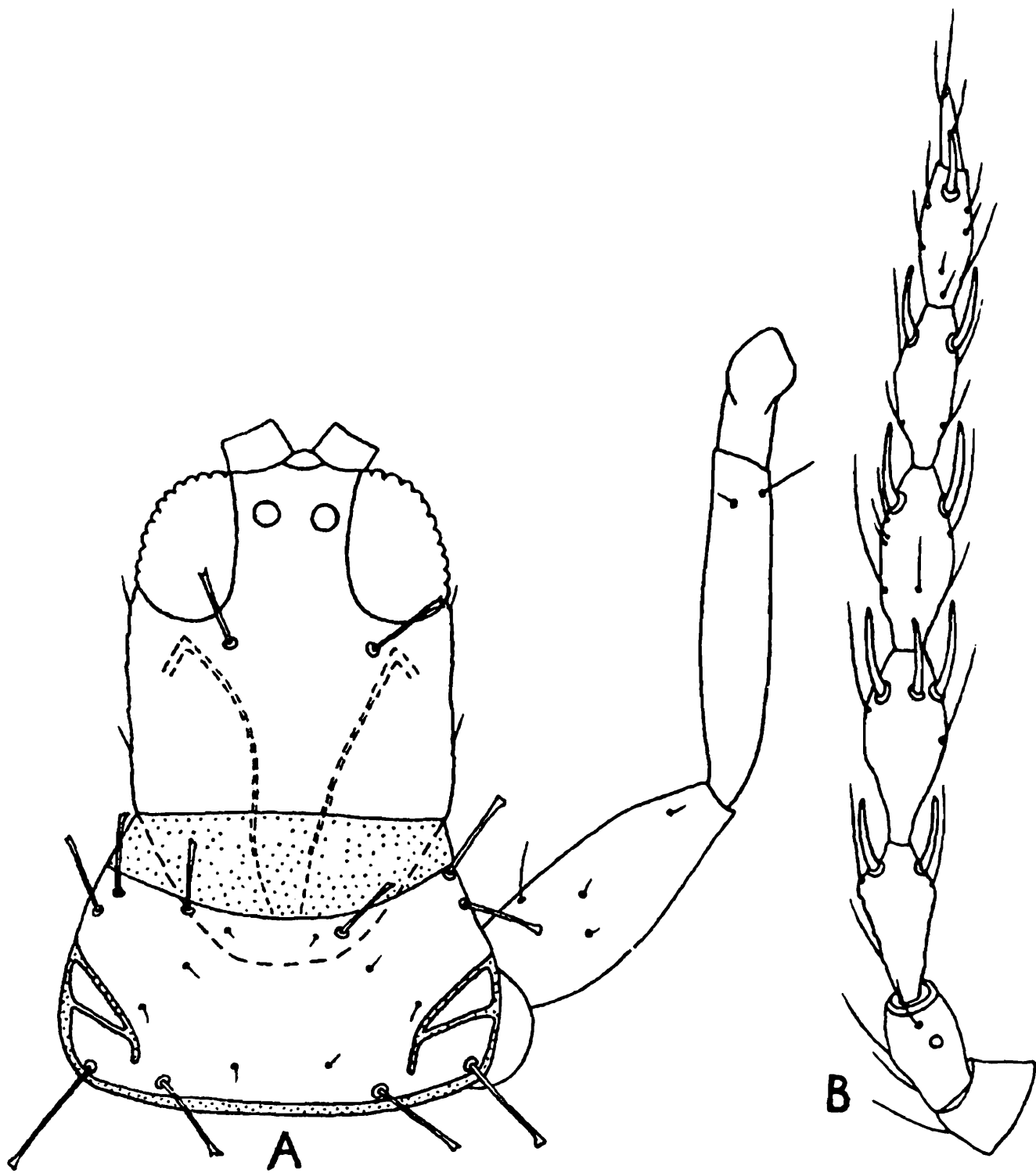


Fig. 11 : *Stigmothrips okajimai* Muraleedharan & Sen
A. Head and pronotum. B. Antenna.

SUMMARY

The monograph deals with the Thysanoptera fauna of Tripura. Altogether 33 species pertaining to 20 genera under 3 families have been recorded. Eleven species have been described new to science from the State. Key to the suborders, families, genera and species; description of species described from the area and short diagnostic

characters in case of single species represent a genus have been provided.

ACKNOWLEDGEMENTS

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INSECTA : COLEOPTERA : GYRINIDAE, DYTISCIDAE AND HYDROPHILIDAE

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INTRODUCTION

Aquatic coleoptera forms an important constituent of aquatic insect fauna both in larval and adult stages. Fourteen families of Coleoptera, 5 families under suborder Adephaga and 9 families under suborder Polyphaga are either wholly or partly aquatic. Of the five families of Adephaga only one genus of the family Dytiscidae i.e. *Geodessus* has been recently discovered to be terrestrial inhabit from Meghalaya (Brancucci 1979). All other families are completely aquatic inhabit. Of the families of Polyphaga larges number of species of aquatic habitat are found in the family Hydrophilidae though members of the subfamily Sphaeridiinae are not aquatic in habit, they are usually found in moist habitat, like in dung, under banana sheath, in decaying vegetable matter.

More than 8000 species of aquatic beetles are found in the world. Of these about 588 species are represented in India.

Since the publication of Zimmerman's Catalogue some scattered works were available until Vazirani took up the Indian fauna. From 1953 to 1980 a series of papers of this author were published and in this paper he brought together the information on Indian fauna including description of several new taxa of the family Dytiscidae. In 1984 Vazirani published his monographic work on the fauna of Gyrinidae in the Fauna of British Indian Series. However, the dominant aquatic family Hydrophilidae has been left out united Biswas, Mukherjee, Saha and Ghosh have taken up the group. Fauna of West Bengal

has already been published and Fauna of Meghalaya is in Press.

Of the Fauna of Tripura not a single species was recorded earlier of the 41 species recorded in the present paper all are new record from the state (d'Oochymont, 1928, Vazirani, 1977, 1984). Most significant of these is the definite record of the genus *Hydrocanthus* from the Belonia in the state of Tripura. The genus is a new addition to the list of Indian Dytiscidae.

List of taxa recorded from Tripura

Family I. GYRINIDAE

Subfamily (i) ORECTOCHILINAE

Genus 1. *Orectochilus* Eschscholtz, 1833

Species (1) *Orectochilus productus* Regimbart

Family II. DYTISCIDAE

Subfamily (ii) NOTERINAE

(a) Tribe HYDROCANTHINI

Genus 2. *Hydrocoptus* Motschulsky, 1859

Species (2) *Hydrocoptus bivittis* Motschulsky

(3) *Hydrocoptus subvittulus* Motschulsky

Genus 3. *Hydrocanthus* Say, 1825

Speceis (4) *Hydrocanthus indicus* Wehncke

Genus 4. *Canthydrus* Sharp, 1882

Species (5) *Canthydrus laetabilis* (Walker)

(6) *Canthydrus ritsemai* Regimbart

Subfamily (iii). LACCOPHILINAE

Genus 5. *Laccophilus* Leach 1817Species (7) *Laccophilus anticatus* Sharp(8) *Laccophilus chinensis inefficiens* Walker(9) *Laccophilus flexuosus* Aube(10) *Laccophilus parvulus* Aube(11) *Laccophilus sharpi* RegimbartGenus 6. *Neptosternus* Sharp 1882Species (12) *Neptosternus circumductus*
Regimbart(13) *Neptosternus taprobanicus* Sharp

Subfamily (iv) HYDROPORINAE

(b) Tribe HYDROVATINI

Genus 7. *Hydrovatus* Motschulsky, 1855Species (14) *Hydrovatus castaneus* Motschulsky(15) *Hydrovatus confertus* Sharp(16) *Hydrovatus pinguis* Regimbart

(c) Tribe BIDESSINI

Genus 8. *Guignotus* Houlbert, 1934Species (17) *Guignotus flammulatus* (Sharp)(18) *Guignotus inconstans* (Regimbart)Genus 9. *Clypeodytes* Regimbart, 1894Species (19) *Clypeodytes severini* Regimbart

(d) Tribe HYDROPORINI

Genus 10. *Hyphoporus* Sharp, 1882Species (20) *Hyphoporus elevatus* Sharp

Subfamily (v) COLYMBETINAE

(a) Tribe COPELATINI

Genus 11. *Copelatus* Erichson, 1832Species (21) *Copelatus indicus* Sharp

Subfamily (vi) DYTISCINAE

(f) Tribe HYDATICINI

Genus 12. *Hydaticus* Leach, 1817Species (22) *Hydaticus vittatus* (Fabricius)

(g) Tribe CYBISTERINI

Genus 13. *Cybister* Curtis, 1827Species (23) *Cybister confusus* Sharp(24) *Cybister limbatus* (Fabricius)(25) *Cybister sugillatus* Erichson(26) *Cybister tripunctatus asiaticus* Sharp

Family III. HYDROPHILIDAE

Subfamily (vii) HYDROCHINAE

Genus 14. *Hydrochus* Leach, 1817Species (27) *Hydrochus binodosus* Motsch.(28) *Hydrochus* sp.

Subfamily (viii) SPHAERIDINAE

(h) Tribe SPHAERIDINI

Genus 15. *Sphaeridium* Fabricius, 1775Species (29) *Sphaeridium* sp.Genus 16. *Coelostoma* Brulle, 1835Species (30) *Coelostoma* sp.Genus 17. *Dactylosternum* Wollaston, 1854Species (31) *Dactylosternum* sp.

Subfamily (ix) HYDROPHILINAE

(i) Tribe HYDROBIINI

Genus 18. *Helochares* Mulsant, 1844Species (32) *Helochares anchoralis* Sharp(33) *Helochares crenatus* Regimbart(34) *Helochares densus* Sharp(35) *Helochares lentus* Sharp

Genus 19. *Laccobius* Erichson, 1837

Species (36) *Laccobius* sp.

Genus 20. *Enochrus* Zaitzev, 1919

Species (37) *Enochrus* sp.

(j) Tribe HYDROPHILINI

Genus 21. *Sternolophus* Solier, 1834

Species (38) *Sternolophus rufipes* (Fabricius)

(k) Tribe AMPHIOPINI

Genus 22. *Amphiops* Erichson, 1843

Species (39) *Amphiops pedestris* Sharp

(l) Tribe Berosini

Genus 23. *Regimbartia* Zaitzev, 1908

Species (40) *Regimbartia attenuata* Fabricius

Genus 24. *Berosus* Leach, 1817

Species (41) *Berosus indicus* Motschulsky

SYSTEMATIC ACCOUNT

Key to the families of aquatic COLEOPTERA known from Tripura.

- 1(4) Metacoxae fused with metasternum. Maxillary palpi not longer than antennae.
- 2(3) Eyes divided, appearing as dorsal and ventral pair; antennae short and stout; middle and hind legs short and flattened, tarsi folding fanwise GYRINIDAE
- 3(2) Eyes not divided; antennae elongate, slender; middle and hind legs with tarsi not modified DYTISCIDAE
- 4(1) Meta coxae not fused with metasternum. Maxillary palpi often elongated and longer than antennae. Last glabrous joint obconic or more or less asymmetrical cuplike, embracing the pubescent club HYDROPHILIDAE

Family I. GYRINIDAE

Subfamily (i) ORECTOCHILINAE

Genus 1. *Orectochilus* Eschscholtz, 1833

1833. *Orectochilus* Eschscholtz in Dejean's Catalogue Coleopteres, ed. II : 59.

1984. *Orectochilus*, Vazirani, The Fauna of India, P. 36.

1. *Orectochilus productus* Regimbart

1833. *Orectochilus productus* Regimbart, Ann. Soc. ent. Fr., (6) 5 : 422.

1984. *Orectochilus productus*, Vazirani, The Fauna of India, p. 51.

Material examined : 1 ex. Tripura, Rudra Sagar, 17. ix. 1992, coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Bihar, Assam, West Bengal, Madhya Pradesh, Kerala, Tamil Nadu, Pondicherry.

Remarks : The species is recorded from Tripura for the first time.

Family II. DYTISCIDAE

Key to the sub-families of DYTISCIDAE known from Tripura

- 1(6) Scutellum not visible.
- 2(5) Fourth segment of pro and mesotarsi not reduced and sub-equal to the 3rd tarsal segment, prosternal process straight, occasionally a little depressed.
- 3(4) Posterior legs with two tarsal claws of equal length; sides of pronotum rebordered NOTERINAE
- 4(3) Posterior legs with a single tarsal claw; sides of pronotum not rebordered LACCOPHILINAE
- 5(2) Fourth segment of the pro and mesotarsi much reduced, hardly visible; prosternal process arched and oblique HYDROPORINAE
- 6(1) Scutellum visible.

- 7(8) Anterior border of the eyes excised; three basal segment of the protarsi enlarged but not forming a large pallet
.....COLYMBATINAE
- 8(7) Anterior border of the eyes excised; three basal segment of the protarsi enlarged into rounded, oval or sub-triangular pallet
.....DYTISCINAE

Subfamily (ii) NOTERINAE

Key to the genera of the subfamily NOTERINAE known from Tripura.

- 1(2) Curved spurs not present on the apex of fore tibiae**Hydrocoptus**
- 2(1) Curved spurs present on the apex of the fore tibiae.
- 3(4) Prosternal process very broad; hind tibiae very broad, length 4.0-7.0 mm
.....**Hydrocanthus**
- 4(3) Prosternal process moderately broad, hind tibiae rather slender; Length less than 4.0 mm**Canthydrus**

Genus 2. **Hydrocoptus** Motschulsky, 1859

1859. *Hydrocoptus* Motschulsky, Etudes Entomologiques 8 : 43, 364.
1977. *Hydrocoptus*, Vazirani, Cat. Orient. Dytiscidae, p. 2.

Key to the species of the genus Hydrocoptus known from Tripura.

- 1(2) Punctuation on the elytra in distinct rows; Length 1.8-2.2 mm**subvittulus**
- 2(1) Punctuation on the elytra in numerous and distinct rows; moderately regular but becoming obsolete before the apex; Length 3.0-3.7 mm**bivittis**

2. **Hydrocoptus bivittis** Motschulsky

1859. *Hydrocoptus bivittis* Motschulsky, Etude Entomologiques, 8 : 44 (T. L. Burma).
1977. *Hydrocoptus bivittis*, Vazirani, Cat. Orient. Dytiscidae, p. 4.

Material examined : 1 ex. Tripura, Rudra Sagar, 17. ix. 1992, coll. S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Karnataka; Burma; China; Malayasia; Singapore; Vietnam.

Remarks : The species is first time recorded from Tripura.

3. **Hydrocoptus subvittulus** Motschulsky

1860. *Hydrocoptus subvittulus* Motschulsky, Etud. Entom., 8 : 53 (1859).
1977. *Hydrocoptus subvittulus*, Vazirani, Cat. Orient. Dytiscidae, p. 4.

Material examined : 11 exs., S. Tripura, Belonia, 19. ix. 1992, coll. S. K. Saha & B. N. Das; 1 ex., Tripura, Lembuchhara, 11. ix. 1992, coll.; S. K. Saha & B. N. Das.

Distribution : India : Tripura, Assam, West Bengal, Bihar, Gujarat, Maharashtra, Tamil Nadu, Orissa; Sri Lanka; China.

Remarks : This species is first time recorded from Tripura.

Genus 3. **Hydrocanthus** Say, 1825

1825. *Hydrocanthus* Say, Trans. Amer. Phil. Soc., 2 : 105.
1977. *Hydrocanthus*, Vazirani, Cat. Orient. Dytiscidae, p. 4.

4. **Hydrocanthus indicus** Wehncke

1876. *Hydrocanthus indicus* Wehncke, Dtsch. ent. Z., 20 : 223.
1977. *Hydrocanthus indicus*, Vazirani, Cat. Orient. Dytiscidae, p. 4.

Material examined : 1 ex., Tripura, Belonia (At light), 21. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura; Burma; Vietnam; Thailand; Cambodia; Indonesia; Malayasia.

Remarks : The speices recorded for the first time from India.

Genus 4. *Canthydrus* Sharp, 1882

1882. *Canthydrus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 269, 838.

1977. *Canthydrus*, Vazirani, Cat. Orient. Dytiscidae, p. 5.

Key to the species of genus Canthydrus known from Tripura.

- 1(2) Elytra testaceous in color.....*ritsemai*
 2(1) Elytra brownish-black, with testaceous/
 yellow spots.....*laetabilis*

5. *Canthydrus laetabilis* (Walker)

1858. *Hydroporus laetabilis* Walker, Ann. Mag. nat. Hist., (3) 2 : 205.

1882. *Canthydrus laetabilis*, Sharp, Sci. Trans. R. Dublin Soc., 2 : 277.

1977. *Canthydrus laetabilis*, Vazirani, Cat. Orient. Dytiscidae, p. 6.

Material examined : 1 ex., India : Tripura, Sonamura, 16. ix. 1992, coll.; S. K. Saha; 2 exs., Tripura, Belonia (at light), 19. ix. 1992, coll.; B. N. Das; 2 exs., Tripura, Amarpur, 23. ix. 1992, coll.; S. K. Saha.

Distribution : India : Tripura, Andhra Pradesh, Assam, Bihar, Kerala, Maharashtra, Gujarat, Orissa, Punjab, Rajasthan, Uttar Pradesh, West Bengal; Sri Lanka; Bangladesh; Nepal; Pakistan.

Remarks : This species is first time recorded from Tripura.

6. *Canthydrus ritsemai* Regimbart

1880. *Hydrocanthus ritsemai* Regimbart, Notes Leyden Mus., 2 : 213.

1899. *Canthydrus ritsemai* Regimbart, Ann. Soc. ent. Fr., 68 : 252.

1977. *Canthydrus ritsemai*, Vazirani, Cat. Orient. Dytiscidae, p. 8.

Material examined : 1 ex. Tripura, Belonia (at light), 21. ix. 1992, coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, West Bengal, Assam, Bihar, Orissa, Andhra Pradesh; Burma; Vietnam; Indonesia; Malayasia and Singapore.

Remarks : The species is first time recorded from Tripura.

Subfamily (iii) LACCOPHILINAE

Key to the genera of subfamily LACCOPHILINAE known from Tripura.

- 1(2) Prosternal process simple; posterior angles of pronotum not directed backwards
*Laccophilus*
 2(1) Prosternal process tridentate; posterior angles of pronotum acute, directed backwards and closely fitting the elytra ..
*Neptosternus*

Genus 5. *Laccophilus* Leach, 1817

1817. *Laccophilus* Leach, Zool. Misc., 3 : 69.

1977. *Laccophilus*, Vazirani, Cat. Orient. Dytiscidae, p. 9.

Key to the species of genera Laccophilus known from Tripura.

- 1(2) Elytra brownish-black with markings consisting of yellow fascia.....*anticatus*
 2(1) Elytra testaceous reddish, markings consisting of brown irrotations or brown/black zigzag undulating lines.
 3(4) Elytra testaceous, with solid brown/black irrotations*chinensis inefficiens*
 4(3) Elytra testaceous, with undulating single or double lines, sometimes single lines reduced to irrotation of small, thin, curved lines.
 5(6) Elytral markings flexuosus, excessively irregular and covering and covering entire surface excepting the lateral margins
*flexuosus*
 6(5) Elytra markings consisting of double zigzag lines, undulating or reduced to irrotations of small, thin, curved lines.

- 7(8) Elytra markings of zigzag double markings, generally thick and coalescent; pronotum without any black markings along the anterior and posterior markings
.....*parvulus*

- 8(7) Elytra markings consisting of zigzag double lines, clear and thick but never coalescent; pronotum with transverse black markings, in the middle, along the anterior and posterior margins*sharpi*

7. *Laccophilus anticatus* Sharp

1890. *Laccophilus anticatus* Sharp, Trans. Ent. Soc. London, 1890 : 341.
1977. *Laccophilus anticatus*, Vazirani, Cat. Orient. Dytiscidae, p. 9.

Material examined : 1 ex., Tripura, Lembuchhara, 11. ix. 1992, S. K. Saha & S. K. Ghosh coll.

Distribution : India : Tripura, Assam, Manipur, Bihar, Orissa, West Bengal, Uttar Pradesh, Maharashtra; Bangladesh; Sri Lanka; Indonesia.

Remarks : This species is first time recorded from Tripura.

8. *Laccophilus chinensis inefficiens* Walker

1858. *Laccophilus chinensis* Boheman, In Kongliga Svenska Fregatten. Eugenies resa Zoologi, 1 Insecta : 21.
1859. *Laccophilus inefficiens* Walker, Ann. Mag. Nat. Hist. 3(3) : 51.
1954. *Laccophilus chinensis inefficiens*, Guigrot, Ark. Zool., (N. S.), 6 : 565.
1977. *Laccophilus chinensis inefficiens*, Vazirani, Cat. Orient. Dytiscidae, p. 10.

Material examined : 1 ex., Tripura, Belonia (at light), 19.ix.1992, B. N. Das & S. K. Saha Coll.; 1 ex., Tripura, Belonia, 16. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, West Bengal, Assam, Bihar, Orissa, Madhya Pradesh, Uttar Pradesh, Himachal Pradesh, Punjab, Gujarat,

Rajasthan, Goa; Burma; Nepal; Sri Lanka; Pakistan and Malayasia.

Remarks : This species is first time recorded from Tripura.

9. *Laccophilus flexuosus* Aube

1838. *Laccophilus flexuosus* Aube, In Dejean's species Coleopteres, 6 : 430.
1977. *Laccophilus flexuosus*, Vazirani, Cat. Orient. Dytiscidae, p. 11.

Material examined : 11 exs., Tripura, Lembuchhara, 11. ix. 1992, S. K. Saha & S. K. Ghosh Coll.; 3 exs., Tripura, Sonamura, 16. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Andhra Pradesh, Bihar, Orissa, Madhya Pradesh, Karnataka, Maharashtra, Rajasthan, Gujarat, West Bengal, Uttar Pradesh, Himachal Pradesh, Tamil Nadu; Iran; Iraq; Japan; Burma; Sri Lanka; Pakistan; Nepal; Indonesia and Hongkong.

Remarks : This species is first time recorded from Tripura.

10. *Laccophilus parvulus* Aube

1838. *Laccophilus parvulus* Aube, In Dejean's, Species Coleopteres, 6 : 429.
1977. *Laccophilus parvulus*, Vazirani, Cat. Orient. Dytiscidae, p. 13.

Material examined : 1 ex., Tripura, Sepahijala (at light), 14. ix. 1992, S. K. Saha & S. K. Ghosh Coll.; 2 exs., Tripura, Lembuchhara, 11. ix. 1992, Coll.; S. K. Saha & B. N. Das; 9 exs., Tripura, Sonamura, 16. ix. 1992, S. K. Saha; 8 exs., Tripura, Belonia, 19. ix. 1992, Coll.; B. N. Das.

Distribution : India : Tripura, Assam, Manipur, Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Goa, Orissa, Rajasthan, Gujarat, Tamil Nadu, West Bengal; Burma; Sri Lanka; Pakistan; Thailand; Malayasia; Indonesia and Vietnam.

Remarks : The species is first time recorded from Tripura.

11. *Laccophilus sharpi* Regimbart

1889. *Laccophilus sharpi* Regimbart, Ann. Soc. ent. Fr., 6(9) : 151.

1977. *Laccophilus sharpi*, Vazirani, Cat. Orient. Dytiscidae, p. 15.

Material examined : 1 ex. West Tripura, Sonamura, 16. ix. 1992, S. K. Saha & B. N. Das Coll.

Distribution : India : Tripura, Bihar, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Gujarat, Tamil Nadu, Uttar Pradesh, Andaman Island; Burma; Pakistan; Nepal; Sri Lanka; Japan; China and Iraq.

Remarks : The species is recorded for the first time from Tripura.

Genus 6. *Neptosternus* Sharp, 1882

1882. *Neptosternus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 317, 843.

1977. *Neptosternus*, Vazirani, Cat. Orient. Dytiscidae, p. 17.

Key to the species of genus *Neptosternus* known from Tripura

- 1(2) Lateral spines of the posternal process less than half the length of median spine, elytra with two basal testaceous spot, length 3.00 mm***taprobanicus***
- 2(1) Lateral spines of the posternal process longer than the half the length of median spine, elytra with one basal testaceous spot; length 3.5 mm***circumductus***

12. *Neptosternus taprobanicus*, Sharp

1890. *Neptosternus taprobanicus* Sharp, Trans. ent. Soc. Lond., 1890 : 342.

1977. *Neptosternus taprobanicus*, Vazirani, Cat. Orient. Dytiscidae, p. 18.

Material examined : 1 ex. Tripura, Belonia (at light), 21. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Andhra Pradesh and also known from Sri Lanka.

Remarks : The species is first time recorded from Tripura.

13. *Neptosternus circumductus* Regimbart

1899. *Neptosternus circumductus* Regimbart, Ann. Soc. ent. Fr., 68 : 268.

1977. *Neptosternus circumductus*, Vazirani, Cat. Orient. Dytiscidae, p. 17.

Material examined : 1 ex. Tripura, Belonia (at light), 19. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 1 ex. Tripura, Sepahijala, 14. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Orissa, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh.

Remarks : The species is first time recorded from Tripura.

Subfamily (iv) HYDROPORINAE

Key to the genera of subfamily HYDROPORINAE known from Tripura.

- 1(2) Prosternal process broadened at the apex, sutural angles of the elytra acuminate.....***Hydrovatus***
- 2(1) Prosternal process not broadened at the apex.
- 3(6) Pronotum marked with striae on both the sides, pronotal striae generally continued on the elytra.
- 4(5) Clypeus distinctly thickened, semi-circular in outline (with a transverse striae between the eyes).....***Clypeodytes***
- 5(4) Clypeus not thickened, almost cut straight (elytra with a sutural striae).....***Guignotus***
- 6(3) Pronotum not marked with striae on both the sides (base of the epipleurae with an oblique cavity).....***Hyphoporus***

Distribution : India : Tripura, Bihar, Gujarat, Madhya Pradesh, Tamil Nadu, Orissa, Rajasthan, Maharashtra, Uttar Pradesh, West Bengal; Bangladesh; Burma; Sri Lanka; Pakistan; China; Japan; Indonesia; Thailand; Vietnam.

Remarks : The species is first time recorded from Tripura.

18. *Guignotus inconstans* (Regimbart)

1892. *Bidessus inconstans* Regimbart, Anr. Soc. ent. Fr., 36 : 119.

1963. *Guignotus inconstans*, Férnando, Bull. Fish. Res. Stn. Ceylon, 16(1) : 26.

1977. *Guignotus inconstans*, Vazirani, Cat. Orient. Dytiscidae, p. 33-34.

Material examined : 5 exs. South Tripura, Belonia, 19. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 1 ex. West Tripura, Sonamura, 19. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Bihar, Orissa, Rajasthan, Maharashtra, Goa; Karnataka; Sri Lanka; Nepal; Bhutan; Burma; Malayasia; Indonesia; Java; Sumatra.

Remarks : The species is first time recorded from Tripura.

Genus 9. *Clypeodytes* Regimbart

1894. *Clypeodytes* Regimbart, Ann. Soc. ent. Fr., 63 : 230.

1977. *Clypeodytes*, Vazirani, Cat. Orient. Dytiscidae, p. 37.

19. *Clypeodytes severini* (Regimbart)

1892. *Bidessus severini* Regimbart, Ann. Soc. ent. Belg., 36 : 116.

1899. *Clypeodytes severini*, Regimbart, Ann. Soc. ent. Fr., 68 : 216.

1972. *Clypeodytes severini*, Vazirani, J. Bombay, nat. Hist. Soc., 68 : 482.

1977. *Clypeodytes severini*, Vazirani, Cat. Orient. Dytiscidae, p. 38.

Material examined : 2 exs. South Tripura, Belonia, 19. ix. 1992, Coll.; S. K. Saha & B. N. Das.

Distribution : India : Tripura, Bihar, Goa.

Remarks : The species is first time recorded from Tripura.

Genus 10. *Hyphoporus* Sharp 1882

1882. *Hyphoporus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 390, 859.

1977. *Hyphoporus*, Vazirani, Cat. Orient. Dytiscidae, p. 44.

20. *Hyphoporus elevatus* Sharp

1882. *Hyphoporus elevatus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 390.

1977. *Hyphoporus elevatus*, Vazirani, Cat. Orient. Dytiscidae, p. 45.

Material examined : 13 exs. South Tripura, Belonia, 19. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Bihar, Delhi, Punjab, Madhya Pradesh, Uttar Pradesh; Pakistan.

Remarks : This species is first time recorded from Tripura.

Subfamily (v) COLYMBETINAE

Genus 11. *Copelatus* Erichson, 1832

1832. *Copelatus* Erichson, Genera Dytiscidae, pp. 18, 38.

1977. *Copelatus*, Vazirani, Cat. Orient. Dytiscidae, p. 52.

21. *Copelatus indicus* Sharp

1882. *Copelatus indicus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 582.

1977. *Copelatus indicus*, Vazirani, Cat. Orient. Dytiscidae, pp. 54, 55.

Material examined : 1 ex. West Tripura, Sepahijala (at light), 14. ix. 1992, Coll.; S. K. Saha.

Distribution : India : Tripura, Bihar, Assam, Uttar Pradesh.

Remarks : The species is first time recorded from Tripura.

Subfamily (vi) DYTISCINAE

Key to the genera of subfamily DYTISCINAE known from Tripura.

- 1(2) Hind margins of the four basal metatarsal segments on the both the anterior and posterior faces fringed with golden-yellow ciliae over-lapping the base of the next segment ***Hydaticus***
- 2(1) Hind margins of the four basal metatarsal segments not fringed with any ciliae ***Cybister***

Genus 12. ***Hydaticus*** Leach, 1817

1817. *Hydaticus* Leach, Zool. Miscell, 3 : 69, 72.
 1977. *Hydaticus*, Vazirani, Cat. Orient. Dytiscidae, p. 75.

22. ***Hydaticus vittatus*** (Fabricius)

1775. *Dytiscus vittatus* Fabricius, Syst. ent. App. : 825.
 1838. *Hydaticus vittatus*, Aube, in Dejean's species Coleopoteris, 6 : 208.
 1977. *Hydaticus vittatus*, Vazirani, Cat. Orient. Dytiscidae, p. 81.

Material examined : 1 ex. North Tripura, Dharamanagar, Kadamtala, 15. xii. 1989, Y P. Singh Coll.

Distribution : India : Tripura, Gujarat, West Bengal, Uttar Pradesh, Tamil Nadu; Burma; Sri Lanka; Pakistan; Nepal; Bangladesh; China; Formosa; Japan; Indonesia; Java; Sumatra.

Remarks : The species is first time recorded from Tripura.

Genus 18. ***Cybister*** Curtis, 1827

1827. *Cybister* Curtis, Brit. Ent., 4 : 151.
 1977. *Cybister*, Vazirani, Cat. Orient. Dytiscidae, p. 86.

Key to the species of genus Cybister known from Tripura.

- 1(2) Elytra without yellow lateral stripe ***sugillatus***
- 2(1) Elytra with yellow lateral stripe.
- 3(4) Elytra with yellow lateral stripe extending to and including the epipleura, species without any sexual sculpture in the female in the form of longitudinal or Zig-Zag striations ***tripunctatus asiaticus***
- 4(3) Elytra with yellow lateral stripe sub-marginal, not extending to the epipleurae at the base, species generally with elytral sexual sculpture in the form of longitudinal or zig-zag striation.
- 5(6) Midclaws longer than the apical tarsal segment in the male. Female with sexual sculpture of deep irregular short longitudinal striations covering nearly five-sixths of the elytral length and missing along the sutural except at the base ***limbatus***
- 6(5) Midclaws equal to the apical tarsal segment in the male. Female with the longitudinal striations covering three-fifths of elytral length and absent along the sutural line, leaving larger smooth space along the suture than in limbatus ***confusus***

23. ***Cybister sugillatus*** Erichson

1834. *Cybister sugillatus* Erichson, Nova Acta Leop Carol., 16 : 227.
 1977. *Cybister sugillatus*, Vazirani, Cat. Orient. Dytiscidae, p. 89.

Material examined : 2 exs., North Tripura, Dharamanagar, 15. xii. 1989, Coll.; Y P. Sinha.

Distribution : India : Tripura, Assam, Orissa, Madhya Pradesh, Uttar Pradesh, Tamil Nadu, West Bengal, Maharashtra, Manipur, Sikkim. Also known from Tibet, Japan, Indonesia, Philippines.

Remarks : The species is first time recorded from Tripura.

4. *Cybister tripunctatus asiaticus* Sharp

1882. *Cybister asiaticus* Sharp, Sci. Trans. R. Dublin Soc., 2 : 731.

1899. *Cybister tripunctatus asiaticus*, Regimbart, Ann. Soc. ent. Fr., 68 : 352.

1977. *Cybister tripunctatus asiaticus*, Vazirani, Cat. Orient. Dytiscidae, p. 92.

Material examined : 2 exs., Tripura, Ambasa (at light), 25.v.1978, Coll.; J. K. Janathan; 1 ex., Tripura, Saclipara, 26. v. 1984, Coll.; R. H. Kamle; 2 exs. North Tripura, Dharmanagar, Kadamtala, 15. xii. 1989, Coll.; Y. P. Sinha; 1 ex. North Tripura, Dharmanagar, Dhyanpasa, 14. xii. 1989, Coll.; Y. P. Sinha.

Distribution : India : Tripura, Andaman Islands, Rajasthan, Gujarat, Sikkim, Tamil Nadu; Pakistan; Sri Lanka; Burma; Nepal; Bangladesh; Afganistan.

Remarks : The species is first time recorded from Tripura.

25. *Cybister limbatus* (Fabricius)

1775. *Dytiscus limbatus* Fabricius, Systema Ent. : 230.

1838. *Cybister limbatus*, Aube, in Dejean's species Coleopteres, 6 : 55.

1977. *Cybister limbatus*, Vazirani, Cat. Orient. Dytiscidae, p. 91.

Material examined : 1 ex., North Tripura, Dharmanagar, Dhyanpasa, 14.xii.1989, Coll.; Y. P. Sinha.

Distribution : India : Tripura, Bihar, Kerala, Madhya Pradesh, Maharashtra, Goa, Orissa, Arunachal Pradesh, West Bengal; Pakistan; China; Japan; Formosa; Vietnam; Philippines.

Remarks : The species is first time recorded from Tripura.

26. *Cybister confusus* Sharp

1882. *Cybister confusus* Sharp, Sci. Trans. R. Dublin Soc., 68 : 739.

1977. *Cybister confusus*, Vazirani, Cat. Orient. Dytiscidae, p. 90.

Material examined : 1 ex. Tripura, Saclipara, 26. v. 1984, Coll.; R. H. Kamble.

Distribution : India : Tripura, Bihar, Manipur, Karnataka, Maharashtra, Orissa; Pakistan; Sri Lanka.

Remarks : The species is first time recorded from Tripura.

Family III. HYDROPHILIDAE**Key to the subfamily of HYDROPHILIDAE recorded from Tripura.**

- 1(2) Body contour not uniformly curved and not regularly convex, the prothorax narrower than the hind and conspicuously separated there from, nearly as wide as head with eyes HYDROCHINAE
- 2(1) Body contour uniformly curved and body regularly convex, the prothorax not narrower than the hind body and not conspicuously separated therefrom.
- 3(4) Antennae normally longer than maxillary palpi, which are never very long, the last glabrous segment obconic, filled more or less lightly against first segment of pubescent club.....SPHAERIDINAE
- 4(3) Antennae shortened, as long as and often shorter than maxillary palpi, the last glabrous segment more or less asymmetrical, cub like, embracing the first segment of pubescent, always tri-articulate club HYDROPHILINAE

Subfamily (vii) HYDROCHINAE

Genus 14. ***Hydrochus*** Leach, Zool. Misc., III, p. 90.

27. *Hydrochus binodosus* Motschulsky

1860. *Hydrochus binodosus* Motschulsky, Schrenck's Ries., II, p. 104.

1922. *Hydrochus binodosus*, d'Orchymont, Rec. Ind. Mus., VIII, p. 624.

Material examined : 1 ex., Tripura, Rudrasagar, 17. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, Assam.

Remarks : This species is first time recorded from Tripura.

28. *Hydrochus* sp.

Material examined : 6 exs., Tripura, Rangamura, 20. ix. 1992, Coll.; B. N. Das & S. K. Saha; 2 exs., North Tripura, Ambassa, Dulabari, 13. v. 1993, Coll.; S. K. Chakraborty.

Distribution : India : Tripura.

Subfamily (viii) SPHAERIDINAE

Key to the genera of subfamily SPHAERIDINAE known from Tripura.

- 1(2) Apex of abdomen not covered. Scutellum as an elongate triangle. Elytra with a sutural stria. First ventral segment not carinate. Antennae 8 jointed. First joint of posterior tarsi longer than second*Sphaeridium*
- 2(1) Elytra covering the apex of abdomen. Scutellum short triangular.
- 3(4) Antennal club 9 jointed, laxly articulated and very long. Elytra only with a sutural stria, irregularly punctured. Shape very convex, underside less planate, tibiae less enlarged and flattened. Prosternum normally developed before anterior coxae, not carinate or with an anteriorly dentate carina (in horn). Posterior tarsi with first joint twice as long as second*Coelostoma*
- 4(3) Antennal club shorter and its articulation not so lax. Elytra normally with sutural stria and several other striae or serially arranged larger punctures, at least at the sides; exceptionally with coelostomoid appearance but in such cases body more depressed and less convex and with more planate underside. Tibiae more enlarged and flattened and first abdominal segment well developed, usually carinate along its whole length*Dactylosternum*

Genus 15. *Sphaeridium* Fabricius, 1775

1775. *Sphaeridium* Fabricius, Syst. Ent., p. 66.

29. *Sphaeridium* Sp.

Material examined : 6 exs., Tripura, Rangamura, 20. ix. 1992, Coll.; B. N. Das & S. K. Saha; 2 exs., North Tripura, Ambassa, Dulubari, 13. v. 1992, Coll.; S. K. Chakraborty.

Distribution : India : Tripura.

Remarks : The genus is first time recorded from Tripura.

Genus 16. *Coelostoma* Brulle, 1835

1835. *Coelostoma* Brulle, Hist. Nat. Ins. V, (2).

30. *Coelostoma* Sp.

Material examined : 1 ex., South Tripura, Belonia, 19. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura.

Remarks : The genus is first time recorded from Tripura.

Genus 17. *Dactylosternum* Wollaston, 1854

1854. *Dactylosternum* Wollaston, Ins. Mad., p. 99.

31. *Dactylosternum* Sp.

Material examined : 1 ex., Tripura, Sepahijala, 14. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 1 ex., Tripura, Simna, 10. ix. 1992, Coll.; B. N. Das & S. K. Saha.

Distribution : India : Tripura.

Remarks : The genus is first time recorded from Tripura.

Subfamily (ix) HYDROPHILINAE

Key to the tribes of the subfamily HYDROPHILINAE known from Tripura.

- 1(4) Scutellum not longer or not much longer than its width at base. Antennae at most 9 segmented. Pronotum not narrowed behind.

- 2(3) Meso and metasternal carina not reunited intimately HYDROBIINI
- 3(2) Meso and metasternal carina reunited and forming only one ridge HYDROPHILINI
- 4(1) Scutellum a long triangle. Antennae at most 8 segmented.
- 5(6) Eyes divided by a conspicuous and complete canthus reaching the vertex behind. Posterior legs without swimming hairs AMPHIOPINI
- 6(5) Eyes very convex and prominent without complete canthus. Posterior legs with long swimming hairs BEROSINI

(i) Tribe HYDROBIINI

Key to the genera of the tribe Hydrobiini known from Tripura.

- 1(2) Maxillary palpi robust and short, nearly as long as antennae or shorter, last joint as long as or longer than penultimate. No sutural stria, elytra usually striate punctate. Antennae 8 jointed**Laccobius**
- 2(1) Maxillary palpi more or less slender, longer than antennae, with last joint shorter than penultimate.
- 3(4) Maxillary palpi rather short, never very long, with second joint convex on anterior side and concave posteriorly, the last joint bending outwards. Eyes rounded. A sutural stria atleast. Antennae 9 jointed**Enochrus**
- 4(3) Second joint of maxillary palpi with anterior side concave or straight, convex on posterior side, last joint articulated from the outer to the inner towards mouth. Palpi sometimes very long**Helochaeres**

Genus 18. **Helochaeres** Mulsant, 1844

1844. *Helochaeres* Mulsant, Hist. Nat. Col. Fr. Palp, p. 197.
1924. *Helochaeres* Mulsant, Col. Cat., 14(79) : 192-199.

Key to the species of genus Helochaeres known from Tripura.

- 1(4) Elytral interval punctured.
- 2(3) Elytral interval closely but finely punctured**anchoralis**
- 3(2) Elytral interval closely and densely punctured**densus**
- 4(1) Elytral interval smooth.
- 5(6) Punctures on striae strong, deep**crenatus**
- 6(5) Punctures on striae weak and superficial**lentus**

32. **Helochaeres anchoralis** Sharp

1890. *Helochaeres anchoralis* Sharp, Trans. Ent. Soc. London, p. 352.

Material examined : 1 ex., West Tripura, Sonamura, 16. ix. 1992, Coll.; B. N. Das & S. K. Saha.

Distribution : India : Tripura, West Bengal. Also known from Sri Lanka; Indonesia; Indochina.

Remarks : This species is first time recorded from Tripura.

33. **Helochaeres crenatus** Regimbart

1903. *Helochaeres crenatus* Regimbart, Ann. Soc. ent. France, LXXII, p. 54.

Material examined : 2 ex., South Tripura, Belonia, 20. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 1 ex., West Tripura, Rudrasagar, 17. ix. 1992, Coll.; B. N. Das; 1 ex., West Tripura, Sonamura, 16. ix. 1992, Coll.; S. K. Saha.

Distribution : India : Tripura, West Bengal (Darjeeling, Calcutta), Bihar; Indonesia, Sunda Island.

Remarks : The species first time recorded from Tripura.

34. **Helochaeres densus** Sharp

1890. *Helochaeres densus* Sharp, Trans. Ent. Soc. London, p. 352.

1902. *Helochaeres lentus*, Regimbart, Ann. Soc. Ent. Fr., LXXI, p. 473.

Material examined : 1 ex., South Tripura, Belonia, 20. ix. 1992, Coll.; B. N. Das.

Distribution : India : Tripura; Sri Lanka.

Remarks : This species first time recorded from Tripura.

35. *Helochaeres lentus* Sharp

1890. *Helochaeres lentus* Sharp, Trans. Ent. Soc. Lond., p. 352.

Material examined : 1 ex., South Tripura, Belonia, 21. ix. 1992, S. K. Saha Coll.

Distribution : India : Tripura, West Bengal, Bihar.

Remarks : This species first time recorded from Tripura.

Genus 19. *Laccobius* Erichson

1837. *Laccobius* Erichson, Kaf. Mark Brandebg. I, p. 202.

36. *Laccobius* Sp.

Material examined : 1 ex., South Tripura, Belonia, 19. ix. 1992, Coll.; S. K. Saha.

Distribution : India : Tripura.

Remarks : This speices first time recorded from Tripura.

20. *Enochrus* Zaitzev, 1919

1919. *Enochrus* Zaitzer, Rev. Russe. d'Entom., VIII, (1908), p. 91.

37. *Enochrus* Sp.

Material examined : 5 exs., Tripura, Rudra Sagar, 17. ix. 1992, Coll.; B. N. Das & S. K. Ghosh.

Distribution : India : Tripura.

Remarks : This genus is first time recorded from Tripura.

(j) Tribe HYDROPHILINI

Genus 21. *Sternolophus* Solier

1834. *Sternolophus* Solier, Ann. Soc. Ent. Fr., III, p. 302, 310.

38. *Sternolophus rufipes* (Fab.)

1792. *Sternolophus rufipes* Fabricius, Entom. Syst. I, p. 138.

1840. *Sternolophus rufipes*, Laporte, Castelnau, Hist. Nat. Ins. 2 : 54.

Material examined : 13 exs., Tripura, Sonamura, 16. ix. 1992, Coll.; B. N. Das & S. K. Saha; 1 ex., Tripura, Rudra Sagar, 17. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, West Bengal. Also known from Tropical Asia, East Asia, Sunda Island.

Remarks : This species first time recorded from Tripura.

(k) Tribe AMPHIOPINI

Genus 22. *Amphiops* Erichson

1843. *Amphiops* Erichson, Archiv.

1924. *Amphiops* Erichson, Col. Cat., 14 (79) : 259-260.

39. *Amphiops pedestris* Sharp

1890. *Amphiops pedestris* Sharp, Trans. Ent. Soc. Lond. p. 354.

Material examined : 3 exs., Tripura, Rudra Sagar, 17. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 1 ex. Tripura, Lambuchara, 11. ix. 1992, Coll.; B. N. Das & S. K. Ghosh; 2 exs., Tripura, Amarpur, 23. ix. 1992, Coll.; B. N. Das & S. K. Saha.

Distribution : India : Tripura, West Bengal, Pondicherry, Tamil Nadu; Sri Lanka, Indo-China; Saigon; Sumatra.

Remarks : The species first time recorded from Tripura.

(I) Tribe BEROSINI

Key to the genera of tribe BEROSINI known from Tripura.

- 1(2) Five ventral not retractile segments. Antennae composed of seven segments (4 + 3). Upper surface never of a uniform, deep and shining black. Shape elongate. Femora at least in part without dense pubescence. Sutures of ventral segments not depened. Usually a more or less prominent 6th retractile ventral segment..
.....**Berosus**
- 2(1) Only four not retractile ventral segments, the first one not invaded by the posterior coxal cavities. Antennae of 8 segments (5 + 8). Upper surface always of a uniform deep and shining or metallic black. Pronotum narrowly applied within the emargination of anterior side of elytra. The fifth ventral segment is retractile and more or less prominent, emerginate in the male
.....**Regimbertia**

Genus 23. **Regimbertia** Zaitzev, 1908

1908. *Regimbertia* Zaitzev. Horae Soc. Ent. Ross. **38** : 362.

40. **Regimbertia attenuata** Fabricius

1801. *Regimbertia attenuata* Fabricius, Syst. Eleuth, 1 : 253 (Hydrophilidae).

Material examined : 1 ex., Tripura, Sonamura, 16. ix. 1992, Coll.; B. N. Das & S. K. Saha; 1 ex. Tripura, Rudra Sagar, 17. ix. 1992, Coll.; B. N. Das & S. K. Ghosh; 1 ex. Tripura, Belonia, 20. ix. 1992, Coll. S. K. Saha & S. K. Ghosh.

Distribution : India : Tripura, West Bengal. Also known from Sri Lanka, Indo-china, Annam, Cochin-China, Cambodia, Sumatra, Philippine, Formosa, Japan, Australia.

Remarks : The species is first time recorded from Tripura.

Genus 24. **Berosus** Leach, 1817

1817. *Berosus* Leach, Zool. Misc., **3** : 92.
1924. *Berosus* Leach, Col. Cat., **14**(79) : 261-276.

41. **Berosus indicus** Motschulsky

1861. *Berosus indicus* Motschulsky, Bull. Soc. Imp. Nat. Moscou **34** : 110.

Material examined : 48 exs., Tripura, Sonamura, 16. ix. 1992, Coll.; S. K. Saha & B. N. Das; 3 exs., Tripura, Rudra Sagar, 17. ix. 1992, Coll.; S. K. Saha & S. K. Ghosh; 3 exs., Tripura, Belonia, 19. ix. 1992, Coll. S. K. Saha & S. K. Ghosh; 6 exs., Tripura, Sepahijala, 14. ix. 1992, Coll.; S. K. Saha & B. N. Das; 7 exs., Tripura, Lembuchara, 11. ix. 1992, Coll. B. N. Das & S. K. Saha.

Distribution : India : Tripura, West Bengal; Sri Lanka; South Asia.

Remarks : This species first time recorded from Tripura.

SUMMARY

The present paper deals with 41 species under 24 genera belonging to 3 families. Out of 24 genera, genus *Hydrocanthus* Say has been recorded from India for the first. All speices have been recorded from Tripura for the first time. Keys to the subfamilies, tribes, genera and species have been provided. Relevant collection data and important references have also been provided under each species.

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The chart showing district wise distribution of aquatic coleoptera known from Tripura

Name of species	W. Tripura	N. Tripura	S. Tripura	Name of species	W. Tripura	N. Tripura	S. Tripura
<i>Orectochilus productus</i> Regimbart	+	-	-	<i>Hyphoporus elevatus</i> Sharp	-	-	+
<i>Hydrocoptus bivittis</i> Motschulsky	+	-	-	<i>Copelatus indicus</i> Sharp	+	-	-
<i>Hydrocoptus subvittulus</i> Motschulsky	+	-	+	<i>Hydaticus vittatus</i> (Fabricius)	-	+	-
<i>Hydrocanthus indicus</i> Wehncke	-	-	+	<i>Cybister confusus</i> Sharp	-	+	-
<i>Canthydrus laetabilis</i> (Walker)	+	-	+	<i>Cybister limbatus</i> (Fabricius)	-	+	-
<i>Canthydrus ritsemai</i> Regimbart	-	-	+	<i>Cybister sugillatus</i> Erichson	-	+	-
<i>Laccophilus anticatus</i> Sharp	+	-	-	<i>Cybister tripunctatus</i> <i>asiaticus</i> Sharp	-	+	-
<i>Laccophilus chinensis</i> <i>inefficiens</i> Walker	-	-	+	<i>Hydrochus binodosus</i> Motschulsky	+	-	-
<i>Laccophilus parvulus</i> Aube	+	-	+	<i>Hydrdochus</i> Sp.	+	+	-
<i>Laccophilus flexuosus</i> Aube	+	-	-	<i>Sphaeridium</i> Sp.	+	+	-
<i>Laccophilus sharpi</i> Regimbart	+	-	-	<i>Coelostoma</i> Sp.	-	-	+
<i>Neptosternus circumductus</i> Regimbart	+	-	+	<i>Dactylosternus</i> Sp.	+	+	-
<i>Neptosternus taprobanicus</i> Sharp	-	-	+	<i>Helochaeres anchoralis</i> Sharp	+	-	-
<i>Hydrovatus castaneus</i> Motschulsky	+	-	-	<i>Helochaeres crenatus</i> Regimbart	+	-	+
<i>Hydrovatus confertus</i> Sharp	-	-	+	<i>Helochaeres densus</i> Sharp	-	-	+
<i>Hydrovatus pinguis</i> Regimbart	-	-	+	<i>Helochaeres lentus</i> Sharp	-	-	+
<i>Guignotus flammulatus</i> (Sharp)	+	-	-	<i>Laccobius</i> Sp.	-	-	+
<i>Guignotus inconstans</i> (Regimbart)	+	-	+	<i>Enochrus</i> sp.	+	-	-
<i>Clypeodytes severini</i> Regimbart	-	-	+	<i>Sternolophus rufipes</i> (Fabricius)	+	-	-
				<i>Amphiops pedestris</i> Sharp	+	-	+
				<i>Regimbartia attenuata</i> Fabricius	+	-	+
				<i>Berosus indicus</i> Motschulsky	+	-	+

INSECTA : COLEOPTERA : HISTERIDAE

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INTRODUCTION

Members of the family Histeridae are very small to medium in size with hard exoskeleton, generally black and shining in colour and round oval or elongated in shape. They are predaceous in habit both in larval and adult form. They occur in a variety of habitats namely in soil, in dung of various animals, in-termite and ant nests and under bark. Some of the Histerinae beetles are predators of the under bark fauna.

The Indian fauna of Histeridae was studied by earlier workers like Fabricius (1798), Paykul (1811), Wiedmann (1819-21) and others. A detailed information on historical review of taxonomy of Indian Histeridae was provided by Chakraborty and Biswas (1995).

Till now about 175 species under 34 genera are known from India in comparison to about 200 genera and 3000 species from all over the world.

As regards Histeridae fauna of Tripura nothing was recorded earlier. All the species dealt with in this paper are new records from the state with description of a new species.

SYSTEMATIC ACCOUNT

List of taxa

- Family HISTERIDAE
- Subfamily 1. ABRAEINAE
- Tribe 1. ACRITINI
- Genus 1. *Acritus* Le Conte
- Species 1. *A. duchainei* Cooman
2. *A. microsomus* Cooman

- Subfamily 2. DENDROPHILINAE
- Tribe 2. PAROMALINI
- Genus 2. *Platylomalus* Cooman
- Species 3. *P. oceanitis* (Marseul)
4. *P. subimali* sp. nov.
- Tribe 3. BACANIINI
- Genus 3. *Bacanius* Le Conte
- Species 5. *B. atomarius* Sharp
- Subfamily 3. HISTERINAE
- Tribe 4. TRIBALINI
- Genus 4. *Tribalus* Erichson
- Species 6. *T. colombius* Marseul
- Tribe 5. HISTERINI
- Genus 5. *Santalus* Lewis
- Species 7. *S. latitibius* (Marseul)
8. *S. parallelus*
(Redtenbacher)
- Genus 6. *Pachylister* Lewis
- Species 9. *P. chinensis* (Quens)
- Genus 7. *Hister* Linnaeus
- Species 10. *H. pullatus* Erichson
- Genus 8. *Atholus* Thomson
- Species 11. *A. coelestis* (Marseul)
12. *A. silvicola* (Lewis)
13. *Atholus* sp.

- Tribe 6. PLATYSOMINI
 Genus 9. *Platylister* Lewis
 Species 14. *P. atratus* (Erichson)
 15. *P. strialis* (Marseul)
 Genus 10. *Platysoma* Leach
 Species 16. *P. confucii* Marseul

Family HISTERIDAE

Key to the subfamilies of HISTERIDAE of Tripura.

- 1(2) Antennae inserted in front, near internal border of eyes, often with a little pit opened in front ABRAEINAE
 2(1) Antennae inserted under lateral border of frons, between eyes and base of mandibles.
 3(4) Antennal groove situated at the middle of the lateral (pectoral) border of the prosternum before the anterior coxae; pectoral border provided with a deeply incised cleft to receive the antennal funicle DENDROPHILINAE
 4(3) Antennal groove situated at the anterior angles of prosternum; lateral (pectoral) border not incised HISTERINAE

Subfamily 1. ABRAEINAE

Tribe 1. ACRITINI

Genus 1. *Acritus* Le Conte 1853

1853. *Acritus* Le Conte, *Proc. Acad. Philad.*, VI : 288.

1910. *Acritus*, Bickhardt, *Coleopt. Cat.*, Pars. 24, p. 86.

Brief morphology : Very minute beetles, body oval, weakly convex, black or blackish brown, shining. Frons without stria, no transversal depression to distinguish from the epistome. Antennae inserted on the front inside the eyes with a small elevation; club oval, with 4 articles and funicle with 7 articles. Pronotum much wider than long, arched at the base, marginal stria fine following the border but becomes round a little more distant of the anterior angle; scutellum very

small, triangular. Elytra rounded at sides, truncated at ends, sometimes marked with a short oblique dorsal stria at the anterior part. Prosternum plane, parallel, bordered with a stria which does not continue at the base, truncated at both ends, a little narrow in the middle, without anterior lobe, sometimes wider and like square. Mesosternum more or less wide with a marginal stria often complete, generally separated from the metasternum by a line of punctures, showing various shapes. Legs long, slender, anterior tibiae weakly dilated toward the end, furnished with bristles, posteriors slender; anterior tarsi with 5 articles, posteriors with only 4. Abdomen with 5 segments, 1st large, bistrate between the hind coxae; propygidium transvers, short, pygidium triangular, little convex, strongly inclined.

Key to the species of the genus Acritus known from Tripura.

- 1(2) Mesosternal stria complete, prosternum and metasternum finely and uniformly punctate; suture between meso- and metasterna simple. Mesosternum smooth *A. microsomus* Cooman
 2(1) Mesosternal stria interrupted anteriorly, prosternum and postero-lateral portion of metasternum finely punctate leaving the anterior half of the metasternum smooth; suture between meso- and metasterna crenulate. Mesosternum with few punctures *A. duchainei* Cooman

1. *Acritus duchainei* Cooman

1935. *Acritus duchainei* Cooman, *Rev. France. Ent.*, 2 : 92, Type-loc. Saigon.

1976. *Acritus duchainei*, Gomy, Y., *Bull. Soc. ent. Fr.*, 81 : 262.

Material studied : 1 ex., Santibazar, North Tripura, 19. ix. 1992, S. K. Saha & party coll.

Distribution : India : Tripura (North Tripura Dist.), West Bengal and Bihar. Also known from Saigon and Vietnam.

2. *Acritus microsomus* Cooman

1932. *Acritus microsomus* Cooman, *Bull. Mus. 2^e series*, p. 403, Type-loc. Tonkin, China.

Material studied : 1 ex., Santibazar, North Tripura Dist., 19. ix. 1992, S. K. Saha & party coll.

Distribution : India : Tripura (North Tripura Dist.) and Meghalaya. Also known from Tonkin, China.

Subfamily 2. DENDROPHILINAE

Key to the genera of Subfamily DENDROPHILINAE known from Tripura.

- 1(2) Frons convex; dorsal striae absent, rarely with a single stria below the eye, sutural absent, elytrae deeply and strongly punctate; prosternum bordered on the sides, without striae, anterior lobe indistinct; mesosternum bisinuous anteriorly, without transverse stria ***Bacanius* Le Conte**
- 2(1) Frons plane; dorsal striae present, generally 2-3 in numbers, reduced to oblique lines, sutural absent; prosternum striate parallelly on the sides, anterior lobe much distinct, mesosternum weakly notched anteriorly, generally with a biangular transverse stria ***Platylomalus* Cooman**

Tribe 2. PAROMALINI**Genus 2. *Platylomalus* Cooman**

1948. *Platylomalus* Cooman, *Notes Ent. Chin.*, **12** : 134

1970. *Platylomalus* Therond, *Opusc. Zool.*, **10** : 336

3. *Platylomalus oceanitis* (Marseul)

1855. *Paromalus oceanitis* Marseul, *Ann. Soc. Ent. Fr.* (3) **3** : 110-111. Type-loc. Manila, Philippines.

1970. *Platylomalus oceanitis*, Therond, *Opusc. Zool.*, **10** : 336.

Material studied : 2 exs., Mongiabari, West Tripura Dist., 24.vi.1990, G. N. Saha & party coll.; 1 ex., Mohanpur, West Tripura Dist., 9. ix. 1992, S. K. Ghosh coll.

Distribution : India : Tripura (West Tripura Dist.), West Bengal and Meghalaya. Also known

from Burma, Malacca, Philippines, Malayasia and Sumatra.

Diagnostic characters : Oval, plane above, shining black, finely punctate; frons entirely marginate; marginal stria on the pronotum interrupted behind the eyes; elytrae with 2 rudimentary dorsal striae, 1st shortened at the base, 2nd shortened at the middle; prosternum margined with an elliptical stria; mesosternum with a transverse bisinuous stria on the middle; pygidium almost smooth, generally with irregularities on male. Length 2.20 mm width 1.20 mm.

4. *Platylomalus subimali* sp. nov.

Body small, oval, weakly convex, head and pronotum reddish brown, rest dark brown; antennae and legs brown. Frons plane, finely punctate, marginal stria incomplete, existing only above the eyes. Pronotum transverse, arched at the base and sides, gradually narrowing anteriorly, anterior margin bisinuously notched, anterior angles pointed; marginal stria wellmarked. entire; finely, uniformly and less compactly punctate. Elytrae weakly sinuous anteriorly, longer than broad, arched laterally narrowed posteriorly to a truncated apex, uniformly convex except the sutural margin at middle which is slightly elevated; dorsal margin without any stria; lateral margin with a strong stria extending from humerus to the apex; uniformly punctate, punctures larger than the pronotul punctures. Propygidium almost smooth with very fine punctures; pygidium almost smooth like propygidium, often with a semilunar deep marking at its apex. Prosternum rather straight, with a parallel stria, rounded at the base, prosternal lobe without marginal stria. Mesosternum notched in front with a biangular strong stria, median arch is longer with the angles sharp. Metasternum smooth anteriorly and sparsely punctate posteriorly. 1st abdominal segment strongly punctate. Anterior tibiae with 3 teeth.

Length : 1.36-1.48 mm. **Width** : 0.90 mm.

Holotype : India : Tripura, Mongiabari, West Tripura Dist., 24. vi. 1990, G. N. Saha & party coll.; ex. "Hay stack"

Paratype : 1. 1 ex. locality and other data as in Holotype. 2. 2 exs. Meghalaya, near police bazar, 28.xi.1974, T. Sengupta & Party Coll.; ex. "under bark of Orkho tree"

Comparison : This species is very close to *P. khongius* Mars. but differs in having the arched pronotal base, (Vs. straight in *Khongius*) almost smooth propygidium (Vs. distinctly punctate in *Khongius*), pygidium smooth often with a semilunar deep marking (Vs. irregularly sculptured in *Khonguis*), median arch of the mesosternal stria long (Vs. shorter in *Khongius*), anterior tibiae with 3 teeth (Vs. 4 teeth in *Khongius*).

This species is named as a regards to Sri Subimal Bhattachary, a reputed and popular teacher and poet working at Agartala, Tripura.

Tribe 3. BACANIINI

Genus 3. *Bacanius* Leconte

1853. *Bacanius* Leconte, *Proc. Acad. Philad.* 6 : 291

1910. *Bacanius* Bickhardt, *Coleopt. Cat. Pars.* 24 : 85.

5. *Bacanius atomarius* Sharp

1885. *Bacanius atomarius* Sharp, *Trans. Roy. Dublin Soc.* 3 : 128. Type-loc. Honolulu.

1910. *Bacanius atomarius*, Bickhardt, *Coleopt. Cat. Pars.* 24 : 85.

Material studied : 1 ex., Sonamura, West Tripura Dist., 16. ix. 1992, S. K. Saha & party coll., ex. "haystack"

Distribution : India : Tripura (West Tripura) and West Bengal. Also known from Honolulu.

Diagnostic characters : Very small beetles, brownish, weakly convex, body strongly punctate; elytrae without striae; prosternum, mesometasternum and 1st abdominal segment strongly punctate, mesosternum with a weakly arched, transverse crenulation on the middle; pygidium strongly punctate; anterior tibiae with 4 very minute spine on the margins, Length 1.00 mm. Width-0.60 mm.

Subfamily 3. HISTERINAE

Key to the tribes of Subfamily HISTERINAE known from Tripura.

- 1(2) Mesosternum truncated or feebly rounded infront (rarely broadly but evenly

emarginate); true frontal stria absent; pronotum without lateral striae; front tibiae narrow with fine spine on external edge, not dented TRIBALINI

- 2(1) Mesosternum emarginate infront; frontal stria generally present; pronotum rarely with one or more lateral striae (except *Macrosternus* Mars., *Asolenus* Lewis and *Baconia* Lewis); front tibiae much broadened with external edge dented.

- 3(4) Tarsal groove of front tibiae straight, distinctly bordered at the inner edge only HISTERINI

- 4(3) Tarsal groove of front tibiae 'S' shaped, strongly cleft, sharply defined PLATYSOMINI

Tribe 4. TRIBALINI

Genus 4. *Tribalus* Erichson 1837

1834. *Tribalus* Erichson, in *Klug Jahrb. Ins.* 1, p. 164.

1910. *Tribalus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 65.

6. *Tribalus colombius* Marseul

1864. *Tribalus colombius* Marseul, *Abeille* 1, p. 335, Type-loc. Colombo, Sri Lanka.

1913. *Tribalus colombius*, Bickhardt, *Rec. Ind. Mus.*, 8 : 125.

Material studied : 1 ex., Boxanagar, North Tripura, 15. vi. 1990, G. N. Saha & party coll.; ex. "under bark"; 1 ex., Mohanpur, West Tripura, 9. ix. 1992, S. K. Ghosh coll.

Distribution : India : Tripura (North & West Tripura Dist.), Meghalaya and Assam. Also known from Sri Lanka and Burma.

Diagnostic characters : Small beetles, sub globular, closely punctate, shining black; head convex, frons raised at the lateral margin near eyes, epistome triangular bordered with a short lateral stria, not separated from the frons; pronotum with a fine marginal stria interrupted behind the neck; each elytron with an oblique rudimentary stria near the scutellum, sutural striae

present shortened anteriorly; prosternum bordered with a stria on each side, prosternal lobe short, weakly notched in front; mesosternal stria obsolete in front, mesosternum separated from the metasternum with an weakly arched crenellate stria.

Tribe 5. HISTERINI

Key to the genera of the Tribe HISTERINI known from Tripura.

- 1(2) Mesosternum roundedly truncated anteriorly; prosternal keel narrow; antennal fossette deep and not quite circular; pygidium inflexed; body short, oval and convex *Atholus* Thomson
- 2(1) Mesosternum weakly to strongly sinuous.
- 3(4) Body large; mandibles asymmetrical in case of ♂; labrum transverse but projecting anteriorly; antennal fossette absent; anterior tibiae 3-dentate; *Pachylister* Lewis
- 4(3) Body medium; mandibles symmetrical; antennal fossette present; anterior tibiae 3-4 dentate.
- 5(6) Body oblong, parallel laterally, somewhat convex; labrum semicircular; antennal fossette longitudinally excavated behind the pronotal angle; internal lateral striae on the pronotum always distant from the margin *Santalus* Lewis
- 6(5) Body oval, convex; labrum oval; antennal fossette well defined; internal lateral striae close to the margin, often with an external, more or less shortened *Hister* Linnaeus

Genus 5. *Santalus* Lewis

1906. *Santalus* Lewis, *Ann. Mag. Nat. Hist.* (7) 17 : 341.
1910. *Santalus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 36.

Key to the species of the genus Santalus known from Tripura.

- 1(2) External lateral stria on the pronotum entire, internal sinuous, shortened at the base; dorsal

striae on elytra—1-4 entire, 5 shortened at middle, sutural a little longer than 5; internal subhumeral parallel to the 1st dorsal, close to it, reaching the shoulder with a small, well marked, arched appendix to it; propygidium strongly and closely punctate; anterior tibiae 4-dentate *S. latitibius* (Marseul)

- 2(1) External lateral stria on the pronotum shortened before or near the middle, internal lateral stria entire parallel with the margin; dorsal striae on elytra—1-3 entire 4 a little shortened at the base, 5 not reaching the middle, sutural absent; internal subhumeral fine, not reaching the shoulder; propygidium sparsely punctate; anterior tibiae 3-dentate *S. parallelus* (Redt.)

7. *Santalus latitibius* (Marseul)

1861. *Hister latitibius* Marseul, *Ann. Soc. Ent. Fr.* (4) 1 : 527, Type-loc. Burma.
1910. *Santalus latitibius*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 36.

Material studied : 2 exs., Sepahijola, Agartala, West Tripura Dist., 17. i. 1989, R. S. Burman & party coll.

Distribution : India : Tripura (West Tripura Dist.) and Meghalaya. Also known from Burma.

8. *Santalus parallelus* (Redtenbacher)

1848. *Hister parallelus* Redt., in Hügel, *Kaschmir* iv, 2, p. 514, Type-loc. India.
1906. *Santalus parallelus*, Lewis, *Ann. Mag. Nat. Hist.* (7) 17 : 341.
1910. *Santalus parallelus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 36.

Material studied : 1 ex., Ampa, West Tripura Dist., 18. i. 1971, V. C. Agarwal & party coll.

Distribution : India : Tripura (West Tripura Dist.), West Bengal and Bihar.

Genus 6. *Pachylister* Lewis

1904. *Pachylister* Lewis, *Ann. Mag. Nat. Hist.* (7) 14 : 145.
1910. *Pachylister*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 37.

9. *Pachylister chinensis* (Quens)

1806. *Hister chinensis* Quens, in *Schönh. Syn. Ins.* 1 : 88, Type-loc.—China.
1910. *Pachylister chinensis*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 38.

Material studied : 5 exs. from West Tripura Dist. as follows : 1 ex., Ampa, 18. i. 1971, V. C. Agarwal & party coll.; 1 ex., Banipur, Amarpur, 13. x. 1977, N. Muraleedharan coll.; 1 ex., Ambassa, Teliamura, 7. i. 1989 and 1 ex., Bairagibazar, Agartala, 22. i. 1989, R. S. Burman & party coll.; 1 ex., Khasia Mangal, Teliamura, 9. v. 1992, S. K. Chakraborty coll.; 1 ex., Belonia, South Tripura Dist., 20. ix. 1977, N. Muraleedharan coll.

Distribution : India : Tripura (West & South Tripura Districts), Assam, Meghalaya, Arunachal Pradesh, West Bengal and Karnatak. Also known from China, Sri Lanka, Malayasia and Burma.

Diagnostic characters : Large beetles, body oval, little convex, black; frontal stria obsolete in front, labrum obtusely 3-lobed, mandibles projecting; sides of the pronotum with bristles below, external lateral stria short, internal not touching the base, extending upto the eyes; 1-4 dorsal striae entire, 4 a little shorter than 3, 5 very small, sutural absent, internal sub-humeral stria reaching humerus; propygidium sparsely and pygidium densely punctate; mesosternal stria entire; anterior tibiae with 3 strong teeth. Length 10.8 mm, Width—7.5 mm.

Genus 7. *Hister* Linnaeus

1767. *Hister* Linnaeus, *Syst. Nat.*, ed 12, 11, p. 566.
1910. *Hister*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 35.

10. *Hister pullatus* Erichson

1834. *Hister pullatus* Erichson, in Klug, *Jahrb. Ins.* 1 : 138, Type-loc.—India.
1910. *Hister pullatus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 47.

Material studied : 11 exs. from West Tripura Districts as follows : 1 ex., Ampa, 18. i. 1971, V. C. Agarwal Coll.; 2 exs., Khoai, 5. i. 1989 and

2 exs. Ambassa, Teliamura 7. i. 1989, R. S. Burman Coll.; 6 exs., Khasia Mongal, Teliamura, 9. v. 1992, S. K. Chakraborty Coll., ex. 'cowdung'

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

Diagnostic characters : Medium sized beetles, body oval, rather convex and shining black; frons transverse, finely punctate, with an vertical, median impression like a strong groove, stria entire, forming an angle entering the groove; pronotum bisinuous anteriorly, internal lateral stria entire, external very short; 1-3 dorsal striae entire, 4 shortened at middle with some vestigial point anteriorly, 5 short, apical, sutural arched, reaching the middle; internal subhumeral stria reaching humerus; propygidium and pygidium sparsely punctate at the base, mesosternal stria entire; anterior tibiae 3 dented of which the apical one bifid.

Genus 8. *Atholus* Thomson

1862. *Atholus* Commonotype Skand. Coll., 4 : 228.
1910. *Atholus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 53.

Key to the species of the genus *Atholus* known from Tripura.

- 1(2) Fovea on the pronotum sparsely punctate; 5th & sutural stria of same length, reaching the middle; internal subhumeral stria reduced to an oblong puncture *A. coelestis* (Marseul)
- 2(1) Fovea on the pronotum smooth; 5th reaching the middle, sutural a little longer than 5th, internal subhumeral stria long and deep near the base *A. silvicola* (Lewis)

11. *Atholus coelestis* (Marseul)

1857. *Hister coelestis* Marseul, *Ann. Soc. Ent. Fr.* (3) 5 : 416-417. Type-loc.—China.
1906. *Atholus coelestis*, Lewis, *Ann. Mag. Nat. Hist.* (7) 18 : 402.
1910. *Atholus coelestis*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 53.

Material studied : 9 exs. from West Tripura District as follows : 1 ex., Hatipara, Salbagan, 29. xii. 1988; 3 exs., Maharampur, Teliamura, 8. i. 1989 and 3 exs., Bairagibazar, Agartala, 22. i. 1989, R. S. Burman coll.; 2 exs., Sonamura, 16. ix. 1992, S. K. Saha coll., ex. "Cowdung"

Distribution : India : Tripura (West Tripura District), Meghalaya, West Bengal and Tamil Nadu. Also known from China, Burma and Sri Lanka.

12. *Atholus silvicola* (Lewis)

1901. *Hister silvicola* Lewis, *Ann. Mag. Nat. Hist.* (7) 8 : 376-377. Type-loc. Khasi Hills, Shillong.

1906. *Atholus silvicola* Lewis, *Ann. Mag. Nat. Hist.* (7) 18 : 402.

1910. *Atholus silvicola*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 55.

Material studied : 2 exs., Simna, West Tripura Dist., 10. ix. 1992, S. K. Saha & party coll., ex. "Bannana sheath"

Distribution : India : Tripura (West Tripura District), Meghalaya and West Bengal.

13. *Atholus* sp.

Material studied : 1 ex. Ambassa, West Tripura Dist. 7. i. 1989, R. S. Burman & party coll.

Remarks : This species appears very close to the *A. torquatus* (Mars.) but differs by the lack of impressions on the frons and by the presens of marginal stria behind the neck. Due to the lack of more material we do not designate it to be a new species.

Tribe 6. PLATYSOMINI

Key to the genera of the tribe PLATYSOMINI known from Tripura.

- 1(2) Pygidium convex, generally smooth, strongly inclined *Platysoma* Leach
- 2(1) Pygidium weakly convex, generally strongly punctate, not inclined, arched with the external margin *Platylister* Lewis

Genus 9. *Platylister* Lewis

1892. *Platylister*, Lewis, *Ent. Month. Mag.*, 28 : 103.

1910. *Platylister*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 19.

Key to the species of the genus *Platylister* known from Tripura.

- 1(2) Sutural stria present, reaching beyond the middle, abbreviated at both ends; 4th & 5th dorsal striae subequal, almost reaching the middle; pronotal lateral stria ceasing at the base; internal humeral stria not extending beyond the elytral lateral margin; frons strongly concave; smaller in size
..... *P. strialis* Marseul
- 2(1) Sutural stria absent, 4th & 5th dorsal striae short apical; pronotal lateral stria continue at the base; internal humeral stria extending upto the suture along the apical margin of elytra; frons weakly concave; larger in size
..... *P. atratus* (Erichson)

14. *Platylister atratus* (Erichson)

1834. *Platysoma atratum* Erichson, in Klug, *Jahrb. Ins.*, p. 110. Type-loc.—Coromandel, S. India.

1910. *Platylister atratus*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 19.

Material studied : 4 exs. from West Tripura District, B. N. Das & party coll. as follows : 1 ex., Mohonpur, Agartala, 28.x.1991; 3 exs., Rangamura, 20.ix.1992, ex. "Bannana sheath"

Distribution : India : Tripura (West Tripura Dist.) Meghalaya, West Bengal and South India. Also known from Burma.

15. *Platylister strialis* (Marseul)

1864. *Platysoma strialis* Marseul, *Abeille*, 1 : 301. Type-loc.—Celebes.

1910. *Platylister strialis*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 20.

Material studied : 1 ex., Paratia Rest House, South Tripura District, 30. xii. 1991, M. Dutta & party coll., ex. "under bark of Chamal log"

Distribution : India : Tripura (South Tripura Dist.), Meghalaya, Arunachal Pradesh and West

Bengal. Also known from Celebes, Vietnam, Borneo, Sumatra, Sumba Island, Nepal and Bhutan.

Genus 10. *Platysoma* Leach

1817. *Platysoma* Leach, *Zool. Misc.*, III, p. 77.

1910. *Platysoma*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 19.

16. *Platysoma confucii* Marseul

1857. *Platysoma confucii* Marseul, *Ann. Soc. Ent. Fr.* (3) 5 : 404. Type-loc.—China.

1910. *Platysoma confucii*, Bickhardt, *Coleopt. Cat.*, Pars. 24 : 21.

Material studied : 3 exs., from North Tripura District as follows : 1 ex., Boxanagar, 15.vi.1990, G. N. Saha & party coll.; ex. "under bark"; 2 exs., Kumarghat, 29. ii. 1992, R. S. Burman & party coll.

Distribution : India : Tripura (North Tripura Dist.), Meghalaya and West Bengal. Also known from China, Burma, Sumatra, Philippines and Sri Lanka.

Diagnostic characters : Small to medium sized beetles, frons transverse, encircled with a strong stria, epistome concave; pronotum : lateral stria distant from the marginal, strong and little sinuous, interrupted in front; dorsal stria 1-3 entire, 4-5

equal, shortened at middle, subhumeral entire, reduced; propygidium with sparse punctures; pygidium smooth posteriorly with large punctures at the base; prosternum rounded at the base, mesosternum emarginate bordered with a stria at the sides; anterior tibiae with 4 teeth.

SUMMARY

The present paper deals with 52 examples of 16 species under 10 genera and 3 subfamilies. Out of 16 species, one species, *Platylomalus subimali* has been described as new to science. All this species are recorded for the first time from Tripura. Keys to the subfamilies, tribes, genera and species have been provided. Relevant collection data and important references have also been provided under each species.

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**The chart showing district wise distribution of species of the family
histeridae known from tripura**

Name of species	W. Tripura	N. Tripura	S. Tripura
<i>Acritus duchainei</i> Cooman	—	+	—
<i>Acritus microsomus</i> Cooman	—	+	—
<i>Platylomalus oceanitis</i>	—	—	+
<i>P. subimali</i> sp. n.	—	—	+
<i>Bacanius atomarius</i> Sharp.	—	—	+
<i>Tribalus colombius</i> Mars.	—	+	+
<i>Santalus latitibius</i> (Mars.)	—	—	+
<i>S. parallelus</i> (Redtenbachar)	—	—	+
<i>Pachylister chinensis</i> (Quens)	+	—	+
<i>Hister pullatus</i> Erichson	—	—	+
<i>Atholus coelestis</i> (Marseul)	—	—	+
<i>A. silvicola</i> (Lewis)	—	—	+
<i>Atholus</i> sp.	—	—	+
<i>Platylister atratus</i> (Erichson)	—	—	+
<i>P. strialis</i> (Marseul)	+	—	—
<i>Platysoma confucii</i> Marseul	—	+	—

INSECTA : COLEOPTERA : STAPHYLINIDAE

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INTRODUCTION

The Staphylinidae is the largest family of the Superfamily Staphylinoidea and one of the largest families of order Coleoptera distributed throughout the World. More than 2000 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, 1942-1945) major works have been done by these authors mentioned above. Besides these recent workers namely Herman, Smetana, Coiffait, Rougemont, Hammond and Biswas & Sengupta. But none of these workers worked on the fauna of Tripura and no species has been recorded from Tripura before this work. 59 species under 28 genera and 7 subfamilies are first time recorded from Tripura in this work of which 3 species namely, *Holossus aberrans* Fauvel, *Stiliculus luteipennis* Kraatz and *Philonthus rotundicollis* Menet are first time recorded from India.

The present work on the family Staphylinidae is based on the collection brought from different districts of Tripura by various recent survey parties from Zoological Survey of India. This study is based on 302 examples comprising 59 species under 28 genera, 8 tribes and 7 subfamilies. Key to the subfamilies, Tribes, genera and Species and distributional data of each species of the family Staphylinidae for Tripura have been provided. A chart showing district wise distribution of the species recorded from Tripura is also given. 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, Calcutta.

SYSTEMATIC ACCOUNT

Subfamily (I) OXYTELINAE

Tribe 1. PIESTINI

1. *Holossus* Motschulsky

1. *longipennis* Cameron
2. *aberrans* Fauvel
3. *Olisthaeriformis* Motschulsky

Tribe 2. ELEUSIINI

2. *Eleusis* Castelnau

4. *fusciceps* Kraatz
5. *humilis* Erichson

Tribe 3. OXYTELINI

3. *Oxytelopsis* Fauvel

6. *pseudopsina* Fauvel

4. *Oxytelus* Gravenhorst

7. *bengalensis* Erichson
8. *varipennis* Kraatz
9. *incisus* Motschulsky

5. *Bledius* Leach

10. *transversus* Cameron
11. *baltus* Biswas & Sengupta
12. *maindroni* Fauvel

- Subfamily (II) STENINAE
6. *Stenus* Latreille
13. *monomerus* Fauvel
- Subfamily (III) EUAESTHETINAE
7. *Stenaesthetus* Sharp
14. *sunioides* Sharp
- Subfamily (IV) PAEDERINAE
- Tribe 4. PAEDERINI
8. *Astenus* Stephens
15. *indicus* (Kraatz)
16. *nilgiriensis* Cameron
17. *gracilentus* Fauvel
9. *Acanthoglossa* Kraatz
18. *testaceipennis* Kraatz
10. *Pachymedon* Cameron
19. *shugnuensis* Cameron
11. *Dibelonetes* Shalberg
20. *bengalensis* Biswas & Sengupta
12. *Stilicus* Latreille
21. *rufescens* Sharp
22. *pygmaeus* Kraatz
23. *luteipennis* Kraatz
24. *velutinus* Fauvel
13. *Charichirus* Sharp
25. *chinensis* (Boh.)
14. *Cryptobium* Mannerheim
26. *bernhaueri* Cameron
27. *abdominale* var.
rufipenne Motschulsky
15. *Thinocharis* Kraatz
28. *carinicollis* Kraatz
29. *debilis* Cameron
16. *Paederus* Fabricius
30. *fuscipes* Curtis
17. *Stiliderus* Motschulsky
31. *crassus* (Kraatz)
18. *Stilicopsis* Sachse
32. *indica* Cameron
33. *trinotata* (Kraatz)
34. *pallida* Cameron
19. *Scopaeus* Erichson
35. *beesoni* Cameron
36. *testaceus* Motschulsky
37. *planiusculus* Kraatz
38. *limbatus* Kraatz
20. *Lithocharis* Boised
39. *nigriceps* Kraatz
- Subfamily (V) STAPHYLININAE
- Tribe 5. XANTHOLININI
21. *Leptacinus* Erichson
40. *parumpunctatus* Gyll.
41. *notabilis* Cameron
42. *filum* Kraatz
22. *Indoscitalinus* Heller
43. *anachoreta* (Erichson)
- Tribe 6. STAPHYLININI
23. *Philonthus* Curtis
44. *assamensis* Cameron
45. *rotundicollis* Menet
46. *aeger* Eppelsheim
47. *delicatulus* Boh.
48. *Confusus* Cameron
49. Sp.

- Subfamily (VI) TACHYPORINAE
 Tribe 7. TACHYPORININI
24. *Conosoma* Kraatz
 50. *marginatum* Cameron
25. *Tachyporus* Gravenhorst
 51. *alticola* Cameron
 52. *simlaensis* Cameron
26. *Coproporus* Kraatz
 53. *rufus* Kraatz
 54. *bivittatus* Bernhauer
 55. *ruficollis* Cameron
 56. *minimus* (Motschulsky)
27. *Leucoparyphus* Kraatz
 57. *limbifer* var. *marginicollis* Kraatz
- Subfamily (VII) ALEOCHARINAE
 Tribe 8. MYRMEDONIINI
28. *Cordalia* Jacobs
 58. *longicornis* Cameron
 59. *vestita* Boh.

*Key to the Subfamilies of the Family
 STAPHYLINIDAE from Tripura.*

1. Prothoracic spiracles concealed [except in *Platystehus* and *Thinobius* (but then the suture dehiscent) and *Lithocharis* and *Cryptobium*] by the triangular epimera, which externally are fused with the pronotal epipleura 2
- Prothoracic spiracles exposed, or, if concealed, the epimera are free 5
- 2(1) 1st segment of the maxillary palpi elongate. Posterior coxal conical 3
- 1st segment of the maxillary palpi very short 4

- 3(2) Tarsi 5, 5, 5, ... STENINAE
- Tarsi 4, 4, 4 or 5, 5, 4
EUAESTHETINAE
- 4(2) Antennae inserted under a thickened marginal border of the head. Tarsi variable OXYTELINAE
- Antennae inserted under the prominent anterior angles of the front margin of the head. Tarsi 5, 5, 5 PAEDERINAE
- 5(1) Antennae inserted on the front margin of the head. Prothoracic spiracles exposed
STAPHYLININAE
- Antennae inserted at the inner border of the eye. Prothoracic spiracles exposed or covered by a free-lying epimeron 6
- 6(5) Elytra not extending beyond the metathorax; the prothoracic spiracles exposed
 ALEOCHARINAE
- Elytra usually extending beyond the metathorax; the epipleura separated by a fine sharp keel from the dorsal surface. The prothoracic spiracles usually exposed, but covered by free lying epimera in *Tachinus*, *Tachinomorphus* and *Tachinoderus*
 TACHYPORINAE

Subfamily OXYTELINAE

*Key to the tribes and genera of the
 subfamily OXYTELINAE*

1. Posterior trochanters large 2
- Posterior trochanters small
 OXYTELINI
 3
- 2(1) Anterior trochantin exposed as a long tongue-shaped process behind the posterior margin of the prosternum and separated from the epipleura by a suture. Parallel depressed species. Tarsi 5-segmented ELEUSIINI
 (*Eleusis* Castelnau)
- Anterior trochantin small, not or but slightly exposed PIESTINI
 (*Holusus* Motschulsky)

- 3(1) Anterior and middle tibiae strongly spinose externally 4
- Anterior and middle tibiae ciliate, at most with two small spines before the apex
..... *Oxytelopsis* Fauvel
- 4(3) Cylindrical species with geniculate antennae *Bledius* Leach
- Species not cylindrical, antennae normal ...
..... *Oxytelus* Gravenhorst

Genus *Holosus* Motschulsky

1857. *Holosus* Motschulsky, *Bull. Soc. Mosc.*, **30**(4) : 496.

Key to the species of *Holosus* Motschulsky

- 1 Thorax not deeply impressed at the posterior angles. Facies of *Olisthaerus*
..... *olisthaeriformis* Motschulsky
- Thorax with deep impression at the posterior angles 2
- 2(1) Penultimate segments of antennae fully as long as broad *longipennis* Cameron
- Penultimate segments of antennae distinctly transverse *aberrans* Fauvel

1. *Holosus olisthaeriformis* Motschulsky

1857. *Holosus olisthaeriformis* Motschulsky, *Bull. Mosc.*, **30** (4) : 500.

1930. *Holosus olisthaeriformis* : Cameron, *Fauna British India*, **1** : 47.

Material examined : 1 ex., INDIA : South Tripura, Amarpur, 1 ex., 2. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Cameron (1930) in *Fauna of British India* mentioned only India.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

2. *Holosus longipennis* Cameron

1925. *Holosus longipennis* Cameron, *Ent. Monthly Mag.*, **61** : 235.

1930. *Holosus longipennis* Cameron, *Fauna British India*, **1** : 49-50.

Material examined : 1 ex., INDIA : West Tripura, Mongiabari, 1 ex., 24. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Tamil Nadu.

Elsewhere : Nil.

Remarks : In the present study, this species is recorded for the first time from Tripura.

3. *Holosus aberrans* Fauvel

1904. *Holosus aberrans* Fauvel, *Rev. d'Ent.*, **23** : 78.

1930. *Holosus aberrans* : Cameron, *Fauna British India*, **1** : 51.

Material examined : 2 exs., INDIA : West Tripura, Mongibari, 2 exs., 24. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Nil.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from India (Tripura).

Genus *Eleusis* Castelnau

1835. *Eleusis* Castelnau, *Etud. Ent.*, **1** : 131.

Key to the species of *Eleusis* Castelnau

1. Minute species. Length 1.5 mm. Species in great part reddish or reddish-testaceous
..... *fusciceps* Kraatz
- Larger species. Length 3 mm. Species dark, the disc of the elytra often reddish or reddish-testaceous *humilis* Erichson

4. *Eleusis humilis* Erichson

1840. *Eleusis humilis* Erichson, *Gen. Spec. Staph.*, : 839.

1863. *Eleusis fasciata* Lec., *New Spec. Col.*, **1** : 59.

1859. *Eleusis indica* Kraatz, *Arch. Naturgesch.*, **25**(1) : 183.

1865. *Eleusis pallidipennis* Fauvel, *Bull. Soc. Linn. Norm.*, **9** : 40.

1889. *Eleusis subtilis* Sharp, *Ann. Mag. Nat. Hist.*, 3(6) : 467.
1865. *Eleusis tenuis* Fauvel, *Bull. Soc. Linn. Norm.*, 9 : 41.
1930. *Eleusis humilis* : Cameron, *Fauna British India*, 1 : 83-84.

Material examined : 34 exs., INDIA : West Tripura, Mongiabari, 15 exs., 14.vi. 1990, D. N. Biswas coll., South Tripura, Amarpur, 6 exs., 12. vi. 1990, D. N. Biswas coll., Boxanagar, 13 exs, 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Andamans, Tamil Nadu, Uttar Pradesh and Meghalaya.

Elsewhere : Sri Lanka, Burma, Japan and generally distributed throughout the tropics.

Remarks : In the present study this species is recorded for the first time from Tripura.

5. *Eleusis fusciceps* Kraatz

1859. *Eleusis fusciceps* Kraatz. *Arch. Naturgesch.*, 25 (1): 184.
1930. *Eleusis fusciceps* : Cameron, *Fauna British India*, 1 : 88.

Material examined : 28 exs., INDIA : West Tripura, Mongiabari, 26 exs., 24. vi. 1990. D. N. Biswas coll., South Tripura, Amarpur, 2 exs., 12. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Andamans, Uttar Pradesh and Meghalaya.

Elsewhere : Singapore and Sumatra.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Oxytelopsis* Fauvel

1895. *Oxytelopsis* Fauvel, *Rev. d'Ent.*, 14 : 199.

6. *Oxytelopsis pseudopsina* Fauvel

1895. *Oxytelopsis pseudopsina* Fauvel, *Rev. d'Ent.*, 14 : 201.

1930. *Oxytelopsis pseudopsina* : Cameron, *Fauna British India*, 1 : 206-207.

1980. *Oxytelopsis pseudopsina* : Biswas & Sengupta, *Oriental Insecta*, 14(3) : 392.

Diagnostic Characters : Ferruginous red, abdomen obscure reddish-testaceous. Head much narrower than the thorax, the post-ocular region evenly rounded to the neck and scarcely twice as long as the eye. Length. 2.3 to 2.75 mm.

Material examined : 21 exs., INDIA : South Tripura, Bagma, 20 exs., 17. vi. 1990, D. N. Biswas coll, Belonia, 1 ex., 19. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : West Bengal, Uttar Pradesh and Meghalaya.

Elsewhere : Burma, Malay Peninsula, Sumatra, Java and Borneo.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Oxytelus* Gravenhorst

1802. *Oxytelus* Gravenhorst, *Col. Micr. Brunsv.*, : 101.

Key to the species of *Oxytelus* Gravenhorst

1. Upper surface entirely micro-reticulate and consequently dull; larger species, length generally above 5 mm *bengalensis* Erichson
- At least the elytra and much of the pronotum lacking micro-reticulation, upper surface at least moderately shining in part; smaller species, length 2.2 to 5 mm. 2
- 2(1) Larger species, length 4 to. 5 mm; elytra with lateral furrow *varipennis* Kraatz
- Smaller species, length 2 to 3.8 mm; elytra without lateral furrow *incisus* Motschulsky
7. *Oxytelus (Caccoporus) incisus* Motschulsky
1857. *Oxytelus incisus* Motschulsky, *Bull. Soc. Nat. Mosc.*, 30 : 504.

1930. *Oxytelus (Caccoporus) varipennis* : Cameron, *Fauna British India* **1** : 234-235.
- 1973-75. *Oxytelus varipennis* : Hammond, *Ent. Scand. Suppl.*, **4** : 154-155.

Material examined : 2 exs., INDIA : West
Tripura, Mohanpur, 2 exs., 9. ix. 1992, B. N. Das
& party coll.

Distribution. : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Bledius* Leach

1819. *Bledius* Leach, (New genera) In Samouelle, George, The entomologist's useful compendium. London, : 174.

*Key to the subgenera and species of Indian
Bledius*

1. Procoxal fissure open, protrochantin widely exposed and large; clypeus dentate or tuberculate *Pucerus (transversus) Cameron*

— Procoxal fissure closed or slightly open, protrochantin concealed or narrowly exposed and small; clypeus devoid of any dentate or tuberculate *Hesperophilus* 2

2(1) Procoxal fissure closed; elytral epipleural ridge present only one-third length of elytron *baltus* Biswas & Sengupta

— Procoxal fissure open; elytral epipleural ridge present along the entire length of elytron. *maindroni* Fauvel

10. *Bledius (Pucerus) transversus*
Cameron

1930. *Bledius (Pucerus) transversus* Cameron, Fauna British India, 1 : 277-278.

1989. *Bledius (Pucerus) transversus* : Biswas & Sengupta, *Rec. zool. Surv. India*, Occ. Paper No. 122, : 9.

1859. *Oxytelus varipennis* Kraatz, Arch. Naturgesch.,
25(1) : 172.

Material examined : 1 ex., INDIA : West Tripura, Sephaijala, 1 ex., 14. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Remarks : In the present study this species is recorded for the first time from Tripura.

11. *Bledius (Hesperophilus) baltus* Biswas & Sengupta

1989. *Bledius (Hesperophilus) baltus* Biswas & Sengupta, *Rec. zool. Surv. India*, Occ. Paper No. 122, : 21-22, figs. 113-119.

Material examined : 1ex., INDIA : South Tripura, Belonia, 1ex., 21. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

12. *Bledius (Hesperophilus) maindroni* Fauvel

1903. *Bledius maindroni* Fauvel, *Rev. d'Ent.*, 22 : 151.

1930. *Bledius (Hesperophilus) maindroni* : Cameron, *Fauna British India*, 1 : 282-283.

1989. *Bledius (Hesperophilus) maindroni* : Biswas & Sengupta, *Rec. zool. Surv. India*, Occ. Paper No. 122, : 21, figs. 111-112.

Material examined : 1ex. INDIA : South Tripura, Belonia, 1 ex., 19. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : Tamil Nadu.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Subfamily (II) STENINAE

Genus *Stenus* Latreille

1796. *Stenus* Latreille, *Prec. Car. Gen. Ins.*, : 77.

1930. *Stenus* : Cameron, *Fauna British India*, 1 : 318-319.

13. *Stenus (Hypostenus) monomerus* Fauvel

1895. *Stenus monomerus* Fauvel, *Rev. d'Ent.*, 14 : 214.

1930. *Stenus (Hypostenus) Monomerus* : Cameron, *Fauna British India*, 1 : 380.

Diagnostic characters : Black, shining. Antennae testaceous, the 1st segment and the club pitchy. Legs testaceous, the knees very much infuscate. Length 3.3 mm.

Material examined : 1 ex., INDIA : South Tripura, Santirbazar, 1 ex., 11. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Burma and MaLay Peninsula.

Remarks : In the present study this species is recorded for the first time from Tripura.

Subfamily (III) EUAESTHETINAE

Genus *Stenaesthetus* Sharp

1874. *Stenaesthetus* Sharp, *Trans. ent. Soc. Lond.*; 79.

1930. *Stenaesthetus* : Cameron, *Fauna British India*, 1 : 445-446.

14. *Stenaesthetus sunioides* Sharp

1874. *Stenaesthetus sunioides* Sharp, *Trans. Ent. Soc. Lond.*, : 80.

1930. *Stenaesthetus sunioides* : Cameron, *Fauna British India*, 1 : 446.

Diagnostic characters : Reddish-brown, head and thorax with close, moderately fine umbilicate punctures. Antennae and legs testaceous, the club of the former scarcely infuscate. Length 2.5 mm.

Material examined : 3 exs., INDIA : South Tripura, Boxanagar, 3 exs., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh, West Bengal and Meghalaya.

Elsewhere : Sri Lanka and Sierra Leone.

Remarks : In the present study this species is recorded for the first time from Tripura.

Subfamily (IV) PAEDERINAE

Key to the genera of the tribe PAEDERINI

- 1 Antennae strongly geniculate
.....*Cryptobium* Mannerheim
- Antennae not geniculate 2
- 2(1) Fourth tarsal segment bilobed 3
- Fourth tarsal segment simple 7
- 3(2) Fourth segment of maxillary palpi short, broad, and wart-like
.....*Paederus* Fabricius
- Fourth segment of maxillary palpi very slender, subulate 4
- 4(3) Labrum bilobed
.....*Stiliderus* Motschulsky
- Labrum bidentate in the middle 5
- 5(4) Labrum emarginate in the middle, the fundus with two small teeth. Head oblong
.....*Astenus* Stephens
- Labrum produced in the middle 6
- 6(5) The produced part of the labrum with two long teeth *Dibelonetes* Sahlberg
- The produced part of the labrum with two short teeth*Stilicopsis* Sachse
- 7(2) First two segments of antennae very stout, the following very slender
.....*Thinocharis* Kraatz
- Antennae normal 8

- 8(7) Neck very slender 9
- Neck at least a fourth as broad as the base of the head 10
- 9(8) Labrum 2-dentate; tongue membranous, bilobed*Stilicus* Latreille
- Labrum 4-dentate; tongue corneous, trifid
.....*Scopaeus* Erichson
- 10(8) Labrum dentate 11
- Labrum with minute median notch
.....*Pachymedon* Cameron
- 11(10) Labrum bidentate in the middle or at least trisinate; prosternal epimera present, the stigma concealed
.....*Acanthoglossa* Stephens
- Labrum unidentate in the middle; prosternal epimera absent, the stigma exposed 12
- 12(11) Prosternal process very short; abdomen not keeled at the middle of the base below
.....*Lithocharis* Boisd
- Prosternal process moderately long; abdomen distinctly keeled at the middle of the base below
.....*Charichirus* Sharp

Genus *Astenus* Stephens

1832. *Astenus* Stephens, III. *Brit. Ent. Mand.*, 5 : 275.

Key to the species of *Astenus* Stephens

1. Sides of the elytra with black setae either outstanding or decumbent 2
- Sides of the elytra without black setae
.....*indicus* Kraatz
- 2(1) Larger (5 mm) and more robust; postocular region parallel for a short distance, then broadly rounded to the base
..... *nilgiriensis* Cameron
- Smaller (4 mm) and narrower; postocular region coarctate with the base
.....*gracilentus* Fauvel

15. *Astenus nilgiriensis* Cameron

1931. *Astenus nilgiriensis* Cameron, *Fauna British India*, **2** : 82-83.

Material examined : 1 ex., INDIA : South Tripura, Bagma, 1 ex., 17. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Tamil Nadu.

Remarks : In the present study this species is recorded for the first time from Tripura.

16. *Astenus gracilentus* Fauvel

1859. *Sunius gracilis* Kraatz, *Arch. Naturgesch.*, **25** (1) : 147.

1879-80. *Astenus gracilentus* Fauvel, *Ann. Mus. Civ. Gen.*, **15** : 83.

1931. *Astenus gracilentus* : Cameron, *Fauna British India*, **2** : 84-85.

Material examined : 4 exs., INDIA : West Tripura, Boxanagar, 4 exs., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Meghalaya, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh and Singapore.

Remarks : In the present study this species is recorded for the first time from Tripura.

17. *Astenus indicus* (Kraatz)

1859. *Sunius indicus* Kraatz, *Arch. Naturgesch.*, **25** (1) : 148.

1864. *Sunius pallidulus* Wollaston, *Cat. Can.*, **8** : 648.

1874. *Sunius oculatus* Sharp, *Trans. ent. Soc. Lond.* : 72.

1891. *Sunius parviceps* Ragusa, *Nat. Soc.*, **10** : 239.

1931. *Astenus indicus* : Cameron, *Fauna British India*, **2** : 88.

1983. *Astenus indicus* : Biswas & Sengupta, *Bull Zool. Surv. India*, **5**(1) : 1-9.

Material examined : 6 exs., INDIA : South Tripura, Nalchabazar, 6 exs., 18. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Maharashtra and West Bengal.

Elsewhere : Sri Lanka, Burma, Canaries, Mediterranean, East and West Africa.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Acanthoglossa* Kraatz

1859. *Acanthoglossa* Kraatz, *Arch. Naturgesch.*, **25**(1) : 144.

18. *Acanthoglossa testaceipennis* Kraatz

1859. *Acanthoglossa testaceipennis* Kraatz, *Arch. Naturgesch.*, **25**(1) : 145.

1931. *Acanthoglossa testaceipennis* : Cameron, *Fauna British India*, **2** : 121-122.

Diagnostic characters : Rather shining; head and thorax red, elytra reddish-yellow. Antennae reddish-yellow. Legs yellow. Head and thorax with umbilicate punctures. Species with normal short, fine, decumbent hairs. Length 3 mm.

Material examined : 19 exs., INDIA : West Tripura, Boxanagar, 3 exs., 15. vi 1990, D. N. Biswas coll., North Tripura, Mongiabari, 15 exs., 24. vi. 1990, D. N. Biswas coll., South Tripura, Amarpur, 1 ex., 23. ix. 1992, S. K. Saha & S. K. Ghosh coll.

Distribution : INDIA : Tripura.

Other Indian States : Tamil Nadu, Uttar Pradesh, Meghalaya and West Bengal.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Pachymedon* Cameron

1931. *Pachymedon* Cameron, *Fauna British India*, **2** : 127.

19. *Pachymedon shugnuensis* Cameron

1931. *Pachymedon shugnuensis* Cameron, *Fauna British India*, **2** : 127-128.

Diagnostic characters : Species rather shining; head and thorax dark ferruginous-red and coarsely

granular, elytra black, the humeral angles reddish; abdomen pitchy-black, the posterior margins of 5th and 6th segments reddish-yellow. Antennae reddish. Legs reddish-yellow. Length 5 mm.

Material examined : 1 ex., INDIA : South Tripura, Nalchabazar, 1 ex., 18. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Manipur and West Bengal.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Dibelonetes* Sahlberg

1844. *Dibelonetes* Sahlberg, *Acta Soc. Fenn.*, 2 : 791.

20. *Dibelonetes bengalensis* Biswas & Sengupta

1980. *Dibelonetes bengalensis* Biswa & Sengupta, *Oriental Insects* 14(2) : 253-262.

Diagnostic characters : General appearance narrow, shining and brown, elytra short and its posterior margin broadly ferruginous red, apex of femora narrowly infuscate, segments 4 and 5 of abdomen black, abdomen with basal portion of segments 1-3 densely and coarsely punctured. Head and thorax with reticulate, umbilicate punctured. Length 2.80 mm.

Material examined : 1 ex., INDIA : West Tripura, Boxanagar, 1 ex., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh, Meghalaya and West Bengal.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Stilicus* Latreille

1825. *Stilicus* Latreille, *Encyc. Meth.*, 10 : 495.

Key to the species of *Stilicus* Latreille

1. Elytra with larger and smaller Punctures ...
..... 2

— Elytra uniformly punctured 3

2(1) Larger (4.3 to 7 mm). Elytra in greater part dark *rufescens* Sharp

— Smaller (2 to 2.4 mm). Elytra brownish-yellow *Pygmaeus* Kraatz

3(1) Elytra yellow *luteipennis* Kraatz

— Elytra dark, the posterior margin reddish-yellow *velutinus* Fauvel

21. *Stilicus velutinus* Fauvel

1819. *Stilicus velutinus* Fauvel, *Rev. d'Ent.*, 14 : 226.

1931. *Stilicus velutinus* : Cameron, *Fauna British India*, 2 : 103-104.

Material examined : 2 exs., INDIA : West Tripura, Boxanagar, 2 exs., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : West Bengal and Uttar Pradesh.

Elsewhere : Burma.

Remarks : In the present study this species is recorded for the first time from Tripura.

22. *Stilicus pygmaeus* Kraatz

1859. *Stilicus pygmaeus* Kraatz, *Arch. Naturgesch.*, 25(1) : 126.

1931. *Stilicus pygmaeus* : Cameron, *Fauna British India*, 2 : 109.

Material examined : 1 ex., INDIA : West Tripura, Boxanagar, 1 ex., 15. vi. 1980, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Meghalaya and West Bengal.

Elsewhere : Sri Lanka, Malaya States, Saigon and Timor.

Remarks : In the present study this species is recorded for the first time from Tripura.

23. *Stilicus luteipennis* Kraatz

1859. *Stilicus luteipennis* Kraatz, Arch. Naturgesch., 25(1) : 126.

1931. *Stilicus luteipennis* : Cameron, Fauna British India, 2 : 107.

Material examined : 7 exs., INDIA : West Tripura, Boxanagar, 1 ex. 15. vi. 1990, D. N. Biswas coll., Chabri, 1 ex., 25. vi. 1990, D. N. Biswas coll., South Tripura, Santirbazar, 4 exs., 11. vi. 1990, D. N. Biswas coll., Nalchalbazar, 1 ex., 18. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Nil.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from India (Tripura).

24. *Stilicus rufescens* Sharp

1874. *Stilicus rufescens* Sharp Trans. Ent. Soc. Lond., : 61.

1885. *Stilicus rubellus* Eppelsheim, D.E.Z., : 121.

1914. *Stilicus rufescens* var. *indicus* Cameron, Trans. Ent. Soc. Lond., : 542.

1931. *Stilicus rufescens* : Cameron, Fauna British India, 2 : 108-109.

Material examined : 2 exs., INDIA : West Tripura, Boxanagar, 2 exs., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Meghalaya and Tamil Nadu.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Charichirus* Sharp

1889. *Charichirus* Sharp, Ann. Mag. Nat. Hist., 2(6) : 262.

25. *Charichirus chinensis* (Boh.)

1858. *Lathrobium chinensis* Boh., Resa Eugen., : 32.

1858. *Lithocharis dimidiatus* Motschulsky, Bull. Mosc., 31(2) : 645.

1859. *Lithocharis obliquus* Walker, Ann. Mag. Nat. Hist., 3(3) : 52.

1859. *Lithocharis spectabilis* Kraatz, Arch. Naturgesch., 25(1) : 135.

1931. *Charichirus chinensis* : Cameron, Fauna British India, 2 : 167-168.

Diagnostic characters : Black, nearly opaque, thorax occasionally pitchy; elytra with the posterior third deep red, the colour produced along the suture almost to the scutellum; abdomen with the posterior margins of the segments very narrowly reddish. Antennae reddish. Legs yellow. Length 6.5 mm.

Material examined : 17 exs., INDIA : West Tripura, Boxanagar, 16 exs., 15. vi. 1990, D. N. Biswas coll., South Tripura, Shaigara, 1 ex., 13. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Sri Lanka and Japan

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Cryptobium* Mannerheim

1830. *Cryptobium* Mannerheim, Brach., : 38.

Key to the species of *Cryptobium* Mannerheim

1. Head in both sexes strongly dilated behind; elytra red with the basal third black; abdomen black ***bernhaueri*** Cameron
- Head with the posterior angles broadly rounded to the base; elytra red; abdomen with the 5th (visible) segment red ***abdominale*** var. ***rufipenne*** Motschulsky

26. *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* : Cameron, *Fauna British India*, 2 : 243-244.

Material examined : 1 ex., INDIA : West Tripura, Sephaijala, 1 ex., 14. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Tripura.

27. *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 : 1 ex., INDIA : North Tripura, Mohanpur, 1 ex., 17. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Thinocharis* Kraatz

1859. *Thinocharis* Kraatz, *Arch. Naturgesch.*, 25 (1) : 142.

Key to the species of *Thinocharis* Kraatz

1. Larger (2.1 to 2.5 mm.) and more robust; head reddish-brown*carinicollis* Kraatz
- Smaller (1.8 mm.) and narrower; head black*debilis* Cameron

28. *Thinocharis carinicollis* Kraatz

1859. *Thinocharis carinicollis* Kraatz, *Arch. Naturgesch.*, 25 (1) : 143.

1931. *Thinocharis carinicollis* : Cameron, *Fauna British India*, 2 : 118.

Material examined : 1 ex., INDIA : West Tripura, Boxanagar, 1 ex., 15. vi. 1990, D.N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Sri Lanka, Singapore and Malay Peninsula.

Remarks : In the present study this species is recorded for the first time from Tripura.

29. *Thinocharis debilis* Cameron

1931. *Thinocharis debilis* Cameron, *Fauna British India*, 2 : 119.

Material examined : 16 exs., INDIA : West Tripura, Boxanagar, 15 exs., 15. vi. 1990, D. N. Biswas coll., South Tripura, Bagma, 1 ex., 17. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Paederus* Fabricius

1775. *Paederus* Fabricius, *Syst. Ent.*, : 268.

30. *Paederus fuscipes* Curtis

1823-40. *Paederus fuscipes* Curtis, *Ent. Brit.*, : 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.

Diagnostic characters : Shining; head and last two abdominal segments black; thorax and abdominal segments 1-4 (visible) red; elytra blue.

Antennae dark, the first three or four segments testaceous. Length 6.5 to 7 mm.

Material examined : 9 exs., INDIA : West Tripura, Agartala, Champaknagar, 1 ex., 11. i. 1989, R. S. Burman coll., Teliamura, 29. i. 1971, 1 ex., V. C. Agarwal coll., Ampa, 20. i. 1971, 3 exs., V. C. Agarwal coll., Kanchannagar, 1 ex., 29. xi. 1991, K. K. Roy coll., Kanthalchhari, 1 ex., 2. i. 1992, M. Dutta coll., Nischandrapur 1 ex., 30. xii. 1991, M. Dutta coll.

Distribution : INDIA : Tripura.

Other Indian States : Bihar, Karnataka, Madhya Pradesh, West Bengal and Meghalaya.

Elsewhere : Sri Lanka and also rest of the world except America.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Stiliderus* Motschulsky

1858. *Stiliderus* Motschulsky *Bull. Mosc.*, 31(2) : 639.

31. *Stiliderus crassus* (Kraatz)

1859. *Psilotrachellus crassus* Kraatz, *Arch. Naturgesch.*, 25 : 124.

1931. *Psilotrachellus crassus* ; Cameron, *Fauna British India*, 2 : 115-116.

1939. *Stiliderus crassus* : Blackwelder, *Proc. U.S. Nat. Mus.*, 87 : 107.

1986. *Stiliderus crassus* : Rougemont, *Ent. Abh. Mus. Tierk. Dresden*, 50(2) : 44-45.

Diagnostic characters : Head, thorax and elytra black; thorax granular, with shining keel behind in the middle; elytra subserially, coarsely punctured. Antennae reddish, the middle segments more or less infusate. Length 5 mm.

Material examined : 1 ex., INDIA : West Tripura, Boxanagar, 1 ex., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : West Bengal.

Elsewhere : Sri Lanka, Thailand, Singapore and China.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Stilicopsis* Sachse

1852. *Stilicopsis* Sachse, *Stett. Ent. Zeit.*, 22 : 144.

Key to the species of *Stilicopsis* Sachse

1. Abdomen in greater part black or brown...
.....*indica* Cameron
- Abdomen otherwise coloured 2
2. Abdomen ferruginous-red, the 4th (visible) segment black..... *trinotata* (Kraatz)
- Abdomen entirely reddish-yellow
.....*pallida* Cameron

32. *Stilicopsis pallida* Cameron

1931. *Stilicopsis pallida* Cameron, *Fauna British India*, 2 : 98.

Material examined : 7 exs., INDIA : West Tripura, Mohanpur, 4 exs., 7. vi. 1990, D. N. Biswas coll., Boxanagar, 1 ex., 15. iv. 1990, D. N. Biswas coll.; South Tripura, Bagma, 1 ex., 17. vi. 1990, D. N. Biswas coll.; Simana, 1 ex., 10. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

33. *Stilicopsis indica* Cameron

1931. *Stilicopsis indica* Cameron, *Fauna British India*, 2 : 98.

Material examined : 2 exs., INDIA : South Tripura, Nalchalbazar, 2 exs., 18. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

34. *Stilicopsis trinotata* (Kraatz)

1858. *Sunius trinotata* Kraatz, Arch. Naturgesch., 25(1) : 149.

1931. *Stilicopsis trinotata* : Cameron, Fauna British India, 2 : 95-96.

Material examined : 2 exs., INDIA : West Tripura, Boxanagar, 2 exs., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Tamil Nadu.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Scopaeus* Erichson

1839-40. *Scopaeus* Erichson, Gen. Spec. Staph., : 604.

Key to the species of *Scopaeus* Erichson

1. Head Suborbicular, the posterior angles broadly rounded, never widened behind
..... *beesoni* Cameron
- Head subquadrate, the posterior angles briefly rounded, sometimes a little widened behind 2
- 2(1) Larger (4 mm.); sculpture of head and thorax finely granular *testaceus* Motschulsky
- Smaller, sculpture of head and thorax not granular 3
- 3(2) Head and thorax concolorous, red or yellowish-red *planiusculus* Kraatz
- Head and thorax not concolorous; head black and thorax red *limbatus* Kraatz

35. *Scopaeus testaceus* Motschulsky

1858. *Scopaeus testaceus* Motschulsky, Bull. Mosc., 31(2) : 642.

1859. *Scopaeus rubrotestaceus* Kraatz, Arch. Naturgesch., 25(1) : 128(F).

1859. *Scopaeus semifuscus* Kraatz, Arch. Naturgesch., 25(1) : 128 (F).

1931. *Scopaeus testaceus* : Cameron, Fauna British India, 2 : 173.

Material examined : 1 ex., INDIA : South Tripura, Belonia, 19. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Maharashtra, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka, Singapore and New Guinea.

Remarks : In the present study this species is recorded for the first time from Tripura.

36. *Scopaeus limbatus* Kraatz.

1859. *Scopaeus limbatus* Kraatz, Arch. Naturgesch., 25(1) : 130.

1931. *Scopaeus limbatus* : Cameron, Fauna British India, 2 : 177-178.

Material examined : 2 exs., INDIA : South Tripura, Amarapur, 1 ex., 23. ix. 1992, S. K. Saha & S. K. Ghosh coll., West Tripura, Boxanagar, 1 ex., 15. vi. 1990, 1 ex., D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Karnataka, Uttar Pradesh, West Bengal and Bihar.

Elsewhere : Sri Lanka, Malay Peninsula, Singapore and Penang.

Remarks : In the present study this species is recorded for the first time from Tripura

37. *Scopaeus planiusculus* Kraatz

1859. *Scopaeus planiusculus* Kraatz, Arch. Naturgesch., 25 : 132.

1931. *Scopaeus planiusculus* : Cameron, Fauna British India, 2 : 181-182.

Material examined : 1 ex., INDIA : North Tripura, Jatanbari, 1 ex., 10. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Cameron (1931) locality data of this species mentioned only "India"

Elsewhere : Java and Indo-China.

Remarks : In the present study this species is recorded for the first time from Tripura.

38. *Scopaeus beelsoni* Cameron

1931. *Scopaeus beelsoni* Cameron, *Fauna British India*, 2 : 185-186.

Material examined : 1 ex., INDIA : West Tripura, Mohanpur, 1 ex., 7. vi. 1990. D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Lithocharis* Boised

1835. *Lithocharis* Boised and Lacord., *Faun. Ent. Par.*, 1 : 431.

39. *Lithocharis nigriceps* Kraatz

1859. *Lithocharis nigriceps* Kraatz, *Arch Naturgesch.*, 25(1) : 139.

1874. *Lithocharis parviceps* Sharp, *Trans. ent. Soc. Lond.*, : 66.

1931. *Lithocharis nigriceps* : Cameron, *Fauna British India*, 2 : 159.

Diagnostic characters : Head black, thorax yellowish-red, elytra yellow, more or less infuscate on the disc, abdomen brown. Antennae reddish-yellow. Legs yellow. Length 4 mm.

Material examined : 7 exs., INDIA : South Tripura, Santirbazar, 4 exs., 11. vi. 1990, D. N. Biswas coll., Nalchalbazar, 1 ex., 18. vi. 1990, D. N. Biswas coll., West Tripura, Chabri, 1 ex., 25. vi. 1990, D. N. Biswas coll., Boxanagar, 1 ex., 15. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Bihar, Himachal Pradesh, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka, Singapore, Sumatra, South China and Japan.

Remarks : In the present study this species is recorded for the first time from Tripura.

Subfamily (V) STAPHYLININAE

Key to the tribes and genera of the Subfamily STAPHYLININAE

1. Prosternum with a transverse plate usually united to it by membrane; sometimes fused with it, but in that case the head is scarcely constricted behind, and the 3rd segment of the labial palpi is dilated towards apex and truncate. Antennae at base less distant from each other than from the eye, mostly geniculate.....XANTHOLININI
.....2
- Prosternum without such plate. Antennae at base nearer to the eyes than to each other, rarely geniculate
.....STAPHYLININI (*Philonthus* Curtis)
- 2(1) Mandibles externally with a sulcus extending from the base nearly to the apex
.....*Leptacinus* Erichson
- Mandibles at the base externally with a short sulcus or small fovea only
.....*Indoscitalinus* Heller

Genus *Leptacinus* Erichson

1839. *Leptacinus* Erichson, *Kaf. Mark Brand.*, : 429.

Key to the species of *Leptacinus* Erichson

1. Thorax on each side of the middle with a row of 5 or 6 punctures (dorsal row)
.....*parumpunctatus* (Gyll).
- Thorax on each side of the middle with a row of more than 6 punctures (dorsal row)
.....2

2(1) 7th dorsal segment strongly coriaceous, duller than the others; thorax with dorsal row of 9 or 10 punctures
.....*notabilis* Cameron

— 7th dorsal segment not strongly coriaceous; thorax with dorsal row of 10 to 12 punctures
.....*filum* Kraatz

40. *Leptacinus filum* Kraatz

1859. *Leptacinum filum* Kraatz, Arch. Naturgesch., 25(1) : 111.

1932. *Leptacinus filum* : Cameron, Fauna British India, 3 : 10-11.

Material examined : 1 ex., INDIA : North Tripura, Jatanbari, 1 ex., 10. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Tripura.

41. *Leptacinus notabilis* Cameron

1926. *Leptacinus notabilis* Cameron, Trans. ent. Soc. Lond., 76 : 342.

1932. *Leptacinus notabilis* : Cameron, Fauna British India, 3 : 11.

Material examined : 1 ex., INDIA : West Tripura, Teliamura, 1 ex., 8. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and West Bengal.

Remarks : In the present study this species is recorded for the first time from Tripura.

42. *Leptacinus parumpunctatus* (Gyll.)

1827. *Staphylinus parumpunctatus* Gyll. Ins. Suec., 4 : 481.

1858. *Leptacinus pallidipennis* Motschulsky, Bull. Mosc., 31(2) : 206.

1858. *Leptacinus papuensis* Fauvel, Ann. Mus. Civ. Gen., 12 : 242.

1932. *Leptacinus parumpunctatus* : Cameron, Fauna British India, 3 : 8-9.

Material examined : 4 exs., INDIA : North Tripura, Jatanbari, 2 exs., 10. vi. 1990, D. N. Biswas coll., West Tripura, Boxanagar, 1 ex., 15. vi. 1990, D. N. Biswas coll., Simana, 1 ex., 10. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Cameron (1932) mentioned only widely distributed throughout India.

Elsewhere : Nil.

Remarks : In the present study this species is probably recorded for the first time from Tripura.

Genus *Indoscitalinus* Heller

1900. *Indoscitalinus* Heller, Abh. Mus. Dresd., 9(5) : 5.

43. *Indoscitalinus anachoreta* (Erichson)

1839-40. *Xantholinus anachoreta* Erichson, Gen. Spec. Staph., : 316.

1867. *Xantholinus hongkongensis* Redtb., Reise Novara, 2 : 28.

1858. *Xantholinus morio* Motschulsky, Bull. Mosc., 31(3) : 207.

1932. *Indoscitalinus anachoreta* : Cameron, Fauna British India, 3 : 37.

Diagnostic characters : Elongate, black, shining, the elytra varying from brownish testaceous to pale yellow, abdomen with the last two segments red. Antennae pitchy. Legs reddish-brown to blackish. Length 10-12 mm.

Material examined : 1 ex., INDIA : West Tripura, Girania, 1 ex., 1. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Only mentioned India.

Elsewhere : Sri Lanka, S. China, Mauritius, Reunion and Madagascar.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Philonthus* Curtis

1825. *Philonthus* Curtis, *Brit. Ent.*, 13 : 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*assamensis* Cameron
- Thorax black or metallic 3
- 3(2) Head and thorax with strong metallic reflex*aeger* Eppelsheim
- Head and thorax black, at most with feeble metallic reflex*delicatus* Boh.
- 4(1) Thorax with dorsal row of 5 punctures.
- Antennae black, rather slender, the penultimate segments scarcely transverse*rotundicollis* Menet
- Thorax with dorsal row of 6 punctures. Antennae black, the first two segments pitchy, rather short and stout, the penultimate segments a little more transverse*confusus* Cameron

44. *Philonthus assamensis* Cameron

1932. *Philonthus assamensis* Cameron, *Fauna British India*, 3 : 100.

Material examined : 17 exs., INDIA : North Tripura, Jatanbari, 5 exs., 10. vi. 1990, D. N. Biswas coll., South Tripura, Santirbazar, 5 exs., 11. vi. 1990, D. N. Biswas coll., Amarapur, 3 exs., 12. vi. 1990, D. N. Biswas coll., West Tripura, Sonamura, 4 exs., 16. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Manipur and Meghalaya.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

45. *Philonthus rotundicollis* Menet.

1832. *Philonthus rotundicollis* Menet., *Cat. Rais.*, : 145.

1839-40. *Philonthus scutalus* Erichson, *Gen. Spec. Staph.*, : 438.

1960. *Philonthus duplopunctatus* Motschulsky, *Bull. Mosc.*, 33(2) : 567.

1860. *Philonthus sinuatocollis* Motschulsky, *Schrenck's Reise*, : 121, t. 8, fig. 6.

1932. *Philonthus rotundicollis* : Cameron, *Fauna British India*, 3 : 84.

Material examined : 2 exs., INDIA : South Tripura, Santirbazar, 2 exs., 11. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Nil.

Elsewhere : Pamirs.

Remarks : In the present study this species is recorded for the first time from India (Tripura).

46. *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 : South Tripura, Belonia, 1 ex., 19. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Himachal Pradesh and Uttar Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

47. *Philonthus delicatulus* Boh.

1858. *Philonthus delicatulus* Boh., *Eugen. Resa.* : 29.

1858. *Philonthus lativentris* Motschulsky, *Bull. Mosc.*, 31(2) : 663.

1859. *Philonthus subirideus* Kraatz, Arch. Naturgesch., 25(1) : 81.

1932. *Philonthus delicatulus* : Cameron, Fauna British India, 3 : 98.

Material examined : 1 ex., INDIA : West Tripura, Sonamura, 1 ex., 15. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : Only mentioned India.

Elsewhere : Sri Lanka and China:

Remarks : In the present study this species is recorded for the first time from Tripura.

48. *Philonthus confusus* Cameron

1932. *Philonthus confusus* Cameron, Fauna British India, 3 : 148-149.

Material examined : 2 exs., INDIA : South Tripura, Santirbazar, 2 exs., 11. vi. 1990, D. N. Biswas.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh and Himachal Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

49. *Philonthus* sp.

Material examined : 2 exs., INDIA : South Tripura, Belonia. 1 ex., 19. ix. 1992, B. N. Das & party coll., West Tripura, 1 ex., 19. ix. 1992, B. N. Das & party coll.

Subfamily (VI) TACHYPORINAE

Tribe TACHYPORININI

Key to the genera of the tribe
TACHYPORININI

- 1. Last segment of the maxillary palpi as long as or longer than the preceding 2
- Last segment of the maxillary palpi small and subulate 3

2(1) 1st segment of the posterior tarsi as long as the three following together

.....*Leucoparyphus* Kraatz

— 1st segment of the posterior tarsi not longer than the two following together

.....*Coproporus* Kraatz

3(1) Abdomen finely and indistinctly bordered; the whole surface very finely and closely pubescent; anterior tibiae with comb of fine teeth externally*Conosoma* Kraatz

— Abdomen broadly and distinctly bordered; the head and thorax at least glabrous; anterior tibiae without comb

.....*Tachyporus* Gravenhorst

Genus *Conosoma* Kraatz

1856-58. *Conosoma* Kraatz, Naturg. Ins. Deutschl., 2 : 431.

50. *Conosoma marginatum* Cameron

1926. *Conosoma marginatum* Cameron, Trans. ent. Soc. Lond., : 178.

1932. *Conosoma marginatum* Cameron, Fauna British India, 3 : 360.

Diagnostic characters : Narrow, elongate, black, the posterior margins of the thorax and of the abdominal segments very narrowly and obscurely rufescent. Elytra with on obscure, subtriangular orange spot occupying the posterior margin. Antennae and legs testaceous. Length 5 mm.

Material examined : 1 ex., INDIA : North Tripura, Boxanagar, 1 ex., 18. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Tachyporus* Gr.

1806. *Tachyporus* Gr., Col. Mier., : 1.

Key to the species of Tachyporus Gr.

1. Thorax red; elytra black, with the posterior margin broadly reddish
.....*alticola* Cameron
- Thorax black, with the sides and posterior margin narrowly testaceous; elytra black, with the posterior margin narrowly testaceous for the inner half. The external angles and outer half more broadly
.....*simlaensis* Cameron

51. *Tachyporus simlaensis* Cameron

1926. *Tachyporus simlaensis* Cameron, *Trans. ent. Soc. Lond.*, : 184.

1932. *Tachyporus simlaensis* Cameron, *Fauna British India*, 3 : 380-381.

Material examined : 4 exs., INDIA : West Tripura, Simana, 4 exs., 10. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Uttar Pradesh, Himachal Pradesh and J. & Kashmir.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

52. *Tachyporus alticola* Cameron

1932. *Tachyporus alticola* Cameron, *Fauna British India*, 3 : 384.

Material examined : 3 exs., INDIA : South Tripura, Belonia, 2 exs., 10. ix. 1992, B. N. Das & party coll., West Tripura, Santirbazar, 1 ex., 23. ix. 1992, S. K. Saha and S. K. Ghosh coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Coproporus* Kraatz

1858. *Coproporus* Kraatz. *Bull. Soc. Ent. Fr.*, P. exc.

Key to the species of Coproporus Kraatz

1. Species entirely reddish*rufus* Kraatz
- Species otherwise coloured 2
- 2(1) Head and thorax with ground-sculpture
.....*bivittatus* Bernhauer
- Head and thorax without ground-sculpture 3
- 3(2) Thorax dark red*ruficollis* Cameron
- Thorax black, the margins more or less reddish*minimus* (Motschulsky)

53. *Coproporus bivittatus* Bernhauer

1915. *Coproporus bivittatus* Bernhauer, *Ann. Mus. Nat. Hung.*, 13 : 155.

1932. *Coproporus bivittatus* : Cameron, *Fauna British India*, 3 : 422-423.

Material examined : 8 exs., INDIA : South Tripura, Amarpur, 8 exs., 12. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Himachal Pradesh.

Elsewhere : Sri Lanka, East Africa, South China, Malay Peninsula, Borneo, Formosa and Timor.

Remarks : In the present study this species is recorded for the first time from Tripura.

54. *Coproporus minimus* (Motschulsky)

1858. *Erchomus minimus* Motschulsky, *Bull. Mosc.*, 31 (2) : 220.

1864. *Coproporus orientalis* Solsky, *Bull. Mosc.*, 37(2) : 439.

1859. *Coproporus pygmaeus* Kraatz, *Arch. Naturgesch.* 25 (1) : 58.

1858. *Erchomus rubiginosus* Motschulsky, *Bull. Mosc.*, 31 (2) : 221.

1932. *Coproporus minimus* : Cameron, *Fauna British India*, 3 : 416-417.

Material examined : 3 exs., INDIA : West Tripura, Mongiabari, 3 exs., 24. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Only mentioned India.

Elsewhere : Sri Lanka, Malay Peninsula, Sumatra, Philippines, Seychelles and Reunion.

Remarks : In the present study this species is recorded for the first time from Tripura.

55. *Coproporus rufus* Kraatz

1858. *Coproporus rufus* Kraatz, Arch. Naturgesch., 25 (1) : 59.

1932. *Coproporus rufus* : Cameron, Fauna British India, 3 : 421.

Material examined : 1 ex., INDIA : West Tripura, Mongiabari, 1 ex., 24. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State :

Elsewhere : Formosa and Celebes.

Remarks : In the present study this species is recorded for the first time from Tripura. Cameron (1932) locality data mentioned only "Ind"

56. *Coproporus ruficollis* Cameron

1926. *Coproporus ruficollis* Cameron, Trans. ent. Soc. Lond., : 190.

1932. *Coproporus ruficollis* Cameron, Fauna British India, 3 : 421.

Material examined : 9 exs., INDIA : West Tripura, Mongiabari, 6 exs., 24. vi. 1990. D. N. Biswas coll., Simana, 3 exs., 10. ix. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

Genus *Leucoparyphus* Kraatz

1956-58. *Leucoparyphus* Kraatz, Naturg. Ins. Deutsch., 2 : 393.

57. *Leucoparyphus limbifer* var. *marginicollis* Kraatz

1858. *Erchomus limbifer* Motshulsky, Bull. Mosc., 31(3): 222.

1856-58. *Leucoparyphus limbifer* var. *marginicollis* Kraatz, Naturg. Ins. Deutsch., 2 : 394.

1932. *Leucoparyphus limbifer* : Cameron, Fauna British India, 3 : 424-425.

Diagnostic characters : Black, shining; the thorax with the side margins broadly, the anterior and posterior narrowly reddish yellow; elytra with the suture and posterior margin rather broadly reddish-yellow. Antennae black, the first two segments yellow. Legs yellow. length 3 mm. var. *marginicollis*. Elytra yellow, each with an oval black spot in the middle.

Material examined : 2 exs., INDIA : West Tripura, Simana, 2 exs., 6. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.

Other Indian State : Uttar Pradesh.

Elsewhere : Sri Lanka.

Remarks : In the present study this species is recorded for the first time from Tripura.

Subfamily (VII) ALEOCHARINAE

Tribe MYRMEDONIINI

Genus *Cordalia* Jacobs

1924. *Cordalia* Jacobs, Ent. Zeitschr. (Frankfurt), 38 : 82.

1939. *Cordalia* : Cameron, Fauna British India, 4(1) : 235-236.

Key to the species of *Cordalia* Jacobs

1. Larger (3 mm.) and more robust; antennae much longer, the 5th to 7th segments distinctly longer than broad
.....*longicornis* Cameron

- Smaller (2-2.5 mm.) antennae shorter, the 5th to 7th segments distinctly transverse....
.....*vestita* Boh.

58. *Cordalia longicornis* Cameron

1939. *Cordalia longicornis* Cameron, *Fauna British India*, 4(1) : 238.

Material examined : 1 ex., INDIA : North Tripura, Jatanbari, 1 ex., 10. vi. 1990, D. N. Biswas coll.

Distribution : INDIA : Tripura.,

Other Indian State : West Bengal.

Elsewhere : Nil.

Remarks : In the present study this species is recorded for the first time from Tripura.

59. *Cordalia vestita* (Boh.)

1858. *Falagria vestita*, Boh., *Eugen. Resa, Ins. Col.*, : 25.

1939. *Cordalia vestita* : Cameron, *Fauna British India*, 4(1) : 237-238.

Material examined : 10 exs., INDIA : South Tripura, Amarapur, 2 exs., 12. vi. 1990, D. N. Biswas coll., West Tripura, Boxanagar, 5 exs., 15. vi. 1990, D. N. Biswas coll., North Tripura, Jatanbari, 1 ex., 10. vi. 1990, D. N. Biswas coll., Teliamura, 1 ex., 8. vi. 1990, D. N. Biswas coll., Belonia, 1 ex., 19. iv. 1992, B. N. Das & party coll.

Distribution : INDIA : Tripura.

Other Indian States : Assam and Uttar Pradesh.

Elsewhere : Burma, China, Malay Peninsula and Sumatra.

Remarks : In the present study this species is recorded for the first time from Tripura.

SUMMARY

59 Species consisting of 28 genera distributed in 7 subfamilies are represented in this paper are first time recorded from Tripura of which 3 species are recorded for the first time from India. Key to the subfamilies, tribes, genera, species and distributional data of the family Staphylinidae for Tripura have also been provided. A chart showing districtwise distribution of the species recorded from Tripura is also given.

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The Chart showing District wise distribution of species of the family Staphylinidae from Tripura.

Name of species	N. Tripura	S. Tripura	W. Tripura	Name of species	N. Tripura	S. Tripura	W. Tripura
1. <i>Holusus olisthaeriformis</i> Motschulsky		*		28. <i>Thinocharis carinicolis</i> Kraatz -			*
2. <i>H. longipennis</i> Cameron			*	29. <i>T. debilis</i> Cameron		*	*
3. <i>H. aberrans</i> Fauvel			*	30. <i>Paederus fuscipes</i> Curtis			*
4. <i>Eleusis humilis</i> Erichson		*	*	31. <i>Stiliderus crassus</i> (Kraatz)			*
5. <i>E. fusciceps</i> Kraatz		*	*	32. <i>Stilicopsis pallida</i> Cameron		*	*
6. <i>Oxytelopsis pseudopsina</i> Fauvel		*		33. <i>S. indica</i> Cameron		*	
7. <i>Oxytelus (Caccoporus) incisus</i> Motschulsky		*	*	34. <i>S. trinotata</i> (Kraatz)			*
8. <i>O. (C.) bengalensis</i> Erichson		*		35. <i>Scopaeus testaceus</i> Motschulsky		*	
9. <i>O. (C.) varipennis</i> Kraatz			*	36. <i>S. limbatus</i> Kraatz		*	*
10. <i>Bledius (Pucerus) transversus</i> Cameron			*	37. <i>S. planiusculus</i> Kraatz	*		
11. <i>B. (Hesperophilus) baltus</i> Biswas & Sengupta		*		38. <i>S. beesoni</i> Cameron			*
12. <i>B. (H.) maindroni</i> Fauvel		*		39. <i>Lithocharis nigriceps</i> Kraatz		*	*
13. <i>Stenus (Hypostenus) monomerus</i> Fauvel		*		40. <i>Leptacinus filum</i> Kraatz	*		
14. <i>Stenaesthetus sunioides</i> Sharp		*		41. <i>L. notabilis</i> Cameron			*
15. <i>Astenus nilgiriensis</i> Cameron		*		42. <i>L. parumpunctatus</i> (Gyll.)	*		*
16. <i>A. gracilentus</i> Fauvel			*	43. <i>Indoscitalinus anachoreta</i> (Erichson)			*
17. <i>A. indicus</i> (Kraatz)		*		44. <i>Philonthus assamensis</i> Cameron	*	*	*
18. <i>Acanthoglossa testaceipennis</i> Kraatz	*	*	*	45. <i>P. rotundicollis</i> Menet		*	
19. <i>Pachymedon shugnuensis</i> Cameron	-	*		46. <i>P. aeger</i> Eppelsheim		*	
20. <i>Dibelonetes bengalensis</i> Biswas & Sengupta			*	47. <i>P. delicatulus</i> Boh.			*
21. <i>Stilicus velutinus</i> Fauvel			*	48. <i>P. confusus</i> Cameron		*	
22. <i>S. pygmaeus</i> Kraatz			*	49. <i>P. sp.</i>		*	*
23. <i>S. luteipennis</i> Kraatz		*	*	50. <i>Conosoma marginatum</i> Cameron			*
24. <i>S. rufescens</i> Sharp			*	51. <i>Tachyporus simlensis</i> Cameron			*
25. <i>Charichirus chinensis</i> (Boh.)		*	*	52. <i>T. alticola</i> Cameron		*	*
26. <i>Cryptobium abdominale</i> var. <i>rufipenne</i> Motschulsky			*	53. <i>Coproporus bivittatus</i> Bernhauer		*	
27. <i>C. bernhaueri</i> Cameron	*			54. <i>C. minimus</i> (Motschulsky)			*
				55. <i>C. rufus</i> Kraatz			*
				56. <i>Coproporus ruficollis</i> Cameron			*
				57. <i>Leucoparyphus limbifer</i> var. <i>marginicollis</i> Kraatz			*
				58. <i>Cordalia longicornis</i> Cameron *			
				59. <i>C. vestita</i> (Boh.)	*	*	*

INSECTA : COLEOPTERA : SCARABAEIDAE

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INTRODUCTION

Beetless of the family Scarabaeidae are commonly known as dung beetles. These beetles can easily be recognised by their characteristic form of antennae. The group is very important economically and some of the most serious pest of agriculture, forestry and fruit trees. On the other hand some members of the group are extremely beneficial. These beetles act as nature's scavengers and enrich the soil by burying human faeces and dung of other animals in the soil. Recently Chatterjee and Biswas, (1991, 1995) have contributed to our knowledge of these insects in their work under state fauna series of Orissa, West Bengal and Meghalaya. Detailed information of distribution, habitat and other aspects of the group were provided in these papers.

In the present paper 34 species under 12 genera belonging to 4 subfamilies have been dealt with. Of these 4 species have been recorded for the first time from India and all the 34 species first time recorded from the state of Tripura.

LIST OF SPECIES RECORDED FROM TRIPURA

Family SCARABAEIDAE

Subfamily I. CETONIINAE

Genus 1. *Protaetia* Burmeister

1. *P. pretiosa* (Nonfried)

Subfamily II. DYNASTINAE

Genus 2. *Xylotrupes* Hope

2. *X. gideon* (Linnaeus)

Subfamily III. RUTELINAE

Genus 3. *Popillia* Serville

3. *P. birmanica* Arrow

4. *P. laevistriata* Arrow

Genus 4. *Anomala* Samouelle

5. *A. dimidiata* (Hope)

6. *A. marginipennis* Arrow

7. *A. validipes* Arrow

Subfamily IV. COPRINAE

Genus 5. *Heliocopris* Burmeister

8. *H. bucephalus* (Fabricius)

Genus 6. *Catharsius* Hope

9. *C. birmanensis* Lansberge

10. *C. granulatus* Sharp

11. *C. javanus* Lansberge

12. *C. molossus* (Linnaeus)

13. *C. quadridentatus* Lansberge

14. *C. sagax* (Quenstedt)

Genus 7. *Copris* Geoffroy

15. *C. laevigatus* Gillet

16. *C. sarpedon* Harold

Genus 8. *Onthophagus* Latreille

17. *O. aeneus* (Wiedemann)

18. *O. armatus* Blanchard

19. *O. catta* (Fabricius)

20. *O. fasciatus* Boucomont
21. *O. luridipennis* Boheman
22. *O. ramosellus* Bates
23. *O. rectecornutus* Lansberge
24. *O. sagittarius* Fabricius
25. *O. spinifex* (Fabricius)
26. *O. taurinus* White
27. *O. triceratops* Arrow

Genus 9. *Caccobius* Thomson

28. *C. unicornis* (Fabricius)

Genus 10. *Liatongus* Reitter

29. *L. affinis* Arrow

Genus 11. *Onitis* Fabricius

30. *O. falcatus* (Wulfen)
 31. *O. philemon* Fabricius
 32. *O. subopacus* Arrow
 33. *O. virens* Lansberge
- Genus 12. *Oniticellus* Serrville
34. *O. cinctus* (Fabricius)

Key to the Subfamilies of SCARABAEIDAE

- 1(6) Mesocoxae not parallel, Posterior spiracles situated in the dorsal part of the chitinous ventral segments.
- 2(5) Labrum membranous, not visible externally
- 3(4) Mandibles not visible externally, front coxae vertical, ... 1. CETONIINAE
- 4(3) Mandibles visible externally, front coxae transverse 2. DYNASTINAE
- 5(2) Labrum well developed more or less exposed, claws unequal, separately movable 3. RUTELINAE
- 6(1) Meso coxae usually parallel, Posterior spiracles situated in the membrane between dorsal and ventral segments, Middle coxae widely separated, hind tibia with one spur 4. COPRINAE

Genus 1. *Protaetia* Burmeister 1842

1842. *Protaetia* Burmeister, *Handb. Ent.*, 3 : 472.
1910. *Protaetia*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 136-137.

1. *Protaetia pretiosa* (Nonfried) 1891

1891. *Cetonia pretiosa* Nonfried, *Deutsche Ent. Zeitschr.*, p. 270.
1910. *Protaetia pretiosa*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 141.

Material examined : 1 ex. Tripura, Belonia (South Tripura Dist.), 28. ix. 1977, Dr. N. Muraleedharan Coll.

Distribution : India: Tripura, Bihar, Tamilnadu. Elsewhere : Burma, Sri Lanka.

Remarks : First time recorded from Tripura.

Genus 2. *Xylotrupes* Hope 1837

1837. *Xylotrupes* Hope, *Coleopterist's Manual* 1 : 19.
1910. *Xylotrupes* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 262.

2. *Xylotrupes gideon* (Linnaeus) 1767

1767. *Scarabaeus gideon* Linnaeus, *Syst. Nat.* 12th ed ; 1(2) : 541.
1910. *Xylotrupes gideon*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 1 : 262-265.

Material examined : 2 exs., Tripura, Kanchanpur (South Tripura Dist.), 11. vi. 1988, V. T. Darlong Coll.

Distribution : India : Tripura, West Bengal, Assam, Kerala, Maharashtra, Meghalaya.

Elsewhere : Sri Lanka.

Remarks : First time recorded from Tripura.

Subfamily RUTELINAE

Key to the genera of Rutelinae known from Tripura

- 1(2) Pronotum excised before the scutellum, species usually smaller *Popillia*

- 2(1) Pronotum not excised before the scutellum,
species is larger**Anomala**

Genus 3. **Popillia** Serville 1825

1825. *Popillia* Serville, *Encycl. Meth.*, **10** : 367.
1917. *Popillia*, Arrow, *Fauna Brit. India* (Coleoptera :
Lamellicornia), **2** : 58-59.

*Key to the species of genus Popillia known
from Tripura*

- 1(2) Elytral striae deep**birmanica**
2(1) Elytral striae shallow**laevistriata**

3. **Popillia birmanica** Arrow 1913

1913. *Popillia birmanica* Arrow, *Ann. Mag. Nat. Hist.*,
12(8) : 43.

Material examined : 1 ex., Tripura, Radhapur,
Dharmanagar (North Tripura Dist.), 24. v. 1992,
S. K. Chakraborty Coll.

Distribution : India : Tripura, Assam.

Elsewhere : Bangladesh, Burma.

Remarks : First time recorded from Tripura.

4. **Popillia laevistriata** Arrow 1913

1913. *Popillia laevistriata* Arrow, *Ann. Mag. Nat. Hist.*,
12(8) : 42.

Material examined : 1 ex., Tripura, Nutanbazar
(South Tripura), 13. vi. 1990, G. N. Saha & party
coll.

Distribution : India : Tripura, Assam.

Remarks : First time recorded from Tripura.

Genus 4. **Anomala** Samouelle 1819

1819. *Anomala* Samouelle, *The Entomologist's Useful
Companion*, p. 191.
1917. *Anomala*, Arrow, *Fauna Brit. India* (Coleoptera :
Lamellicornia), **2** : 126-127.

*Key to the species of genus Anomala known
from Tripura*

- 1(4) Hind legs not extremely massive, pronotum
not strongly attenuated in front

- 2(3) Base of the pronotum not completely
margined**dimidiata**

- 3(2) Base of the pronotum completely margined
.....**marginipennis**

- 4(1) Hind legs extremely massive, pronotum
strongly attenuated in front
.....**validipes**

5. **Anomala dimidiata** (Hope) 1831

1831. *Euchlora dimidiata* Hope, *Gray's Zool. Misc.*, p. 23.
1917. *Anomala dimidiata*, Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), **2** : 232-233.

Material examined : 4 exs ; 1 ex., Tripura,
Kumarghat forest (North Tripura), 19. v. 1992,
S. K. Chakraborty coll ; 1 ex., Belonia F. R. H.
(South Tripura Dist.), 27. ix. 1977, Dr.
N. Muraleedharan coll. ; 1 ex., Jhampujhola (West
Tripura Dist.), 7. xi. 1991, B. N. Das & party
coll. ; 1 ex., Tripura 30. xi., 1988, (No other
detail information).

Distribution : India : Tripura, Himachal
Pradesh, Uttar Pradesh, Meghalaya, Manipur,
Jammu & Kashmir, West Bengal, Sikkim.

Elsewhere : Nepal.

Remarks : First time recorded from Tripura.

6. **Anomala marginipennis** Arrow 1912

1912. *Anomala marginipennis* Arrow, *Ann. Mag. Nat. Hist.*,
11(8) : 78.

Material examined : 1 ex., Tripura, Belonia F.
R. H. (South Tripura Dist.), 15. v. 1978, Dr. J. K.
Jonathan & party coll.

Distribution : India : Tripura, Assam,
Meghalaya, Darjeeling, Sikkim.

Remarks : First time recorded from Tripura.

7. **Anomala validipes** Arrow 1917

1917. *Anomala validipes* Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), **2** : 239.

Material examined : 3 exs., Tripura, Udaipur
(South Tripura Dist.), 24. xi. 1991, G. K.
Srivastava & party coll.

Distribution : India : Tripura, Assam

Remarks : First time recorded from Tripura.
Light trap collection.

Subfamily COPRINAE

Key to the genera of Coprinae known from Tripura

- 1(14) Pronotum without two basal impressions near the middle
- 2(11) Scutellum wanting
- 3(6) Elytra with two lateral carinae
- 4(5) First joint of the antennal club shining **Heliocopris**
- 5(4) Antennal club pubescent **Catharsius**
- 6(3) Elytra with one lateral carina
- 7(8) Pronotum with a strong basal groove
..... **Copris**
- 8(7) Pronotum without a strong basal groove
- 9(10) Terminal margin of the front tibiae at right angles to the inner margin ; anterior angles of the prothorax hollowed beneath **Caccobius**
- 10(9) Terminal margin of the front tibiae very rarely right angles to the inner margin ; anterior angles of the prothorax never hollowed beneath **Onthophagus**
- 11(2) Scutellum present
- 12(13) Elytra not fringed before the hind margin **Liatongus**
- 13(12) Elytra fringed before the hind margin ...
..... **Oniticellus**
- 14(1) Pronotum with two basal impressions near the middle **Onitis**

Genus 5. *Heliocopris* Burmeister 1846

1846. *Heliocopris* Burmeister, *Gen. Ins.*, 10 : 27.

1931. *Heliocopris*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 84-85.

8. *Heliocopris bucephalus* (Fabricius) 1775

1775. *Scarabaeus bucephalus* Fabricius, *Syst. Ent.*, p. 24.

1931. *Heliocopris bucephalus*, Arrow, *Fauna Brit India* (Coleoptera : Lamellicornia), 3 : 88-90.

Material examined : 2 exs. ; 1 ex., Tripura, Zirania (North Tripura Dist.), 4. xii. 1991, K. K. Roy & party coll., 1 ex., Sipahijola (West Tripura Dist.), 23. xi. 1991, K. K. Roy & party coll.

Distribution : India : Tripura, Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra, West Bengal.

Elsewhere : Burma, Malayasia, Indonesia.

Remarks : First time recorded from Tripura.

Genus 6. *Catharsius* Hope 1837

1837. *Catharsius* Hope, *Col. Man.*, 1 : 21.

1931. *Catharsius*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 82.

Key to the species of genus *Catharsius* known from Tripura

- 1(8) Elytra entirely opaque
- 2(7) Metasternal shield fringed
- 3(4) Head with a small smooth area adjoining each eye **molossus**
- 4(3) Head without smooth area adjoining each eye
- 5(6) Pronotum with lateral prominence on each side **granulatus**
- 6(5) Pronotum without lateral prominence on each side **sagax**
- 7(2) Metasternal shield not fringed **javanus**
- 8(1) Elytra not entirely opaque
- 9(10) The four posterior tarsi very broad (the 2nd & 3rd joints of the middle tarsus broader than long) **birmanensis**
- 10(9) The four posterior tarsi not very broad
..... **quadridentatus**

9. *Catharsius birmanensis* Lansberge 1874

1874. *Catharsius birmanensis* Lansberge, *Col. Hefte*, 12 : 11.

1931. *Catharsius birmanensis* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 97-98.

Material examined : 1 ex., Tripura, Kumarghat Fishery Rest House (North Tripura Dist.), 20. v. 1992, B. Mitra & party coll.

Distribution : India : Tripura, West Bengal (Darjiling).

Elsewhere : Bhutan, Burma.

Remarks : First time recorded from Tripura. Light trap collection.

10. *Catharsius granulatus* Sharp 1875

1875. *Catharsius granulatus* Sharp, *Col. Hefte.*, 13 : 41.

1931. *Catharsius granulatus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 95-96.

Material examined : 3 ex. ; 1 ex., Tripura, Chandmani Tila, 10. xi. 1969, V. C. Agrawal Coll. ; 1 ex., Kumlian, 9. xi. 1969, V. C. Agrawal Coll. ; 1 ex., Bajra Bari, (South Tripura Dist.), 6. x. 1977, Dr. N. Muraleedharan Coll.

Distribution : India : Tripura, Uttar Pradesh, Bihar, West Bengal.

Elsewhere : Sri Lanka, Pakistan.

Remarks : First time recorded from Tripura.

11. *Catharsius javanus* Lansberge 1886

1886. *Catharsius javanus* Lansberge, *Tijds. Ent.*, 29 : 7.

1931. *Catharsius javanus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 96-97.

Material examined : 1 ex., Tripura, Bajrabari (South Tripura Dist.), 6.x. 1977, Dr. N. Muraleedharan Coll.

Distribution : India : Tripura, Assam.

Elsewhere : Malaysia, Indonesia, W. China.

Remarks : First time recorded from Tripura.

12. *Catharsius molossus* (Linnaeus) 1758

1758. *Scarabaeus molossus* Linnaeus, *Syst. Nat.*, 10 : 347.

1931. *Catharsius molossus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 94-95.

Material examined : 7 exs. ; 4 exs., Tripura, Charilam (Nr. Plulation Centre, West Tripura Dist.), 18-22. xi. 1969, V. C. Agrawal & party coll. ; 1 ex., Chaudmani Tila, 10. xi. 1969, V. C. Agrawal coll. ; 1 ex., Ampa, (West Tripura Dist.), 18. xii. 1971, V. C. Agrawal coll. ; 1 ex., Teliamura (West Tripura Dist.), 2. ii. 1971, V. C. Agrawal coll.

Distribution : India : Tripura, Meghalaya, Assam, Orissa, Maharashtra, Uttar Pradesh, Karnatak, Bihar and West Bengal.

Elsewhere : Sri Lanka.

Remarks : First time recorded from Tripura.

13. *Catharsius quadridentatus* Lansberge 1885

1885. *Catharsius quadridentatus* Lansberge, *Ann. Mus. Civ. Genova*, 2(2) : 392.

1931. *Catharsius quadridentatus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 98-99.

Material examined : 1 ex., Tripura, Agartala, Indra Nagar (West Tripur Dist). 11. xi. 1969, V. C. Agarwal coll.

Distribution : India : Tripura.

Elsewhere : Burma.

Remarks : First time recorded from India.

14. *Catharsius sagax* (Quenstedt) 1806

1806. *Copris sagax* Quenstedt, *Schönh. Syn. Ins.*, 1 : 43.

1931. *Catharsius sagax*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 96.

Material examined : 5 exs.; 2 exs., Tripura, Agartala, Indira Nagar (West Tripura Dist), 11. xi. 1969, V. C. Agarwal Coll.; 1 ex., Agartala, Kumllan, 9. xi. 1969, V. C. Agarwal coll.; 2 exs., Thakchera, Amarpur (South Tripura Dist.), 12. x. 1977, Dr. N. Muraleedharan coll.

Distribution : India : Tripura, Madhya Pradesh, Maharashtra, Tamil Nadu, Kerala, Bihar, Orissa, West Bengal.

Elsewhere : Pakistan, Bhutan, Sri Lanka.

Remarks : First time recorded from Tripura.

Genus 7. *Copris* Geoffroy 1762

1762. *Copris* Geoffroy, *Ins. des Env. de paris*, p. 87.
 1931. *Copris*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 102.

Key to the species of genus Copris known from Tripura

- 1(2) Front tibia bearing three external teeth
*laevigatus*
 2(1) Front tibia bearing four external teeth
*sarpedon*

15. *Copris laevigatus* Gillet 1927

1927. *Copris laevigatus* Gillet, *Ann. Soc. Ent. Belg.*, 67 : 252.
 1931. *Copris laevigatus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 109.

Material examined : 2 exs.; 1 ex., Tripura, Ampa, (West Tripura Dist.), 17. i. 1971, V. C. Agarwal coll.; 1 ex., Kumarghat Forest Range (North Tripura Dist.), 19. v. 1992, S. K. Chakraborty coll.

Distribution : India : Tripura, Manipur.

Remarks : First time recorded from Tripura.

16. *Copris sarpedon* Harold 1848

1848. *Copris sexdentatus* Redtenbacher, *Hugel's Kaschmir*, 4(2) : 520.
 1868. *Copris sarpedon* Harold, *Col. Heft.*, 4 : 104.
 1931. *Copris sarpedon*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 110-111.

Material examined : 7 exs.; 1 ex., Tripura, Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll.; 5 exs., Ampa, (West Tripura Dist.), 18. vi. 1971, V. C. Agrawal coll.; 1 ex., Belonia (South Tripura Dist.), 12. xi. 1991, B. N. Das coll.

Distribution : India : Tripura, Punjab, Uttar Pradesh, Jammu & Kashmir, Meghalaya.

Elsewhere : Bangladesh, Nepal, Siam.

Remarks : First time recorded from Tripura.

Genus 8. *Onthophagus* Latreille 1802

1802. *Onthophagus* Latreille, *Hist. Nat. Crust. et Ins.* 3 : 141.
 1931. *Onthophagus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 159-162.

Key to the species of genus Onthophagus known from Tripura

- 1(10) Pronotum wholly or partly granular or rugose
 2(3) Pronotum entirely granular or rugose, without distinct punctures*spinifex*
 3(2) Pronotum partly granular or rugose, with some punctures (or smooth areas)
 4(7) Front angles of pronotum not produced, very blunt
 5(6) Elytral intervals strongly punctured.....
*aenescens*
 6(5) Elytral intervals very lightly punctured.
*ramosellus*
 7(4) Front angles of pronotum more or less produced
 8(9) Pronotum dark green or Coppery
*catta*
 9(8) Pronotum light brown, with the punctures black*rectecornutus*
 10(1) Pronotum punctured, without granules, asperities or rugosity
 11(16) Upper surface without hair, smooth, or with only very minute, scanty, and inconspicuous setae
 12(15) Upper surface entirely dark (some times with a variable metallic lustre)
 13(14) Elytra lightly, not deeply striate
*armatus*
 14(13) Elytra deeply striate*triceratops*
 15(12) Upper surface not entirely dark
*sagittarius*
 16(11) Upper surface distinctly hair or setose
 17(20) Sutural interval entirely dark

18(19) Base, apex, and sides of the elytra pale
.....*fasciatus*

19(18) Base, apex, and sides of the elytra not
entirely pale*taurinus*

20(17) Sutural interval not entirely dark
.....*luridipennis*

**17. *Onthophagus aenescens* (Wiedemann)
1823**

1823. *Copris aenescens* Wiedemann, *Zool. Mag.*, 2(1) : 13.

1931. *Onthophagus aenescens*, Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), 3 : 216-217.

Material examined : 2 exs., Tripura, Teliamura
(West Tripura Dist.), Khoai, 5. i. 1989, S. K.
Chatterjee coll.

Distribution : India : Tripura, Bihar, West
Bengal. Elsewhere : Pakistan.

Remarks : First time recorded from Tripura.

18. *Onthophagus armatus* Blanchard 1853

1853. *Onthophagus armatus* Blanchard, *Voy au Pole Sud*,
p. 98, pl. 7, figs. 9 & 10.

1931. *Onthophagus armatus*, Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), 3 : 293-294.

Material examined : 1 ex., Tripura, Teliamura,
Khoai (West Tripura Dist.), 5. i. 1989, S. K.
Chatterjee & R. S. Burman coll.

Distribution : India : Tripura, Assam.

Elsewhere : Burma, Phillipines, Vietnam,
Indonesia.

Remarks : First time recorded from Tripura.

19. *Onthophagus catta* (Fabricius) 1787

1787. *Scarabaeus catta* Fabricius, *Mant. ins.*, 1 : 12.

1931. *Onthophagus catta*, Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), 3 : 230-231.

Material examined : 1 ex., Tripura, Agartala,
Indera Nagar (West Tripura Dist.), 11 .xi. 1969,
V. C. Agarwal coll.

Distribution : India : Tripura, Orissa,
Maharashtra, Madhya Pradesh, Tamil Nadu,
Andhra Pradesh.

Elsewhere : Pakistan, Arabia, Africa,
Madagascar.

Remarks : First time recorded from Tripura.

20. *Onthophagus fasciatus* Boucomont 1914

1914. *Onthophagus fasciatus* Boucomont, *Ann. Mus. Civ.*
Genova, 46 : 231.

1931. *Onthophagus fasciatus*, Arrow, *Fauna Brit. India*.
(Coleoptera : Lamellicornia), 3 : 311-312.

Material examined : 2 exs.; 1 ex., Tripura,
Teliamura (West Tripura Dist.), Khoai, 5. i. 1989,
S. K. Chatterjee coll.; 1 ex., Agartala (West
Tripura Dist.), 21. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Uttar Pradesh,
Madhya Pradesh, Maharashtra, Tamil Nadu,
Kerala.

Elsewhere : Bangladesh.

Remarks : First time recorded from Tripura.

21. *Onthophagus luridipennis* Boheman 1858

1858. *Onthophagus luridipennis* Boheman, *Eugenies Resa*,
p. 45.

1931. *Onthophagus luridipennis*, Arrow, *Fauna Brit. India*
(Coleoptera : Lamellicornia), 3 : 317-318.

Material examined : 6 exs., Tripura, Teliamura
(West Tripura Dist.), Brahmachora, 4. i. 1989,
S. K. Chatterjee coll.; 1 ex., Kalacherra (West
Tripura Dist.), 1. i. 1989; 7 exs., Khoai, Teliamura
(West Tripura Dist.), 5. i. 1989; 4 exs., Baramura,
Teliamura (West Tripura Dist.), 6. i. 1989;
4 exs., Ambasa (West Tripura Dist.), 7.i. 1989;
1 ex., Agartala, Champaknagar (West Tripura
Dist.), 11. i. 1989; 1 ex., Agartala, Bisramgonj
(West Tripura Dist.), 18. i. 1989; 4 exs., Agartala,
Nalchar (West Tripura Dist.), 21. i. 1989; 1 ex.,
Agartala, Bairagibazar (West Tripura Dist.),
22. i. 1989, all specimens are collected by S. K.
Chatterjee.

Distribution : India : Tripura, Assam, Uttar
Pradesh.

Elsewhere : Bangladesh, Burma, Indonesia,
Phillipines, Indo-China.

Remarks : First time recorded from Tripura.

22. *Onthophagus ramosellus* Bates 1891

1831. *Onthophagus capella* Hope, Gray's Zool. Misc., p. 22.
 1891. *Onthophagus ramosellus* Bates, Entom., 24 : 11 Suppl.
 1931. *Onthophagus ramosellus*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 217-218.

Material examined : 8 exs., Tripura, Teliamura (West Tripura Dist.), Khoai, 5. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Meghalaya, Assam, Himachal Pradesh, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, Bihar, West Bengal.

Elsewhere : Upper Burma.

Remarks : First time recorded from Tripura.

23. *Onthophagus rectecornutus* Lansberge 1883

1883. *Onthophagus rectecornutus* Lansberge, Notes Leyd. Mus., 5 : 49.
 1907. *Onthophagus rectecornutus* Arrow, Ann. Mag. Nat. Hist., 19(7) : 421.

Material examined : 5 exs.; 1 ex., Tripura, Agartala Sepahijala (West Tripura Dist.), 17. i. 1989; 1 ex., Teliamura, Brahmachora (West Tripura Dist.), 4. i. 1989; 2 exs., Ambasa (West Tripura Dist.), 7. i. 1989; 1 ex., Agartala, Nalchar (West Tripura Dist.), 21. i. 1989, all specimens are collected by S. K. Chatterjee.

Distribution : India : Tripura, Nagaland, Bihar, Tamil Nadu, Karnatak.

Elsewhere : Burma, Bhutan, Bangladesh, Myanmar, Malaysia, Vietnam.

Remarks : First time recorded from Tripura.

24. *Onthophagus sagittarius* Fabricius 1775

1775. *Onthophagus sagittarius* Fabricius, Syst., Ent. p. 24.
 1931. *Onthophagus sagittarius*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 304-307.

Material examined : 42 exs.; 1 ex., Tripura, Agartala (West Tripura Dist.), Mohanpur, 2. i. 1989; 1 ex., Hatipara, Salbagan (West Tripura Dist.), 29. xii. 1989; 1 ex., Teliamura (West

Tripura Dist.), 4. i. 1989; 22 exs., Teliamura (West Tripura Dist.), Khoai, 5. i. 1989; 1 ex., Teliamura (West Tripura Dist.), Baramura, 6. i. 1989; 5 exs., Ambasa (West Tripura Dist.), 7. i. 1989; 1 ex., Agartala (West Tripura Dist.), Jirania, 10. i. 1989, 3 exs., Agartala (West Tripura Dist.), Champak Nagar, 11. i. 1989; 2 exs., Agartala (West Tripura Dist.), Nalchar, 21. i. 1989; 2 exs., Agartala (West Tripura Dist.), Bairagibazar, 22. i. 1989, all specimens are collected by S. K. Chatterjee; 2 exs., Ambasa (West Tripura Dist.), 5. xii. 1988, R. C. Basu coll., 1 ex., Joyendrnagar, 18. xii. 1986, R. C. Basu coll.

Distribution : India : Tripura, Uttar Pradesh, Madhya Pradesh, West Bengal.

Elsewhere : Burma, Malaysia, Indonesia, China.

Remarks : First time recorded from Tripura.

25. *Onthophagus spinifex* (Fabricius) 1781

1781. *Scarabaeus spinifex* Fabricius, Spec. Ins., 1 : 29.
 1868. *Onthophagus reflexicornis* Redtenbacher, Reise d. Novara, p. 57.
 1931. *Onthophagus spinifex*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 200-201.

Material examined : 1 ex., Tripura (West Tripura Dist.), Khoai, 5. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Maharashtra, Tamil Nadu, Bihar.

Elsewhere : Sri Lanka.

Remarks : First time recorded from Tripura.

26. *Onthophagus taurinus* White 1844

1844. *Onthophagus taurinus* White, Ann. Mag., Nat. Hist., 16 : 424.
 1931. *Onthophagus taurinus*, Arrow, Fauna Brit. India (Coleoptera : Lamellicornia), 3 : 316-317.

Material examined : 1 ex., Tripura, Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura.

Elsewhere : Bangladesh, Burma, Myanmar, Thailand, Formosa, China.

Remarks : First time recorded from India.

27. *Onthophagus triceratops* Arrow 1913

1913. *Onthophagus triceratops* Arrow, *Rec. Ind. Mus.*, 8 : 195.

Material examined : 8 exs.; 7 exs., Tripura, Teliamura, Khoai (West Tripura Dist.), 5. i. 1989, S. K. Chatterjee coll.; 1 ex., Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Assam.

Remarks : First time recorded from Tripura.

Genus 9. *Caccobius* Thomson 1863

1863. *Caccobius* Thomson, *Skand. Col.*, 5 : 34.

1872. *Caccophilus* Jekel, *Rev. Mag. Zool.*, p. 410.

1931. *Caccobius*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 141-142.

28. *Caccobius unicornis* (Fabricius) 1801

1798. *Copris unicornu* Fabricius, *Ent. Syst. Suppl.*, p. 33.

1801. *Copris unicornis* Fabricius, *Syst. Eleut.*, 1 : 52.

1931. *Caccobius unicornis*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 145-147.

Material examined : 4 exs., Tripura, Teliamura (West Tripura Dist.), Brahmachara, 4. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Assam, Uttar Pradesh, Madhya Pradesh.

Elsewhere : Bangladesh, China, Vietnam, Indonesia, Phillipines, Malaysia.

Remarks : First time recorded from Tripura.

Genus 10. *Liatongus* Reitter 1893

1893. *Liatongus* Reitter, *Verh. Brunn.*, 31 : 166.

1931. *Liatongus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 362-363.

29. *Liatongus affinis* Arrow 1908

1908. *Oniticellus affinis* Arrow, *Ann. Mag. Nat. Hist.*, (8) 1 : 181.

1931. *Liatongus affinis*, Arrow, *Fauna Brit. India* (Coleoptera : Lemellicornia), 3 : 367-368.

Material examined : 4 exs.; 2 exs., Tripura, Baramura (West Tripura Dist.), 6. i. 1989, S. K. Chatterjee coll.; 1 ex., Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll.; 1 ex., Teliamura (West Tripura Dist.), Khoai, 5. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Manipur, West Bengal.

Elsewhere : Burma, Myanmar, Thailand & Indo-China.

Remarks : First time recorded from Tripura.

Genus 11. *Onitis* Fabricius 1798

1798. *Onitis* Fabricius, *Ent. Syst. Suppl.*, p. 2.

1931. *Onitis* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 386-387.

Key to the species of genus *Onitis* known from Tripura

- 1(2) Narrow ; pronotum very feebly punctured**falcatus**
- 2(1) Broader ; pronotum well punctured
- 3(4) Metasternum longitudinally grooved in front**philemon**
- 4(3) Metasternum flat, not grooved
- 5(6) Clypeo-frontal carina broadly interrupted ; Male, terminal external tooth of the front tibia projecting in front**subopacus**
- 6(5) Clypeo-frontal carina narrowly interrupted ; Male, terminal external tooth of the front tibia tapering in front**virens**

30. *Onitis falcatus* (Wulfen) 1786

1786. *Scarabaeus falcatus* Wulfen, *Descr. Cap. Ins.*, p. 14, pl. 2, fig. 17.

1876. *Onitis falcatus* Lansburge, *Ann. Soc. Ent. Belg.* : 18 : 126.

1931. *Onitis falcatus*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 392-393.

Material examined : 11 exs. ; 2 exs., Ambasa, (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll. ; 1 ex., Nalchar (West Tripura Dist.), 21. i. 1989, S. K. Chatterjee coll. ; 8 exs., Amp, 17-18. vi. 1971, V. C. Agrawal coll.

Distribution : India : Tripura, Uttar Pradesh, Maharashtra, Tamil Nadu, Kerala, Bihar, Orissa, West Bengal.

Elsewhere : Bangladesh, Myanmar, Malaysia, South China, Phillipines.

Remarks : First time recorded from Tripura.

31. *Onitis philemon* Fabricius 1801

1801. *Onitis philemon* Fabricius, *Syst. Eleut.*, 1 : 30.

1931. *Onitis philemon* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 393-394.

Material examined : 24 exs. ; 13 exs., Tripura, Amp, 17-18. vi. 1971, V. C. Agrawal Coll. ; 1 ex., Nalchar (West Tripura Dist.), 21. i. 1989, S. K. Chatterjee Coll. ; 5 exs., Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll. ; 1 ex., Teliamura (West Tripura Dist.), 5. i. 1989, S. K. Chatterjee coll. ; 2 exs., Champaknagar (West Tripura Dist.), 11. i. 1989, S. K. Chatterjee coll. ; 1 ex., Ambasa (West Tripura Dist.), 5. xii. 1986, C. R. Basu coll. ; 1 ex., Sepehijola (West Tripura Dist.), 17. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Punjab, Uttar Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Tamil Nadu, Bihar, Orissa.

Elsewhere : Sri Lanka.

Remarks : First time recorded from Tripura.

32. *Onitis subopacus* Arrow 1931

1875. *Onitis philemon* Lansberge, *Ann. Soc. Ent. Belg.*, 18 : 133.

1931. *Onitis subopacus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 395-396.

Material examined : 2 exs. ; 1 ex., Tripura, Amp, 17. vi. 1971, V. C. Agrawal coll. ; 1 ex.,

Teliamura (West Tripura Dist.), 5. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Madhya Pradesh, Uttar Pradesh, Tamil Nadu, Jammu & Kashmir, Bihar, West Bengal.

Elsewhere : Bangladesh, Burma, Nepal, Sri Lanka, Malaysia, Thailand, Myanmar.

Remarks : First time recorded from Tripura.

33. *Onitis virens* Lansberge 1875

1875. *Onitis virens* Lansberge, *Ann. Soc. Ent. Belg.*, 18 : 135.

1931. *Onitis virens*, Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 396-397.

Material examined : 8 exs. ; 6 exs., Tripura, Amp, 17. vi. 1971, V. C. Agrawal coll. ; Teliamura (West Tripura Dist.), 5. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Madhya Pradesh, Maharashtra, Uttar Pradesh, Tamil Nadu, Bihar, West Bengal.

Elsewhere : Bangladesh, Myanmar, South China, Vietnam.

Remarks : First time recorded from Tripura.

Genus 12. *Oniticellus* Serveille 1825

1825. *Oniticellus* Serveille, *Encycl. Meth.*, 10 : 356.

1901. *Tiniocellus* Peringuey, *Trans S. Afr. Phil. Soc.*, 12 : 116 (Type, *O. spinipes* Roth.)

1931. *Oniticellus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 375.

34. *Oniticellus cinctus* (Fabricius) 1775

1775. *Scarabaeus cinctus* Fabricius, *Syst. Ent.*, p. 30.

1931. *Oniticellus cinctus* Arrow, *Fauna Brit. India* (Coleoptera : Lamellicornia), 3 : 379-380.

Material examined : 15 exs. ; 4 exs., Tripura, Amp 17-18. vi. 1991, V. C. Agrawal coll. ; 11 exs., Ambasa (West Tripura Dist.), 7. i. 1989, S. K. Chatterjee coll.

Distribution : India : Tripura, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, Karnatak, Assam, West Bengal.

Elsewhere : Bangladesh, Myanmar, Malaysia, South China, Thailand, Vietnam.

Remarks : First time recorded from Tripura.

species have been recorded for the first time from Tripura and 4 species have been recorded for the first time from India. Keys to the subfamilies, genera and species have been provided. Informations on distributional records of all the species included in this paper have been provided on the basis of literature and collections present in Zoological Survey of India, Important Synonymies have also been added.

SUMMARY

The paper deals with 34 species under 12 genera belonging to 4 subfamilies namely Cetoniinae, Dynastinae, Rutelinae and Coprinae of Lamellicorn beetles from Tripura. All the 34

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The chart showing Districtwise distribution of species of the family Scarabaeidae known from Tripura (India).

Name of species	W. Tripura	N. Tripura	S. Tripura
1. <i>Protaetia pretiosa</i> Nonfried			+
2. <i>Xylotrupes gideon</i> (Linnaeus)			+
3. <i>Popillia birmanica</i> Arrow		+	
4. <i>P. laevistriata</i> Arrow			+
5. <i>Anomala dimidiata</i> (Hope)	+	+	+
6. <i>A. marginipennis</i> Arrow			+
7. <i>A. validipes</i> Arrow			+
8. <i>Heliocopris bucephalus</i> (Fabricius)	+	+	
9. <i>Catharsius birmanensis</i> Lansberge		+	
10. <i>C. granulatus</i> Sharp			+
11. <i>C. javanus</i> Lansberge			+
12. <i>C. molossius</i> (Linnaeus)	+		
13. <i>C. quadridentatus</i> Lansberge	+		
14. <i>C. sagax</i> (Quenstedt)	+		+
15. <i>Copris laevigatus</i> Gillet		+	
16. <i>C. sarpendon</i> Harold	+		+
17. <i>Onthophagus aenescns</i> (Wiedemann)	+		

Name of species	W. Tripura	N. Tripura	S. Tripura
18. <i>O. armatus</i> Blanchard	+		
19. <i>O. catta</i> (Fabricius)	+		
20. <i>O. fasciatus</i> Boucomont	+		
21. <i>O. luridipennis</i> Boheman	+		
22. <i>O. ramosellus</i> Bates	+		
23. <i>O. rectecornutus</i> Lansberge	+		
24. <i>O. sagittarius</i> Fabricius	+		
25. <i>O. spinifex</i> (Fabricius)	+		
26. <i>O. taurinus</i> white	+		
27. <i>O. triceratops</i> Arrow	+		
28. <i>Caccobius unicornis</i> (Fabricius)	+		
29. <i>Liatongus affinis</i> Arrow	+		
30. <i>Onitis falcatus</i> (Wulfen)	+		
31. <i>O. Philemon</i> Fabricius	+		
32. <i>O. subopacus</i> Arrow	+		
33. <i>O. virens</i> Lansberge	+		
34. <i>Oniticellus cinctus</i> (Fabricius)	+		

INSECTA : COLEOPTERA : ELATERIDAE

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INTRODUCTION

'Elateridae' which are commonly called as the 'click-beetles' is a large and interesting group of terrestrial coleoptera belonging to the superfamily—Elateroidea. The common name of these beetles is due to the fact that when it falls in a reverse position on its back it can again spring into the air by the action of their 'click' structure—a prosternal spine working in a mesosternal groove.

These beetles are mostly sombre or blackish coloured elongated insects, but few of them are very colourful—red, yellow and even metallic colours. Their size may vary from few millimeters to about 5-6 cms. The posterior angles of their prothorax usually produced, sometimes strongly so. Antennae inserted on the front in grooves near the eyes.

These beetles frequent foliage, flower and soil. Some members possess photogenic organs like that of Lampyridae. The eggs and larvae of certain beetles are also luminous.

The larvae of 'Elateridae' which are commonly called as "wire-worms" are elongated and cylindrical and very tough skinned. Some larvae are root feeders and extremely destructive. These larvae damage vegetables, root lets of seedlings, small plants, grass and maize field etc. They are not all vegetable feeders as many are found in decaying wood and some are carnivorous and even feed on one another. These beetles are known to damage young growing shoots by gnawing the epidermis or biting through stalks and petioles.

According to J.F. Lawrence (1972) some 9000 species under 400 genera in 12 subfamilies were recorded from all parts of the world of which approximately 70 genera and more than 400 species are from India.

Though 'Elateridae' is a large, interesting and economically important group of coleoptera still this group has been neglected for a long time. Following are the workers who have contributed to our knowledge about Indian Elateridae fauna. E. Candeze was the prime worker of this group. From his catalogue (1891) we have listed 200 sp. from India. E. Fleutiaux was also another worker who have worked on the fauna of Oriental Zone specially Indo-Chinese fauna. Fleutiaux (1941) has given a key to the subfamilies of Elateridae which has been largely accepted by most of the workers. Schwarz, O. (1906-1907) has given the descriptions of genera of Elateridae in *Genera Insectorum*. Schimmel, R & Platia, G. have described some 30 new species from India. Ohira H. & Becker E. have jointly published some papers on this group but they mainly worked on the materials collected from 'Canadian Nepal Expedition to Himalaya in 1967' They have recorded some 15 species from India. Von Hayek, C. M. F. (1973, 1979) has given the reclassification of the subfamily-Agrypninae with some addition & corrections later. She has recorded 89 species under 7 genera from India. From India, other than Steebings (1914) and Beeson (1941) the only worker on this group is Dr. L. K. Vats of Kurukshetra University with his Co-workers Chauhan and Kashyap. They have recorded some 130 sp. with one new genus from North West

India (mainly U. P., H. P. and Haryana) of which some 113 sp. are new to Science.

So far fauna of Tripura is concerned not a single species has been recorded so far. Materials of this study are based on the collection made by various survey parties of Z. S. I. from different districts of Tripura. 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 15 species belonging to 9 genera and 6 subfamilies have been dealt within this paper. All of them are firstly recorded from Tripura.

Classified list of Elateridae recorded from Tripura.

Subfamily I. AGRYPNINAE

Genus 1. *Agrypnus* Eschscholtz

- Species 1. *A. angulosus* (Candize)
2. *A. haedulus* (Candeze)
3. *A. jurulosus* (Candize)

Subfamily II. DENTICOLLINAE

Genus 2. *Pachyderes* Guérin-Meneville, 1834

- Species 4. *P. bengalensis* Candeze

Subfamily III. ELATERINAE, Fleutiaux

Genus 2. *Drasterius* Eschscholtz

- Species 5. *D. collaris* Candeze

Genus 4. *Ludigenus* Candeze

- Species 6. *L. politus* Candeze

Genus 5. *Megapenthes* Kiesenwetter

- Species 7. *M. birmanicus* Candeze

Subfamily IV. CONODERINAE, Fleutiaux

Genus 6. *Heteroderes* Latreille

- Species 8. *H. spinicollis* Candeze
9. *H. lenis* Candeze
10. *H. chrysites* Candeze

Genus 7. *Aeolus* Eschscholtz

- Species 11. *A. brachmana* Candeze

Subfamily V. MELANOTINAE Jacobson

Genus 8. *Melanotus* (Megerle) Eschscholtz

- Species 12. *M. fuscus* (Fabricius)
13. *M. sp.*

Subfamily VI. CARDIOPHORINAE, Fleutiaux

Genus 9. *Cardiophorus* Eschscholtz

- Species 14. *C. limbatus* Candeze
15. *C. sinoconstrictus* Vats & Chauhan

SYSTEMATIC ACCOUNT

Family ELATERIDAE

Key to the subfamilies of ELATERIDAE known from Tripura

- 1(10) Mesocoxae open to both mesepimeron and mesepisternum or only to mesepisternum, mesepimeron normal size or with setae on base of claws. Scutellum not chordate.
2(5) Setae present at base of claws; mesosternum and metasternum connate.
3(4) Prosternopleural suture opened or deeply grooved for receiving the antennae, very rarely prosternopleural suture grooved for reception of anterior tarsi
.....AGRYPNINAE
4(3) Antennae not received in deep prosternopleural grooves, the grooves closed or open at front, with shallow excavation at the most, (fourth Tersal segment lobed beneath. Antennae 11 segmented)
.....CONODERINAE

- 5(2) Setae absent from base of claws, may be present else where on claws, mesosternum and metasternum separated by distinct suture.
- 6(7) Head capsule flattened prognathus
.....DENTICOLLINAE
- 7(6) Head capsule oval, deflexed.
- 8(9) Claws simple to serrate, frontal ridge various, often thick and protruding to obsolete in the middle
.....ELATERINAE
- 9(8) Claws pectinate, frontal ridge various usually prominent to more rarely obsolete
.....MELANOTINAE.
- 10(1) Mesocoxae closed to mesepisternum and a reduced mesepimeron of mesosternum and metasternum; no setae on base of claws. Scutellum usually cordate.....
.....CARDIOPHORINAE.

Subfamily I. AGRYPNINAE

Authorities vary in their opinion regarding the status of this group. Schenkling (1925), Fleutiaux (1941) and also very recently Von Hayek (1973, 1979) has treated this group as a subfamily. Stibick (1979) has treated the group as a tribe (Agrypnini) under subfamily Pyrophorinae. However, we have followed here Von Hayek and has treated this group as a subfamily.

This group contains 17 genera of which 7 genera, namely *Adelocera*, *Lacon*, *Agrypnus*, *Meristhus* (*Sulcimerus*), *Rismethus*, *Lanelater* and *Octocryptus* are recorded from India. Only one genus *Agrypnus* Eschscholtz has been represented in the collection.

The materials of this group are distributed throughout the world.

Genus 1. *Agrypnus* Eschscholtz, 1829

1829. *Agrypnus* Eschscholtz. In Thon. *Entomologisches Archiv*. 2(1) : 32.
1973. *Agrypnus*; Von Hayek. *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.* 20 : 113.

The genus *Agrypnus* was originally established by Eschscholtz, 1829 with a list of twelve species. The type species was pointed out by Arnett (1952) as *Elater murinus* Linnaeus. Latreille (1834), Germar (1840) added some species to this list of Eschscholtz. But, Candeze's catalogue (1891) include 54 species all together of which 8 were from India. C. M. F. Von Hayek (1973, 1979) has recorded 501 species of *Agrypnus* Eschscholtz from the world of which 46 species are recorded from India. Vats & Kashyap (1992) has recorded 48 species including 40 new species from North West India. So, totally 86 species of *Agrypnus* Esch. are recorded from India at present. In this paper we have recorded 3 species from Tripura.

Key to the species of the genus *Agrypnus* known from Tripura.

- 1(2) Elytra bicoloured.....*A. angulosus*
- 2(1) Elytra unicoloured.
- 3(4) Lateral margin of prothorax non-sinuate, size 2.7 cm..... *A. haedulus*
- 4(3) Lateral margin of prothorax sinuate, size 1.2 cm*A. jurulosus*

1. *Agrypnus angulosus* (Candeze), 1857

1857. *Lacon angulosus* Candeze *Mem. Soc. r. Sci. Liege* 12 : 117.
1926. *Adelocera angulosus* Fleutiaux, *Annls. Soc. Ent. Fr.* 95 : 96.
1979. *Agrypnus angulosus*, Von Hayek, *Bull. Bri. Mus. (Nat. Hist.)* 38 (1-6) : 207.

Material examined : 1 ex., India : N. Tripura; Kumarghat; 18.v.1992; S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura).

2. *Agrypnus haedulus* (Candeze), 1857

1857. *Lacon haedulus* Candeze, *Mem. Soc. r. Sci. Liege* 12 : 122.
1926. *Adelocora haedulus*, Fleutiaux, *Annls. Soc. Ent. Fr.* 95 : 96.
1973. *Agrypnus haedulus*, Von Hayek, *Bull. Br. Mus. (Nat. Hist.) Suppl.* 20 : 162.

Material examined : 1 ex., India : N. Tripura : Pabiachhara, Kumarghat : 17. v. 1992; B. Mitra & party coll.

Distribution : India : Tripura (N. Tripura), West Bengal.

3. *Agrypnus jurulosus* (Candeze), 1889

1889. *Lacon jurulosus* Candeze, *Annls. Soc. Ent. Belg.* **33** : 73.

1973. *Agrypnus jurulosus*, Von Hayek, *Bull. Br. Mus. (Nat. Hist.) Suppl.* **20** : 172.

Material examined : 1 ex.; N. Tripura, Chintamanipara, Ambassa; 14. v. 1992; M. Sil. & party coll.

Distribution : India : Tripura (N. Tripura), Sikkim, West Bengal, Bihar.

Subfamily II. DENTICOLLINAE Reitter, 1905

Reitter (1905) established the subfamily Denticollinae. Previously Candeze (1857) treated it as Campylides. This is one of the largest subfamilies. Stibick (1979) has treated it as a subfamily and has included 3 tribes (namely, Denticollini, Ctenicerini and Pachyderini) under it. The tribe Pachyderini contains 9 genera and seventy species. Only *Pachyderes* Guerin has been recorded in the present collection.

2. Genus. *Pachyderes*, Guerin-Meneville, 1834

1834. *Pachyderes* Guerin-Meneville, *Icon. Regne Anim.* Vol. -3, fac. 4 : 41.

1921. *Pachyderes*, Hyslop, *Proc. U. S. Natn. Mus.* **58** : 661.

Candeze (1891) included *Pachyderes* under Tribe Eudactylites. Schwarz (1906) has also treated it as a tribe. Fleutiaux (1919) named and based the subfamily Pachyderinae with related genus *Pachyderes*. However, Stibick (1979) has included *Pachyderes* under the tribe-Pachyderini of subfamily Denticollinae. We have recorded one species of *Pachyderes* Guerin from Tripura.

4. *Pachyderes bengalensis* Candeze, 1889

1889. *Pachyderes bengalensis* Candeze, *Annls. Soc. ent. Belg.* **33** : 67-223.

1892. *Pachyderes bengalensis* Candeze, *Annls. Soc. ent. Belg.* **36** : 488.

Material examined: 1 ex., India : N. Tripura; Kumarghat; 18. v.1992; S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura), West Bengal.

Subfamily III. ELATERINAE, Fleutiaux, 1936

This is the largest subfamily of Elateridae. Candeze (1891) treated it as tribe-Elaterites including 18 genera. Schwarz (1906) has also treated it as a tribe and has included 15 genera. However, Fleutiaux (1941) has treated it as subfamily-Elaterinae. Stibick (1979) has reported that subfamily Elaterinae has 9 tribes many of which were treated as subfamilies by other authors. This subfamily include 180 genera and subgenera.

In the present study we have reported 3 genera of Elaterinae from Tripura.

Key to the genera of subfamily ELATERINAE recorded from Tripura.

- 1(2) Body short, with prominent striations on the elytra*Drasterius*
- 2(1) Body elongate.
- 3(4) Sides narrowed posteriorly*Ludigenus*
- 4(3) Sides parallel*Magapenthes*

3. Genus. *Drasterius* Eschscholtz, 1829

1829. *Drasterius* Eschscholtz, *In Thon. Arch.* Vol. 2. pt. 1 : 33.

1921. *Drasterius*, Hyslop, *Proc. U. S. Natn. Mus.* **58** : 642.

Candeze (1891) has included this genus *Drasterius* Each. under Tribe Elaterites. Schwarz (1906) has also treated it under tribe Elaterini. Fleutiaux (1941) has treated it under subfamily-Elaterinae and we have also done so.

There is only one species recorded from Tripura.

5. *Drasterius collaris* Candeze, 1859

1859. *Drasterius collaris* Candeze, *Mem. Soc. r. Liege* 14 : 427.

1918: (1919) *Drasterius collaris*, Fleutiaux, *Ann. soc. ent. Fr. (N. S.) Paris* 87 : 212

Material examined: 7 exs., S. Tripura: Belonia; 20-21. ix. 1992; S. K. Ghosh, coll.; 4 exs., W. Tripura Sonamura; 19. ix. 1992; B. N. Das & party coll.

Distribution : India : Tripura (South and West Tripura). Also recorded from Laos, Tonkin, Vientiane.

Remarks : These materials are attracted by light traps.

4. Genus. *Ludigenus* Candeze, 1863

1863. *Ludigenus* Candeze; *Mem. Soc. r. Liege*. 17 : 325.

1921. *Ludigenus*, Hyslop; *Proc. U. S. Nat. Mus.* 58 : 653.

Candeze (1891) included the genus *Ludigenus* Cand. Under tribu—Ludiites. Schwarz (1906) has treated this genus under tribus—Steatoperini. But, Fleutiaux (1936) has treated this genus under subfamily—Elaterinae. We have recorded one species of *Ludigenus* from Tripura.

6. *Ludigenus politus* Candeze, 1863

1863. *Ludigenus politus* Candeze, *Mem. Soc. r. Sci. Liege* 17 : 326.

1970. *Ludigenus politus*, Ohira, *Ann. Hist. Natur. Mus. Natn. Hung.*; *Thomus* 62 : Part-III : 229.

Material examined: 1 ex., S. Tripura; Amarpur; 12. iii. 1990; Dr. G. N. Saha & party coll.

Distribution : India : Tripura (S. Tripura); Assam, Andaman Islands. The material is also recorded from Burma, Combodia, Sumatra, Celebes, Borneo, Laos, Philippines, Vietnam, China, Formosa.

Remarks : The material was collected from under the bark of a tree.

5. Genus. *Megapenthes* Kiesenwetter, 1863

1863. *Megapenthes* Kiesenwetter, *Nat. Ins. Deut.*, Vol. 4 : 353.

1921. *Megapenthes*, Hyslop; *Proc. U. S. Natn. Mus.* 58 : 655.

Candeze (1891) and Schwarz (1906) has treated *Megapenthes* Kiesenwetter under the tribe Elaterini. Schenkling (1925) listed the genus in subfamily Elaterinae. But, Fleutiaux (1947) established a new subfamily Ampedinae and included *Megapenthes* Kiësen. under this subfamily. Vats & Chauhan (1992) has followed Fleutiaux. But Stibick (1979) has included this genus under Tribe Megapenthini of subfamily Elaterinae. We have included it under subfamily-Elaterinae.

The genus include one species from Tripura.

7. *Megapenthes birmanicus* Candeze, 1888

1888. *Megapenthes birmanicus* Candeze, *Ann. Mus. Stor. Nat. Genova* : 667.

1906. *Megapenthes birmanicus*, Schwarz; In Wyttsmann *Genera Insectorum* : 122-124.

Material examined: 2 exs., N. Tripura : Jadurambari : Abhanga; 1. iii. 1991; G. K. Srivastava coll. 1 ex., N. Tripura: Ambassa; 2. iii. 1991; G. K. Srivastava coll.; 1 ex., W. Tripura: Khowai; 4. iii. 1991, G. K. Srivastava coll.

Distribution : India : Tripura (N. Tripura and W. Tripura). Also recorded from Burma, Birmanien.

Subfamily IV. CONODERINAE, Fleutiaux 1919

Candeze (1891) has treated this as tribu Monocrepidites, while Schwarz (1906) has also treated it as a tribe including 9 genera. Fleutiaux (1919) has raised it as the subfamily Conoderinae. Stibick (1979) has included it as a tribe-Conoderini under Subfamily-Pyrophorinae mainly due to the presence of setae at the base of claw. We have recorded 2 genera from Tripura under this subfamily.

Key to the genera of Conoderinae known from Tripura.

- 1(2) Punctuation on pronotum double
 **Heteroderes**
- 2(1) Punctuation on pronotum simple (4th tarsal segment broadened and more or less strongly cordate **Aeolus**

6. Genus. **Heteroderes** Latreille, 1834

1834. *Heteroderes* Latreille, *Ann. Soc. Ent. Fr.* 3 : 155.
1921. *Heteroderes*, Hyslop, *Proc. U. S. Nat. Mus.* 58 : 649.

Heteroderes Latreille was treated under tribu-Monocrepidites by Candeze (1891) with 78 species from the world and 11 species from India. Schwarz (1906) has also recorded 11 species from India. Here we have recorded three species of *Heteroderes* from Tripura.

Key to the species of Heteroderes Latr, recorded from Tripura.

- 1(2) Antennae extended upto the middle of the prothorax **H. spinicollis**
- 2(1) Antennae extended beyond the middle of the prothorax.
- 3(4) Body colour blackish **H. lenis**
- 4(3) Body colour brownish, elytra covered with straw yellow and brown patches
 **H. chrysites**

8. **Heteroderes spinicollis** Candeze, 1859

1859. *Heteroderes spinicollis* Candeze, *Mem. Soc. r. Liege* 14 : 360.
1906. *Heteroderes spinicollis*, Schwarz. In Wytsmann *Genera Insectorm* : 107.

Material examined : 1 ex., W. Tripura; Agartala (N. B. B. College area); 1. xi. 1974; M. S. Shishodia, coll.

Distribution : India : Tripura (W. Tripura) Also recorded from Ceylon.

9. **Heteroderes lenis** Candeze, 1859

1859. *Heteroderes lenis* Candeze, *Mem. Soc. r. Sci. Liege*, 14 : 357.
1906. *Heteroderes lenis*, Schwarz. In Wytsmann *Gen. Insect.* : 107.

Material examined : 6 exs., S. Tripura; Belonia; 19. ix. 1992; S. K. Ghosh coll.

Distribution : India : Tripura (S. Tripura) and Bihar.

Remarks : These materials are attracted by light and can easily be caught by light traps.

10. **Heteroderes chrysites** Candeze, 1859

1859. *Heteroderes chrysites* Candeze, *Mem. Soc. r. Liege*, 14 : 346.
1906. *Heteroderes chrysites*, Schwarz. In Wytsmann *Gen. Insect.* : 107.

Material examined : 1 exs., W. Tripura : Sonamura 19. ix. 1992; B. N. Das & party.

Distribution : India : Tripura (W. Tripura), West Bengal (Calcutta) & Maharashtra (Bombay).

7. Genus. **Aeolus** Eschscholtz, 1829

1829. *Aeolus* Eschscholtz, *In thon. Arch.*, Vol. 2 : 33.
1921. *Aeolus*, Hyslop; *Proc. U. S. Nat. Mus.*, 58 : 624.

Candeze (1891) recorded 126 species under the genus *Aeolus* from many countries of the world but none from India even Asia. Schwarz (1906) has also referred that the species of *Aeolus* is distributed in America and Australia. But, later on, this genus was recorded from Asia and even India. Here, we have recorded single species of *Aeolus* Esch.

11. **Aeolus brachmana** Candeze, 1859

1859. *Aeolus brachmana* Candeze, *Mem. Soc. r. Sci. Liege*, 14 : 283 et 345.
1888. *Heteroderes brachmana* Candeze. *Ann. Mus. Civ. Gen.*, : 676.
1918. (1919) *Aeolus brachmana*, Fleutiaux; *Ann. soc. Ent. Fr.* 87 : 208.

Material examined : 7 exs., India : W. Tripura : Sonamura; 19. ix. 1992; S. K. Ghosh coll.

Distribution : India : Tripura (W. Tripura), also Orissa, West Bengal, South East India. Also recorded from Hanoi, Tonkin.

Subfamily V. MELANOTINAE,
Jacobson, 1913

Candeze (1891) has treated this group as tribu Melanotites. But, Jacobson (1913) raised it to a subfamily level and included 8 genera and more than 300 species of which mostly were in the genus *Melanotus* Esch. *Elater fuscipes* Gyllenhall was designated as the type species. The present study include the genus *Melanotus* Esch. from Tripura.

8. Genus. *Melanotus* (Megerle) Eschscholtz,
1829

1829. *Melanotus* (Megerle) Eschscholtz, *In Thon. Arch.*,
Vol. 2 : 32.

1921. *Melanotus*, Hyslop; *Proc. U. S. Natn. Mus.*,
58 : 656.

The genus *Melanotus* Esch. is the main genus of the subfamily-Melanotinae. Candeze (1891) has recorded 139 species of this genus of which 10 were from India. Ohira & Becker (1974) have recorded one new species from Darjeeling of India. Vats & Chauhan (1991) have recorded 8 species of *Melanotus* including 7 new species from North West India.

We have identified one species and other one is yet to be named. Hence, we have treated it as *Melanotus* sp.

12. *Melanotus fuscus* (Fabricius, 1801)

1801. *Elater fuscus* Fabricius; *Syst. El.* II : 228.

1970. *Melanotus fuscus* Ohira, *Ann. Hist. Nat. Mus. Hung.* : Tomus 62 : 220.

Material examined : 2 exs., India : W. Tripura : Sepahijala; 24. ii. 1991; G. K. Srivastava coll.

Distribution : India : Tripura (W. Tripura), Arunachal Pradesh, Uttar Pradesh, Bihar, West Bengal, Andhra Pradesh.

The material is also recorded from South-East Asia; Burma, Ceylon, Indo-China, Ambonia.

13. *Melanotus* sp.

Material examined : 1 ex., India : N. Tripura; Jadurambari; Beat-Abhanga; 1. iii. 1991; G. K. Srivastava, coll.

Remarks : This specimen cannot be placed in any of the known Indian species. As we have a single specimen, so specific determination has not been attempted. This species will be dealt with separately in future.

Subfamily VI. CARDIOPHORINAE,
Fleutiaux, 1941

Candeze (1891) has described the group under Tribe-Cardiophorites with 7 genera, the main one being *Cardiophorus* Eschscholtz. Schwarz (1906) has also treated it as a tribe. While, Fleutiaux (1941) has raised it to the subfamily level. Stibick (1979) has also given the status of subfamily. It is quite a large subfamily with about 38 genera and 1000 species. Stibick has also divided it under 2 tribes (namely Cardiophorini and Nyctorini). The type species is *Elater ruficollis* Linnaeus.

9. Genus. *Cardiophorus* Eschscholtz, 1829

1829. *Cardiophorus* Eschscholtz, *In Thon. Arch.*,
Vol. 2 : 34.

1921. *Cardiophorus*, Hyslop; *Proc. U. S. Natn. Mus.*,
58 : 633.

Cardiophorus was originally described by Eschscholtz in 1829 including 13 species. Candeze (1891) listed 306 species of this genus from all over the world and 41 species from India. Schenkling (1925, 1927) has listed about 500 species from the world. Later, Fleutiaux (1947), Lanchester (1971) and others have described several new species. Vats & Chauhan (1991) have described 14 new species from North India.

*Key to the species of **Cardiophorus** Esch.
recorded from Tripura.*

- 1(2) Pronotum with simple punctation
..... **C. limbatus**.
2(1) Pronotum with double punctation
..... **C. sinoconstrictus**.

14. *Cardiophorus limbatus*, Candeze, 1860

1860. *Cardiophorus limbatus* Candeze, *Mem. Soc. r. Sci. Liege* 15 : 209.
1991. *Cardiophorus limbatus*, Vats & Chauhan, *Res. Bull. (Sci.) Punj. Uni.* 42(I-IV) : 15.

Material examined : 1 ex.; South Tripura: Belonia; 19. ix. 1992; B. N. Das & party coll.

Distribution : India : Tripura (South Tripura) and Haryana.

15. *Cardiophorus sinoconstrictus* Vats and Chauhan, 1991

1991. *Cardiophorus sinoconstrictus* Vats & Chauhan, *Res. Bull. (Sci.) Punj. Uni.* 42(I-IV) : 17.

Material examined : 1 ex.; N Tripura; Ambassa; 14. v. 1992; S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura) also Uttar Pradesh, Haryana.

SUMMARY

The present paper deals with 15 species belonging to 9 genera and 6 subfamilies. All these are new record from Tripura. Keys to the subfamilies, genera and species have been provided. Informations on distribution & history have also been provided, wherever possible.

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**The Chart showing District wise distribution of species of the family
Elateridae from Tripura.**

Name of species	W. Tripura	N. Tripura	S. Tripura
1. <i>Agrypnus angulosus</i>	+	—	—
2. <i>Agrypnus haedulus</i>	+	—	—
3. <i>Agrypnus jurulosus</i>	+	—	—
4. <i>Pachyderes bengalensis</i>	+	—	—
5. <i>Drasterius collaris</i>	—	+	+
6. <i>Ludigenus politus</i>	—	+	—
7. <i>Megapenthes birmanicus</i>	+	—	+
8. <i>Heteroderes spinicollis</i>	—	—	+
9. <i>Heteroderes lenis</i>	—	+	—
10. <i>Heteroderes chrysites</i>	—	—	+
11. <i>Aeolus brachmana</i>	—	—	+
12. <i>Melanotus fuscus</i>	—	—	+
13. <i>Melanotus sp.</i>	+	—	—
14. <i>Cardiophorus limbatus</i>	—	+	—
15. <i>Cardiophorus sinoconstrictus</i>	+	—	—

INSECTA : COLEOPTERA : SILVANIDAE

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INTRODUCTION

The Silvanidae are a moderately large family of the section Clavicornia under the superfamily Cucujoidea of the suborder Polyphaga. The silvanids are usually small (1.3-4.5 mm.), reddish-brown and occasionally with dorsal spots. The Silvanidae can be recognised by its 5-5-5 tarsal formula in both sexes with smallest penultimate segment, usually closed behind front coxal cavities, outwardly opened mesocoxal cavities, 11-segmented antennae usually clubbed. The silvanids are largely associated with litter or vegetation 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 works of Grouvelle (1908, 1912) ; Halstead (1973) ; Pal and Sengupta (1977, 1979, 1984), Pal (1981a, b, 1985) ; Pal, Sengupta and Crowson (1984), and Sengupta and Pal (1996) have contributed to the knowledge of Silvanidae of India including the States of northeast India. But no species is yet recorded from the State of Tripura. The present account is based on a collection recently made by the author from Tripura. This collection represents 5 species under 3 genera of 1 subfamily.

SYSTEMATIC ACCOUNT

Family SILVANIDAE

Subfamily SILVANINAE

Diagnosis : Head without fronto-clypeal suture and devoid of longitudinal grooves or striae ; antennal insertions hidden under projection of frons, antennal club distinct.

Genus I. *Silvanoprus* Reitter

1911. *Silvanoprus* Reitter, *Fauna Germanica*, 3 : 45.

[Type-species : *Silvanus fagi* Guérin-Ménéville].

Diagnosis : Eyes moderately large and coarsely faceted, 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 striae punctures ; tarsal segment 3 of legs strongly lobed below ; intercoxal process of first abdominal ventrite broad but narrowed towards apex and slightly pointed, coxal lines closed and usually narrowly separated from posterior margins of hind coxal cavities.

1. *Silvanoprus scuticollis* (Walker)

1859. *Silvanus scuticollis* Walker, *Ann. Mag. nat. Hist.*, (3) 3 : 53.

1876. *Silvanus triangulus* Reitter, *Col. Hefte.*, 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 Basiliensis*, 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 spines 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 ; median lobe of aedeagus slightly tapered at apex, each paramere with a pair of apical setae : one long and other short. Length-2.17-2.55 mm.

Material : 3 ex. India : Tripura, West District, Akhaura border, nr. Agartala, 2 ex., 26. iv. 1994, T. K. Pal, ex. haystack ; Kamalasagar, 1 ex., 25. iv. 1994, T. K. Pal, ex. haystack.

Distribution : India : Assam, Meghalaya, Tripura, Sikkim, West Bengal, Bihar, Uttar Pradesh, Tamil Nadu ; Sri Lanka ; Malaysia ; Indonesia ; Japan ; East Africa ; Madagascar ; France ; Guyana ; West Indies.

2. *Silvanoprus longicollis* (Reitter)

1876. *Silvanus longicollis* Reitter, *Col. Hefte*, 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 ; aedeagus with median lobe slightly tapered at apex, each paramere with a long apical seta. Length-2.20-2.30 mm.

Material : 4 ex. India : Tripura, West District, Akhaura border, nr. Agartala, 26. iv. 1994, T. K. Pal, ex. haystack.

Distribution : India : Assam, Meghalaya, Tripura, Sikkim, West Bengal, Uttar Pradesh, Tamil Nadu ; Sri Lanka ; Malaysia ; Indonesia ; China ; Japan ; Madagascar ; East Africa.

3. *Silvanoprus cephalotes* (Reitter)

1876. *Silvanus cephalotes* Reitter, *Col. Hefte*, 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 and Sengupta, *Entomologica Basiliensis*, 4 : 70.
 1984. *Silvanoprus cephalotes* : Pal, *Rec. zool. Surv. India*, 81 (3-4) : 339.

Diagnosis : Yellowish to reddish brown and covered with short pubescence ; eyes slightly less than half of length of 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 ; aedeagus with median lobe slightly tapered at apex, each paramere with a pair of setae : one long and other short. Length—2.20 mm.

Material : 1 ex. India : Tripura, West District, Akhaura border, nr. Agartala, 26. iv. 1994, T. K. Pal, ex. haystack.

Distribution : India : Assam, Meghalaya, Tripura, Sikkim, West Bengal, Bihar, Uttar Pradesh, Delhi, Karnataka, Tamil Nadu ; Bhutan ; Nepal; Sri Lanka; Indonesia; Japan; China.

Genus II. *Protosilvanus* Grouvelle

1912. *Silvanus* (*Protosilvanus*) Grouvelle, *Annls. Soc. ent. Fr.*, **81** : 336.

1973. *Protosilvanus* Grouvelle : Halstead, *Bull. Br. Mus. nat. Hist. (Ent.)*, **29**(2) : 89.

[Type-species : *Silvanus lateritius* Reitter.]

Diagnosis : Elongated, rather parallel-sided ; head with eyes large and coarsely faceted, temple flattened beneath eye and shelf-like, vertex with a distinct 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, maxillary lacinia without apical spines, segments 2 of both maxillary and labial palpi longer than apical segments ; prothorax elongated, front angles with prominent spines, side margins finely denticulate, front coxae widely separated and coxal cavities closed, sterno-pleural suture extending to lateral margin, mesocoxae widely separated, wing with single anal vein ; each elytron with 9 rows of striae punctures, interstice 7 more or less carinate ; tarsi of legs simple ; intercoxal process of first abdominal ventrite broad and broadly pointed at apex, coxal lines closed.

4. *Protosilvanus lateritius* (Reitter)

1878. *Silvanus lateritius* Reitter, *Verh. zool. bot. Ges. Wien.*, **28** : 194.

1908. *Silvanus lateritius* : Grouvelle, *Annls. Soc. ent. Fr.*, **77** : 490.

1912. *Silvanus* (*Protosilvanus*) *lateritius* : Grouvelle, *Annls. Soc. ent. Fr.*, **81** : 336.

1973. *Protosilvanus lateritius* : Halstead, *Bull. Br. Mus. nat. Hist. (Ent.)*, **29**(2) : 96.

1984. *Protosilvanus lateritius* : Pal and Sengupta, *Oriental Ins.*, **18** : 237.

Diagnosis : Dorsally flattened, yellowish to reddish brown and covered with short pubescence ; eyes about half as long as head, temple shorter than width of an eye facet and sloped downward, antennal segments 9 and 10 with apical spines, punctation on vertex coarse and dense ; elongated prothorax slightly narrowed behind middle, widest across anterior spines, lateral depressions on pronotum well developed, punctation on pronotum almost similar to that of vertex of head ; elytra more than twice as long as broad, almost parallel-sided with side margins slightly wavy, punctures deep and large, interstice 7 strongly carinate and extending slightly more than anterior three-fourths ; aedeagus with median lobe tapered at apex, each paramere with a few apical setae, of which posterior three setae longer than others, median strut long and slightly broader at apex. Length—2.9 mm.

Material : 2 ex. India : Tripura, West District, Bishalgarh, 22 km. 0-Agartala, 28. iv. 1994, T. K. Pal., ex. under bark.

Distribution : India : Arunachal Pradesh, Assam, Meghalaya, Tripura, Sikkim, West Bengal, Bihar, Uttar Pradesh, Himachal Pradesh, Kerala, Tamil Nadu, Andaman Is.; Nepal ; Bangladesh ; Myanmar ; Sri Lanka ; Thailand ; Vietnam ; Malaysia ; Singapore ; Indonesia ; Philippines ; Taiwan ; China ; Japan.

Genus III. *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 with eyes moderately large and coarsely faceted, temple flattened beneath eye, transverse impressed line on vertex behind eyes absent, 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 longer than other segments and fusiform, maxillary lacinia without apical spine ; prothorax about 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 ; wing with single anal vein, each elytron with 9 rows of stria punctures, tarsal segments 2 and 3 lobed below ; intercoxal process of first abdominal ventrite broad and its apex slightly rounded, coxal lines closed.

5. *Monanus concinnulus* (Walker)

1858. *Monotoma concinnulus* Walker, *Ann. Mag. nat. Hist.* (3) 2 : 207.
1867. *Silvanus signatus* Frauenfeld ; *Verh. zool. bot. Ges. Wien.*, 17 : 438.
1874. *Cryptamorphia fasciatus* Wollaston, *Entomologist's mon. Mag.*, 10 : 169.
1876. *Cryptamorphia concinnula* : Waterhouse, *Entomologist's 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 of length of 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 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 ; aedeagus with parameres elongated, each paramere with an apical long and two short setae. Length—1.60-2.30 mm.

Material : 45 ex. India : Tripura, West District, Jirania, 18 km. 0-Agartala, 10 ex., 23. iv. 1994, T. K. Pal, ex. haystack ; Kamalasagar, 10 ex., 25. iv. 1994, T. K. Pal, ex. haystack ; Akhaura border, nr. Agartala, 25 ex., 26. iv. 1994, T. K. Pal, ex. haystack.

Distribution : India : Meghalaya, Tripura, Sikkim, West Bengal, Bihar, Uttar Pradesh, Delhi, Tamil Nadu, Karnataka ; Outside India this species is widely distributed in both the Old and New Worlds.

Key to the genera and species of *Silvanidae* of Tripura.

1. Lateral margin of prothorax with 8 to 10 blunt denticles. Transverse blackish spot near middle of elytra ; dorsal surface shiny
.....*Monanus concinnulus* (Walker)
- Lateral margin of prothorax finely serrated and without large teeth or denticles. Elytra unicolourous 2
2. Dorsal surface markedly flattened ; sterno-pleural suture of prothorax extending to lateral margin, front coxae widely separated ; apical segments of maxillary and labial palpi shorter than segment 2 ; tarsal segments simple ; antennal segments 9 and 10 with apical spine ; 7th elytral interstice carinate
.....*Protosilvanus lateritius* (Reitter)
- Dorsal surface moderately flattened ; sterno-pleural suture of prothorax extending to anterior spine, front coxae narrowly separated ; apical segments of maxillary and labial palpi longest ; tarsal segment 3 lobed below ; antennal segments 9 and 10 devoid of apical spines ; elytral interstices not carinate
.....(*Silvanoprus*) 3

3. Prothorax broader than long, width of prothorax across anterior spines more than 1.5 times as broad as width across posterior angles, prothorax distinctly narrowed posteriorly, lateral margins almost straight, shape of prothorax somewhat triangular
*Silvanoprus scuticollis* (Walker)
- Prothorax longer than broad, width of prothorax across anterior spines less than 1.25 times as broad as width across posterior angles, prothorax slightly narrowed posteriorly behind middle, lateral margin of prothorax distinctly sinuate, shapes of prothorax different 4
4. Temple of head short, temple about as long as one or two eye facets and its outer apical angle somewhat pointed ; puncturation of head and prothorax reticulate-type, coarse and dense*Silvanoprus cephalotes* (Reitter)
- Temple of head long, temple about as long as eye or longer than eye and its outer apical margin rounded ; puncturation of head and prothorax ocellate-type, coarse and somewhat globular*Silvanoprus longicollis* (Reitter)

SUMMARY

5 species belonging to 3 genera under 1 subfamily are dealt with in this paper. All these species are first time recorded from the State of Tripura.

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INSECTA : COLEOPTERA : COCCINELLIDAE

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INTRODUCTION

The Coccinellidae, popularly called the lady-bird beetles are very common in forested and agricultural area. These beetles are of economic importance because some phytophagous species occur as pests of plants while many others, mostly predacious species, check the populations of several crop pests by predating on them.

Nothing is known about these beetles from Tripura. This present paper is a break through to the study of Coccinellidae Fauna of Tripura.

In this paper we have studied materials collected since 1969 to 1992 by different survey parties from Zoological Survey of India.

About 35 species under 17 genera in 8 tribes under 5 subfamilies have been recorded from this state in contrast to the Indian record 350 species under more than 50 genera and World record 4500 species under 500 genera in 21 tribes and 6 subfamilies. Coccinellid fauna of Tripura has not been explored fully. It is believed that with further surveys of the state specially the North Tripura District, many more species of the family would be discovered.

In our previous work "Coccinellidae Fauna of West Bengal" and "Coccinellidae Fauna of Meghalaya" we have elaborately discussed Morphology and historical development of taxonomic studies of the family.

Classified list of coccinellidae recorded from Tripura.

Subfamily 1. STICHOLOTINAE

Tribes 1. STICHOLOTINI

Genus 1. *Jauravia* Motschulsky

Species 1. *J. limbata* Mots.

2. *J. pallidula* Mots.

Subfamily 2. SCYMNINAE

Tribe 2. SCYMNINI

Genus 2. *Pullus* Mulsant

Species 3. *P. nymphaeus* Kapur

4. *Pullus* sp.

Genus 3. *Scymnus* Kugelann

Species 5. *S. (Pullus) brunnescens*
Mots.

6. *S. (Pullus) fuscatus*
Boheman

7. *S. (Pullus) posticalis*
Sicard

8. *S. (Pullus) pyrocheilus*
Mulsant

9. *S. (Pullus) quadrillum*
Mots.

Tribe 3. ASPIDIMERINI

Genus 4. *Cryptogonus* Mulsant

Species 10. *C. bimaculatus* Kapur

11. *C. complexus* var.
posticus Kapur

12. *C. orbiculus* var.
fulvocinctus Muls.

13. *Cryptogonus* Sp.
 Genus 5. *Pseudaspidimerus* Kapur
 Species 14. *P. circumflexa* (Mots.)
 Subfamily 3. CHILOCORINAE
 Tribe 4. PLATYNASPINI
 Genus 6. *Platynaspis* Redtenb.
 Species 15. *P. kapuri* Sp. n.
 Tribe 5. CHILOCORINI
 Genus 7. *Chilocorus* Leach
 Species 16. *C. braeti* Weise
 17. *C. nigritus* (Fab.)
 Genus 8. *Brumus* Mulsant
 Species 18. *B. suturalis* Fab.
 Subfamily 4. COCCINELLINAE
 Tribe 6. COCCINELLINI
 Genus 9. *Oenopia* Mulsant
 Species 19. *O. luteopustulata* Muls.
 20. *O. quadripunctata* Kapur
 21. *O. sauzeti* Muls.
 Genus 10. *Coelophora* Mulsant
 Species 22. *C. bissellata* Muls.
 23. *C. saucia* Muls.
 Genus 11. *Menochilus* Timberlake
 Species 24. *M. sexmaculatus* (Fab.)
 Genus 12. *Micraspis* Dejean
 Species 25. *M. discolor* (Fab.)
 26. *M. vincta* (Gorham)
 Genus 13. *Coccinella* Linnaeus
 Species 27. *C. septempunctata* Linn.
 28. *C. transversalis* Fab.
 Genus 14. *Harmonia* Mulsant
 Species 29. *H. arcuata* (Fab.)
 Tribe 7. PSYLLOBORINI

- Genus 15. *Illeis* Mulsant
 Species 30. *I. indica* Timb.
 Subfamily 5. EPILACHNINAE
 Tribe 8. EPILACHNINI
 Genus 16. *Epilachna* Chevrolat
 Species 31. *E. dodecastigma*
 (Wiedmann)
 32. *E. processa* Weise
 33. *E. septima* Dieke
 34. *E. vigintioctopunctata*
 (Fab.)
 Genus 17. *Afissa* Dieke
 Species 35. *A. flavicollis* (Thunberg)

SYSTEMATIC ACCOUNT

Family COCCINELLIDAE

Key to the subfamilies of COCCINELLIDAE known from Tripura.

- 1(2) Terminal segment of maxillary palpi elongate oval or elongate conical; body minute or small in size.....
STICHOLOTINAE
 2(1) Terminal segment of maxillary palpi strongly divergent apically or nearly parallel sided, rarely slightly convergent apically; body minute to large in size.
 3(6) Antennae relatively short, at most two-third as long as head width, often very short, position of insertion varies; the terminal segment of maxillary palpi generally parallel sided, never strongly divergent apically; Clypeus normal or strongly expanded laterally.
 4(5) Clypeus strongly expanded laterally; anterior margin of pronotum deeply and trapezoidally concave and lateral portions of pronotum very strongly descending below; tibiae often angulate externally
 ... CHILOCORINAE

- 5(4) Clypeus not strongly expanded laterally; anterior margin of pronotum not deeply or not trapezoidally concave, lateral portion descending below but not very strongly; tibiae normal, not angulate
.....SCYMNINAE
- 6(3) Antennae relatively long, at least about one-half as long as the head-width, position of insertion varies; the terminal segment of maxillary palpi usually strongly divergent apically.
- 7(8) Female genital plate (9th sternite) always very elongate; dorsum pubescent, weakly or moderately convex; compound eyes sometimes coarsely faceted; antennae eight to eleven segmented and laterally inserted; tarsal formula true tetramerous, Cryptotetramerous or true trimerous
.....COCCIDULINAE*
- 8(7) Female genital plate (9th sternite) not elongate, oval or transverse; dorsum glabrous or pubescent; compound eyes never coarsely faceted; antennae always eleven segmented and more or less dorsally inserted; tarsal formula : Cryptotetramerous.
- 9(10) Dorsum glabrous; mandibles with a bifid or multidenticulate tip and also with a basal tooth; mesepimeron nearly triangular, its posterior margin almost straight or slightly angulate; mentum relatively narrowly articulated with submentum and distinctly divergent apically; inner margin of female genital plate without notch or small emargination and with a stylus rather long and usually strongly curved with a well developed capsule, median piece of tegmen usually not very slender COCCINELLINAE
- 10(9) Dorsum pubescent; mandibles with a multidenticulate tip and without a basal tooth; mesepimeron quadrate, its posterior margin distinctly angulate; mentum very

broadly articulated with submentum and convergent apically; inner margin of female genital plate with notch or small emargination and with stylus at far outward from the inner corner of female genital plate; siphon of male genitalia rather short and weakly curved without a well developed capsule, median piece of tegmen tubular and slender
.....EPILACHNINAE

Subfamily 1. STICHOLOTINAE

Tribe 1. STICHOLOTINI

Genus 1. *Jauravia* Motschulsky1858. *Jauravia* Motsch., *Etud. Ent.*, VII : 117.1931. *Jauravia* Motsch : Korschefsky, *Coleoptm. Cat.*, Pars 118, P. 222.*Key to the species of the genus Jauravia Mots. known from Tripura*

- 1(2) Elytra yellowish brown to brown, without black patches or spots; underside testaceous; penis narrower towards the apex
.....*J. pallidula* Mots.
- 2(1) Elytra black, except the broad testaceous lateral and apical borders extending from base to apex; underside yellowish brown, metasternum black; penis as above but a little less narrow towards the apex
.....*J. limbata* Mots.

1. *Jauravia limbata* Motschulsky1858. *Jauravia limbata* Motschulsky, *Etud. ent.*, VII : 117-118 (*Type-loc.*—ceylon).1900. *Clanis limbata* (Mots.) : Weise, *Dtsch. ent. Z.*, PP. 417-445.1908. *Sticholotis limbata* (Mots.) : Weise, *Stettin ent. zg.* Vol. XIX, PP. 227.1931. *Sticholotis limbata* (Mots.) : Korschefsky, *Coccinellidae. I and II. Coleoptm. Cat.*, Pars 118 : 212.1946. *Jauravia limbata* Mots. : Kapur, *Ann. Mag. nat. Hist.*, Ser. 11. Vol. 13. P. 82.

*Not treated in this paper.

Material studied : 1 ex., Garjee Bazar, 26. xi. 1969, V. C. Agarwal coll.; 1 ex., Jadurambari, N. Tripura Dist., 1. iii. 1991, G. K. Srivastava coll.; 1 ex., Kumarghat, N. Tripura Dist., 25. v. 1992, S. K. Chakraborty coll.; ex "at light"

Distribution : India : Tripura, Meghalaya, Assam and Malabar. Also known from Ceylon.

Remarks : This is the first record of this species from Tripura.

2. *Jauravia pallidula* Motschulsky

1858. *Jauravia pallidula* Motschulsky, Etud Ent., Vol. VII, PP. 117-118. (Type-loc.—Ceylon, India).

1946. *Jauravia pallidula* Mots. : Kapur, Ann. Mag. nat. Hist., 13(11) : 80-82.

Material studied : 1 ex., Charilam, S. Tripura 15. xi. 1969, V. C. Agarwal & party coll.

Distribution : India : Tripura, Meghalaya, West Bengal, Maharashtra and Tamil Nadu. Also known from Sri Lanka (Ceylon).

Remarks : This species is recorded for the first time from Tripura.

Subfamily 2. SCYMNINAE

Key to the tribes of subfamily SCYMNINAE known from Tripura

- 1(2) Eyes exposed anteriorly, inner ocular margins not parallel to each other; antennae 9-11 segmented, usually shorter than two-thirds of head-width; elytral epipleura very narrow without distinct foveae; trochanters normal ; femora cylindrical and stout, tarsi trimerous or cryptotetramerous; first abdominal segment not convex posteriorly

.....Tribe SCYMNINI

- 2(1) Eyes covered anteriorly by the expanded head-capsule; antennae nine segmented and very short, less than one-fourth of head width; elytral epipleura very narrow with distinct foveae; trochanters elongate, femora broadly expanded to conceal the compressed tibiae, tarsi true trimerous; first abdominal

segment convex posteriorly

.....Tribe ASPIDIMERINI

Tribe 2. SCYMNINI

Key to the genus and subgenus of tribe Scymnini known from Tripura.

Anterior margin of prosternum straight or slightly sinuate at middle, prosternal carinae present*Scymnus* Kugelann

a(b) Femoral line of the first abdominal sternum incomplete Subgenus *Scymnus* S.Str.

b(a) Femoral line complete Subgenus *Pullus* Mulsant

Genus 2. *Pullus* Mulsant

1846. *Pullus* Mulsant, Sulcicolles-Scuripalpes, 4 : 241.

1963. *Pullus* Mulsant : Kapur, Bull. Br. Mus. nat. Hist. (Ent.), 14 : 22-23.

3. *Pullus nymphaeus* Kapur

1970. *Pullus nymphaeus* Kapur, Rec. Zool. Surv. India, 62 (1&2) : 1-4, (Type-loc.—Calcutta).

Material studied : 2 exs., Khoai, Teliamura, W. Tripura Dist., 5. i. 1989, R. S. Burman coll.

Distribution : India : Tripura, West Bengal.

Remarks : This species is very close to *Scymnus* (*Pullus*) *brunnescens* Mots. Which is comparatively larger and uniformly reddish testaceous to testaceous in colour. *P. nymphaeus* is smaller in size, piceous in colour except dark brown near the apex. It is first time recorded from Tripura

4. *Pullus* sp.

Material studied : 1 ex., Jirania, Agartala, W. Tripura Dist., 10. i. 1989, R. S. Burman coll. and 1 ex., Agartala, W. Tripura Dist. 29. v. 1992, S. K. Chakraborty coll.

Remarks : These examples are close to *Scymnus* (*Pullus*) *apiciflavus* Mots. and *Pullus hingstoni* Kapur in colour pattern but much

smaller in size. Two examples mentioned above are not identical to each other. For the lack of sufficient number of examples we do not place it as new species.

Genus 3. *Scymnus* Kugelann S. str.

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 known from Tripura.

- 1(6) Elytra yellowish brown, reddish brown, darkbrown or black, without testaceous apex.
- 2(3) Pronotum and elytra uniformly yellowish brown to dark brown without any spot or marking *S. (P.) brunnescens* Mots.
- 3(2) Pronotum and elytra reddish brown to dark-brown; pronotum often with a black marking at the base without distinct border; external margin of elytra in the middle and sutural margin at the basal two-thirds reddish or dark brown *S. (P.) fuscatus* Boheman
- 4(5) Pronotum and elytra black; each elytron with one large sub-humeral, oblique oval, and one sub-apical small oblique oval reddish brown spot. *S. (P.) quadrillum* Mots.
- 5(4) Pronotum and elytra not uniformly black.
- 6(1) Elytra black except the apical testaceous portion, pronotum testaceous with black markings
- 7(8) Pronotum with a basal, median black spot; one third of the elytral apex at the sutural and two-fifths or less at the external margin testaceous *S. (P.) pyrocheilus* Mulsant
- 8(7) Pronotum black at the central-third, except the narrow anterior and quadrangular lateral testaceous area, often the basal black area extends upto two-thirds from the median line. One-sixth of the elytral apex at the sutural and one third or less at the external margin testaceous, whose basal margin

convex and directed anteriorly

..... *S. (P.) posticalis* Sicard

5. *Scymnus (Pullus) brunnescens* Motschulsky

1863. *Scymnus brunnescens* Mots., *Bull. Soc. Nat. Moscou*, 36 : 425. (Type-loc.—Ceylon).

1966. *Scymnus (Pullus) brunnescens* Mots : Kapur, *Proc. Nat. Inst. Sci. India*, 32 B (3-4) : 160.

Material studied : 3 exs., Indra Nagar, Agartala, 11. ix. 1969; 1 ex., Garjee Bazar, 26. xi. 1969; 5 exs., Chailengta (Manu), N. Tripura Dist., 21-23. xii. 1972; 2 exs., Ganganagar, 14. xii. 1972; 4 exs., Fatik Ray, Kumarghat, N. Tripura Dist., 25. xii. 1972, V. C. Agarwal & party coll. 2 exs., Pecharthal, Dharmanagar, 11. xii. 1988 and 1 ex., Panisagar, Dharmanagar, N. Tripura Dist., R. C. Basu coll.; 2 exs., Ambassa, Teliamura, W. Tripura Dist., 7. i. 1989, R. S. Burman coll. 8 exs., Belonia, S. Tripura Dist., 19. ix. 1992, S. K. Saha & B. N. Das party, ex. "at light"

Distribution : India : Tripura, Meghalaya, Assam, West Bengal, South and Central India and Andamans. Also known from Ceylon.

Remarks : This is a new record of this species from Tripura.

6. *Scymnus (Pullus) fuscatus* Boheman

1858. *Scymnus fuscatus* Boheman, *Eugenes Resa*, P. 208. (Type-loc.—Manilla, Java).

1931. *Scymnus (Scymnus) fuscatus* Boheman : Korschefsky, *Coleoptm. Cat.* Pars 118 : 143.

1955. *Scymnus (Pullus) fuscatus* Boheman : Madar, *Ent. Arb. Mus. Frev*, 6(3) : 908.

1961. *Scymnus (Pullus) fuscatus* Boheman : Kamiya, *Jour. Fac. Agric. Kyushu Univ.*, 11(3) : 311.

Material studied : 1 ex., Tripura, 1969; and 4 exs., Anand Nagar, Agartala, 12. xi. 1969, V. C. Agarwal & party coll.; 2 exs., Kailasahar, Manu, N. Tripura Dist., 8. xii. 1988; 7 exs. Pecharthal, Dharmanagar, N. Tripura Dist., 11. xii. 1988; 1 ex., Panisagar, 12. xii. 1988 and 2 exs., Biltai,

14. xii. 1988, Dharmanagar, N. Tripura Dist.; 2 ex., Jogendranagar, Agartala, S. Tripura Dist., 18. xii. 1988, R. C. Basu coll.; 6 exs., Ambassa, N. Tripura Dist., 7. i. 1989 and 1 ex., Bisramganj, Agartala, W. Tripura Dist., 15. i. 1989, R. S. Burman coll.; 1 ex., Sepahizola, W. Tripura Dist., 15. vi. 1990, G. N. Saha & party coll.; 1 ex., Belonia, S. Tripura Dist., 19. ix. 1992, S. K. Ghosh & party coll.

Distribution : India : Tripura, Meghalaya, Also known from China, Japan, Burma, Philippines, Thailand, Sumatra and Ceylon.

Remarks : This also a new record of the species from Tripura.

7. *Scymnus (Pullus) posticalis* Sicard

1912. *Scymnus posticalis* Sicard, *Ann. Soc. Ent. France*, **81** : 503, (Type-loc.—Burma).

1931. *Scymnus (Pullus) posticalis* Sicard : Korschefsky, *Coleopt. Cat. Pars* 118 : 144.

Material studied : 1 ex., Ambassa, 5. ii. 1971, V. C. Agarwal coll. and 1 ex. Radhapur, Dharmanagar, N. Tripura Dist. 24. v. 1992, B. Mitra coll.

Distribution : India : Tripura, Meghalaya. Also known from Burma.

Remarks : This is a new record of this species from Tripura.

8. *Scymnus (Pullus) pyrocheilus* Mulsant

1853. *Scymnus (Pullus) pyrocheilus* Mulsant, *Ann. Soc. Linn. Lyon*, **1** : 281 (Type-loc.—Calcutta).

— *Scymnus (Pullus) pyrocheilus* Mulsant, *opusc. Ent.* III P. 153.

1931. *Scymnus (Pullus) pyrocheilus* Muls. : Korschefsky, *Coleopt. Cat. Pars* 118 : 144.

Material studied : 1 ex., Chailengta, Manu, N. Tripura Dist. 22. xii. 1972, V. C. Agarwal & party coll.; 1 ex., Halahali, Kamalpur, N. Tripura Dist., 24. xii. 1991, S. Ahmed coll.; 1 ex., Kumarghat, N. Tripura Dist., 29. ii. 1992, R. S. Burman coll.; 1 ex., Hawabari, Teliamura, W.

Tripura Dist., 11. v. 1992, S. K. Chakraborty coll.; 1 ex., Fishery Rest House Campus, Kumarghat, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty coll.; 3 exs., Radhapur, Dharmanagar, N. Tripura Dist. 24. v. 1992, B. Mitra coll.; 1 ex., Jaithang Vill.; Bagbasa, N. Tripura Dist., 25. v. 1992, S. K. Chakraborty coll.; 1 ex., Anandabazar, Dharmanagar, N. Tripura Dist. 26. v. 1992, B. Mitra coll.

Distribution : India : Tripura, Meghalaya, West Bengal and Andamans. Also known from Nepal.

Remarks : This is the first record of the species from Tripura.

9. *Scymnus (Pullus) quadrillum* Motschulsky

1858. *Scymnus quadrillum* Mots., *Etud. Ent.*, **7** : 120 (Type loc.—"Indes orientales").

1900. *Scymnus (Pullus) quadrillum* Mots. : Weise, *Dtsch. ent. Z.*, **28** : 436.

1972. *Scymnus (Pullus) quadrillum* Mots. : Kapur, *Rec. Zool. Surv. India* 66 (1-4) : 311.

Material studied : 1 ex., Mohanpur, Agartala, W. Tripura Dist., 2. ii. 1989, R. S. Burman coll.; 1 ex., Ananda Bazar, Dharmanagar, N. Tripura Dist., 26. v. 1992, B. Mitra coll. and 1 ex., Rudra Sagar, W. Tripura Dist., 17. ix. 1992, S. K. Saha & party coll.

Distribution : India : Tripura, Delhi and Mysore State.

Remarks : It is a widely distributed species in India but first time recorded from Tripura.

Tribe 3. ASPIDIMERINI

Key to the genera of Tribe Aspidimerini known from Tripura.

- 1(2) Prosternal carinae varying in outline, the area enclosed by them lying at the same level as the rest of prosternum, which is flat, the part external to carinae triangular in outline.....
.....Genus *Cryptogonus* Mulsant

- 2(1) Prosternal carinae as wide apart as the base of prosternal process, parallel, extending from the base to the anterior margin of the segment and meeting each other in a transverse ridge to enclose a rectangular area which, when viewed from the underside, lies at a higher level than the lateral parts of prosternum
.....Genus *Pseudaspidimerus* Kapur

Genus 4. *Cryptogonus* Mulsant

1850. *Cryptogonus* Mulsant, *Spec. Trim. Seculipalp.* P. 944-945.
1931. *Cryptogonus* Mulsant : Korschefsky, *Coleoptm. Cat.*, Pars 118, P. 172.

Key to the species of the genus *Cryptogonus*
Muls. known from Tripura.

- 1(2) Prosternal carinae as long as the prosternum, always reaching its anterior margin, narrow and sub-parallel in the basal half and widening in the anterior half before meeting at the anterior margine. Pronotum black Elytrae black except its apical one-third is reddish testaceous with the basal black area meeting it and being convex near the sutural and concave towards the external margins
.....*C. complexus* var. *posticus* Kapur
- 2(1) Prosternal carinae shorter than the length of prosternum, nearly two thirds as long, subparallel, meeting each other in a rounded arch before the anterior margin.
- 3(4) Elytra reddish testaceous, each with a sub-rounded to oblong oval, discal black spot which is nearly half as wide; pronotum black, except the narrow anterior margin and corners*C. bimaculatus* Kapur
- 4(3) Elytra black except the testaceous entire external border and the apex confluent together. Pronotum as above
...*C. orbiculus* var. *fulvocinctus* Mulsant

10. *Cryptogonus bimaculatus* Kapur

1948. *Cryptogonus bimaculatus* Kapur, *Trans. R. ent. Soc. Lond.*, 99 : 100-101 (Type-loc.—Assam, Patkai Mountains).

Material studied : 3 exs., Anandapur, Agartala, 30. xii. 1988 and 2 exs. Bairagibazar, Agartala, W. Tripura Dist. 22. i. 1989, R. S. Burman coll.

Distribution : India : Tripura, Assam, Nagaland, West Bengal (Darjeeling). Also known from Burma and Thailand.

Remarks : This is a new record of the species from Tripura.

11. *Cryptogonus complexus* Kapur

1948. *Cryptogonus complexus* Kapur, *Trans. R. ent. Soc. Lond.*, 99 : 110-111. (Type-loc.—Assam, Patkai Mountains).

Material studied : 1 ex., Jaithang vill., Bagbasa, N. Tripura Dist., 25. v. 1992, S. K. Chakraborty coll.

Distribution : India : Tripura, Meghalaya, Assam and Sikkim. Also known from Bhutan and Burma.

Remarks : The specimen studied here belong to variety *posticus* Kapur (1948). This is a new record of the species from Tripura.

12. *Cryptogonus orbiculus* var. *fulvocinctus*
(Mulsant)

1853. *Aspidimerus fulvocinctus* Mulsant, *Ann.Soc. Linn. Lyon* (2)1 : 266. (Type-loc.—Asia).
1900. *Cryptogonus fulvocinctus* (Mulsant) : Weise, *Dtsch. ent. Z.*, 1900 : 425, 427.
1948. *Cryptogonus orbiculus* var. *fulvocinctus* (Mulsant) : Kapur, *Trans. R. ent. Soc. Lond.*, 99 : 94.

Material studied : 1 ex., Nalchar, Agartala, W. Tripura Dist., 21. i. 1989, R. S. Burman coll. and 1 ex., Jaithang vill., Bagbasa, N. Tripura Dist., 25. v. 1992, S. K. Chakraborty coll.

Distribution : India : Tripura, Meghalaya, West Bengal. Also known from Sri Lanka.

13. *Cryptogonus* sp.

Material studied : 1 ex., Bairagibazar, 22. i. 1985 & 1 ex., Anandapur, 30. xii. 1988, Agartala, W. Tripura Dist., R. S. Burman coll.

Remarks : These two examples belong to the *fulvoterminalis* group and appearing close to *C. lepidus* Weise, Unless we get further material we like to leave this species unnamed.

Genus 5. *Pseudaspidimerus* Kapur

1900. *Aspidimerus* Weise, *Dtsch. ent. Z.* 1900 : 426

1948. *Pseudaspidimerus* Kapur, *Trans. R. ent. Soc. Lond.*, 99 : 117-118.

14. *Pseudaspidimerus circumflexa* (Motschulsky)

1858. *Platynaspis circumflexa* Mots., *Etud. ent.*, 7 : 118.
(Type-loc.—Ceylone).

1900. *Aspidimerus circumflexa* (Mots.) : Weise, *Dtsch. ent. Z.*, 1900 : 423.

1948. *Pseudaspidimerus circumflexa* (Mots.) : Kapur, *Trans. R. ent. Soc. Lond.*, 99 : 121.

Material studied : 1 ex., Dulubari, Ambassa, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty coll. and 2 exs., Radhapur, Dharmanagar, N. Tripura Dist., 24. v. 1992, B. Mitra coll.

Distribution : India : Tripura, Meghalaya, Assam, West Bengal, Bihar, Maharashtra and Tamil Nadu. Also known from Burma and Sri Lanka.

Remarks : This species can be easily recognised by its reddish testaceous colour with a black spot at the basal margin of pronotum; an oblong oval sutural black spot in the basal-one third and an oblong to sub rounded black discal spot near the suture on each elytron. It is a first time record of this species from Tripura.

Subfamily 3. CHILOCORINAE

Key to the tribes of Subfamily CHILOCORINAE

- 1(2) Antennae very short, 7 segmented; middle coxal cavities broadly separated; metendosternite with a short stalk; tarsi true trimerous; abdomen composed of five

visible segments in both sexes. Body small, less than 2mm. in length, dorsum pubescent
.....TELSIMIINI¹

- 2(1) Antennae longer, 7-10 segmented; middle coxal cavities moderately separated; metendosternite with a rather long stalk; tarasi cryptotetramerous; abdomen composed of six visible segments at least in male. Body larger, more than 2mm. in length, dorsum glabrous or pubescent.
- 3(4) Dorsum pubescent; cardo of maxilla distinctly expanded laterally; femora strongly flattened and set into foveae of underside of body; abdomen composed of six distinct visible segments in both sexes PLATYNASPINI
- 4(3) Dorsum glabrous; cardo of maxilla not expanded laterally; femora normal; abdomen composed of five visible segments in female and six in male CHILOCORINI

Tribe 4. PLATYNASPINI

Genus 6. *Platynaspis* Redtenbacher

1843. *Platynaspis* Redtenb., *Tentamen Dispos. Gen.*, P. 6, 11.

1932. *Platynaspis* Redtenb. : Korschefsky, *Coleopt. Cat.*, Pars 120, P. 231.

15. *Platynaspis kapuri* Sp. n.²

(Text fig. 1)

Body subrounded, convex. Head with frons brownish yellow in male and blackish brown in female, antennae and mouth-parts light to reddish brown, eyes grey, pronotum black except the lateral margins below the eyes which are yellowish white and almost square in appearance. Scutellum and the elytra black except the narrow apical margin which is brownish yellow, each elytron is marked with a transverse, wavy brownish yellow spot on the disc, close to the

¹Not treated in this paper.

²The species is named in honour of Dr. A. P. Kapur.

suture. In the female example this transverse spot is confluent with the apical margin near the external margin. Pronotal epipleurae brownish yellow, Pro-meso and meta sternum black, elytral epipleurae brownish with distinct foveae for the hind femur; legs light brown, tarsi cryptotetramerous; abdominal sternites dark brown in the anterior part and light brown in the posterior part.

Head with frons having fine punctation and moderately long, sparse and whitish pubescence directed backwards. Pronotum about twice as broad as long, moderately convex in the middle, anterior angles subrounded, pubescence whitish and larger. Scutellum subtriangular with straight base, pubescence and punctation similar to that of pronotum. Elytra fairly strongly punctate, pubescence similar to that of pronotum. Under side with brownish pubescence, short, moderately close and depressed, the prosternal carinae converging, meeting each other at the middle, a little above the anterior coxal margin, finely punctate; meso- and metasternum coarsely punctate, the later distinctly convex; abdominal lines incomplete.

Male genitalia with the basal piece and median lobe well developed (Fig. B); viewed from the side, the basal piece appears a little longer than the median lobe, a distinct hole is there between the upper surface and the base; parameres slightly longer than median lobe, wing-like appearance, having few long setae at its tip; trapes slightly curved, nearly as long as the basal piece and median lobe combined, truncated at the apex; siphon (Fig. C) relatively slender, curved in the basal half, more or less straight distally with a constriction before the tip, siphonal capsule with the outer arm expanded and well developed in contrast to the ill developed inner arm. Female with no genital plate (Fig. D) with a subrounded apex; papilla small, bearing a few long setae; spermatheca (Fig. E) strongly chitinized, a little curved, slightly swollen at both the ends.

Length 2.21mm-2.50mm, Width 1.81mm-2.18mm.

Holotype—A male : India : Tripura, Shalgara, S. Tripura Dist., 13. ix. 1992, S. K. Saha & party coll., Male genitalia dissected and mounted between two cover slips and on the same pin as the specimen.

Paratype : A female : India : West Bengal, Panighata, Siliguri, alt. 280m., 14. i 1971, J. M. Julka coll. Female genitalia dissected and mounted on the same pin as the specimen.

Remarks : So far three species are known from India. Those are *P. flavoguttata* Gorham, *P. saundersi* Crotch and *P. trimaculata* Weise. In our National Collection we found a female specimen of *Platynaspis* det. A. P. Kapur as sp. n. Probably he could not publish it for the lack of further material. In the present study we got a male specimen of the same species and we describe it as *Platynaspis kapuri*.

In *P. flavoguttata* body colour is reddish brown, there are two whitish-yellow spots on head, one on each side above the eyes three whitish-yellow basal spots are there on pronotum of which the middle one produced forward as a central line and each elytron bears three whitish-yellow spots, two transversely about the middle (one on the margin) and one before the apex.

In *P. saundersi* pronotum black, elytra yellow-testaceous, suture black, (the black colour dilates behind the scutellum) and with four black spots (one in the humeral callus, one linear, at the external margin, one rather large, close to the suture behind the middle and the rest a little before the apex).

P. trimaculata is having three spots in total on the body. *P. kapuri* sp. n. is having only two spots on the body.

P. kapuri sp. n. completely differs from the above species by its body colour as well as spot patterns on elytra.

Tribe 5. CHILOCORINI

Key to the genera of Tribe Chilacorini known from Tripura.

- 1(2) Anterior tibiae and the other two with a triangular tooth on outer margin at

extremity of tarsal groove; body subhemispherical; pronotum almost emarginate towards the outer corners where it does not lie against the elytral margins; elytral margin feebly reflexed, epipleurae deeply incurved; antennae 8-segmented

.....**Chilocorus** Leach

- 2(1) Anterior tibiae without any such tooth as mentioned above but middle and posterior tibiae with tibial spurs; body shortly oval, moderately convex; pronotum lies for the most part against the elytral margin; elytral margin not reflexed; antennae 9-segmented

.....**Brumus** Mulsant

Genus 7. **Chilocorus** Leach

1815. *Chilocorus* Leach, in Brewster, *Edinb. Encycl.*, ix, P. 116.
1932. *Chilocorus* Leach : Korschefsky, *Coleopt. Cat.*, Pars 120, P. 237.

Key to the species of the genus **Chilocorus** known from Tripura.

- 1(2) Medium sized beetles, pronotum and elytra shining black **C. braeti** Weise
2(1) Medium sized beetles, similar in colour and other aspects except the antero-lateral corners of pronotum, which is yellowish **C. nigrinus** (Fabricius)

16. **Chilocorus braeti** Weise

1895. *Chilocorus braeti* Weise, *Ann. Soc. ent. Belg.*, 39 : 154 (Type-loc.—Kurseong, N. Bengal).
1963. *Chilocorus braeti* Weise : Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)*, 14(1) : 24.

Material studied : 1 ex., Ambassa, N. Tripura Dist., 2. iii. 1991, G. K. Srivastava Coll.

Distribution : India : Tripura, Meghalaya, West Bengal and Sikkim.

Remarks : This is a new record of the species from Tripura.

17. **Chilocorus nigrinus** (Fabricius)

1798. *Coccinella nigrita* Fabricius, *Suppl. Ent. Syst.*, P-79. (Type-loc.—East Indies).
1850. *Chilocorus nigrinus* (Fabricius) : Mulsant, *Ann. Soc. Agric. Lyon*, 2 : 263.
1966. *Chilocorus nigrinus* (Fabricius) : Kapur, *Proc. nat. Inst. Sci. India, Delhi*, 32 B(3-4) : 171.

Material studied : 8 exs., Udaipur, S. Tripura Dist. 19. ii. 1992, R. S. Burman Coll.; 8 exs., Agartala, W. Tripura Dist., 29. v. 1992, S. K. Chakraborty coll.

Distribution : India : Tripura, West Bengal, Madhya Pradesh, Goa and Andaman Islands. Also known from Burma, Indonesia and Thailand.

Remarks : This species is first time recorded from Tripura.

Genus 8. **Brumus** Mulsant

1850. *Brumus* Mulsant, *Spec. Trim. Securipalp.*, P. 492.
1932. *Brumus* Mulsant : Korschefsky, *Coleopt. Cat.*, Pars 120, P. 265.

18. **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.
1972. *Brumus suturalis* (Fab.) : Kapur, *Rec. Zool. Surv. India* 66(1-4) : 315.

Material studied : 2 exs., Indra Nagar, Agartala, W. Tripura Dist., 11. ix. 1969; 1 ex., Garjee, 24. xi. 1969; 4 exs., Abahya, 4. xii. 1969, V. C. Agarwal & party coll.; 1 ex., Pecharthal, Dharmanagar, N. Tripura Dist., 11. xii. 1988, R. C. Basu coll.; 2 exs., Sabroom, Manughat, S. Tripura Dist., 5. i. 1992, B. Mitra coll.; Teliamura, W. Tripura Dist., 2 exs., 9. v. 1992, M. Sil coll and 1 ex., 11. v. 1992, B. Mitra coll. 1 ex., Ambassa, 12. v. 1992; 1 ex. Dulubari, 13. v. 1992 and 1 ex., Kulai, 15. v. 1992, N. Tripura Dist., S. K. Chakraborty coll.; 1 ex., Agartala, W. Tripura Dist., 28. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Meghalaya, Sikkim, West Bengal, Madhya Pradesh, Maharashtra, Karnataka and Goa. Also known from Nepal, Bhutan and Sri Lanka.

Diagnostic characters : Body shortly oval, moderately convex; pronotum reddish brown; elytra testaceous, each elytron with a narrow black longitudinal strip at middle and a black sutural border forming 3 black narrow strips in total. Strips are free at both ends.

Remarks : This is a new record of the species from Tripura.

Subfamily 4. COCCINELLINAE

*Key to the tribes of subfamily
COCCINELLINAE known from Tripura.*

- 1(2) Anterior margin of clypeus 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 Tribe COCCINELLINI
- 2(1) Anterior margin of clypeus truncate without any projection on each side; antennae inserted in front, a little away from the eyes, antennal club loosely segmented, 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 Tribe PSYLLOBORINI

Tribe 6. COCCINELLINI

*Key to the genera of the tribe Coccinelline
known from Tripura*

- 1(6) The terminal segment of antennae convergent apically.
- 2(3) The terminal segment of antennae pointed. Antennae short, as long as or slightly shorter than frons, antennal club distinct and compact, 11-segmented, the 10th segment nearly as wide as long with an oblique apical side, 9th segment transverse. Elytral epipleuron entire, broader than one-eighth of body width and strongly incline below. First abdominal sternum with an incomplete femoral line; prosternal carinae running two-third of its length from base*Menochilus* Timberlake
- 3(2) The terminal segment of antennae not pointed.
- 4(5) Antenna short, club compact, subfusiform; elytral epipleurae more inclined, not marked with fovea; thoracic fovea well-marked; prosternal carinae reaching almost to the anterior margin of the prosternal process; femoral line incomplete*Oenopia* Mulsant
- 5(4) Antenna long, slender, club loosely set, 9th & 11th segment generally longer than broad; elytral epipleurae with distinct fovea; thoracic fovea not marked; prosternal carinae reaching almost half of the prosternal process; femoral line incomplete*Coelophora* Mulsant
- 6(1) The terminal segment of antennae divergent, transvers, often with a truncate apex.
- 7(10) Anterior margin of mesosternum emarginate.
- 8(9) Smaller in size, oval, convex; pronotum reddish brown, basal margin black with two black spots arising from the basal margin at middle*Micraspis* Dejean

- 9(8) Larger in size, elongated, depressed; pronotum reddish brown with an almost square, large, black spot on the disc, leaving a narrow reddish margin anteriorly and a little more than one-fourth of the width reddish brown area laterally. Often the square black spot is replaced by 2 or 4 oblique black streak in the middle *Harmonia* Muls.
- 10(7) Anterior margin of mesosternum straight. Medium sized beetles, pronotum black, except the anterolateral corners which are square in shape, and white or testaceous in colour *Coccinella* Linn.

Genus 9. *Oenopia* Mulsant

1850. *Oenopia* Mulsant, *Spec. Trim. Securipalp*, P. 420.
1932. *Oenopia* Mulsant : Korschefsky, *Coleoptm. Cat.*, Pars 120, P. 287.

Key to the species of the genus *Oenopia* Muls. known from Tripura.

- 1(4) Elytra testaceous yellow or yellowish brown.
- 2(3) Each elytron bordered black only on the 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 *O. luteopustulata* Muls.
- a) Each elytron with one elongated and one small oval black spots at the humeral callus, one irregularly rounded black spot at the middle, close to the suture, two irregularly rounded black spots at the posterior two thirds near the external margin and one oblique oval black spot on the suture at the posterior one fourth var. *nigromaculata* Mader
- b) Each elytron with two black, transverse bands originating from the sutural margin and terminating into irregularly shaped black spots subsequently, often the spots get detached from the transverse bands, at the apex sutural margin gives rise to a triangular black spot. Which meeting with its counterpart on the other elytron gives the appearance of a semilunar black spot var. *pracuae* Weise
- 3(2) Each elytron bordered black only on the sutural margin which dilated into a large round 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.... *O. sauzeti* Mulsant
- 4(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..... *O. quadripunctata* Kapur

19. *Oenopia luteopustulata* Mulsant

1850. *Oenopia luteopustulata* Mulsant, *Spec. Trim. Securipalp.*, P.421. (Type-loc.—Assam).
1977. *Oenopia luteopustulata* Mulsant : A. K. Ghosh, S. Biswas & A. R. Lahiri, *Bull. Meg. Sci. Soc.*, 2 : 14.

Material studied : 7 exs., Nand Nagar, Agartala, 13. xi. 1969; 1 ex., Garjee, 24. xi. 1969; 1 ex., Abhoya, 4. xii. 1969; 2 exs., Chailengta, Manu, N. Tripura Dist., 23. xii. 1972, V. C. Agarwal & party coll.; 2 exs., cal. Univ., Centre, Agartala, 1984, B. K. Agarwal coll.; 1 ex., Jogendranagar, Agartala, 18. xii. 1988, R. C. Basu coll.; 2 exs., Teliamura, Ambassa, 7. i. 1989 and 1 ex., Sonamura, 14. i. 1989, R. S. Burman coll.; 2 exs., Belonia, S. Tripura Dist., 25. ii. 1991; 1 ex., Ambassa, N. Tripura Dist., 2. iii. 1991; and 1 ex., Khowai, W. Tripura Dist. 4. iii. 1991, G. K. Srivastava coll.; 2 exs., Jalafa, Subrooms, S. Tripura Dist., 4. i. 1992; 1 ex., Hawabari, Teliamura, W. Tripura Dist., 11. v. 1992; 3 exs., Pecharthal, N. Tripura Dt. 20. v. 1992; 1 ex., Radhapur, Dharmanagar, N. Tripura Dist., 24. v. 1992, B. Mitra coll.; 1 ex., Selama, N. Tripura Dist., 26. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Meghalaya, Assam, West Bengal, Sikkim, Simla and Kumaun Hills, Plains of U. P. and Andaman Islands. Also known from Nepal, Bhutan, Burma, Tibet and Thailand.

Remarks : This species shows considerable variation in the elytral colour pattern. In this present study we could not find a typical example of the species. We got only two varieties viz. *nigromaculata* Mader and *Praçuae* Weise. This species is first time recorded from Tripura.

20. *Oenopia quadripunctata* Kapur

1963. *Oenopia quadripunctata* Kapur, *Bull. Br. Mus. nat. Hist. (Ent.)*, 14(1) : 27-29 (*Type-loc.*—Shillong, Assam).

1977. *Oenopia quadripunctata* Kapur : A. K. Ghosh, S. Biswas & A. R. Lahiri, *Bull. Meg. Sci. Soc.*, 2 : 14.

Material studied : 2 exs., Khasiamangal, W. Tripura Dist., 9. v. 1992, B. Mitra & M. Sil Coll.

Distribution : India : Tripura, Meghalaya, West Bengal and Sikkim. Also known from Bhutan and Burma.

Remarks : This is the first time record of the species from Tripura.

21. *Oenopia sauzeti* Mulsant

1866. *Oenopia sauzeti* Mulsant, *Monogr. Coccinell.*, P. 281. (*Type-loc.*—India).

1955. *Oenopia sauzeti* Mulsant : Kapur, *Rec. Ind. Mus.*, 53 : 331-332.

Material studied : 4 exs., Cal. Univ. Centre, Agartala, 1984, B. K. Agarwal coll.

Distribution : India : Tripura, West Bengal, Sikkim, Kumaun Hills (U. P.), Murree and Dalhousie Hills (Punjab). It is also known from Nepal and Bhutan.

Remarks : This is the first record of the species from Tripura.

Genus 10. *Coelophora* Mulsant

1850. *Coelophora* Mulsant, *Spec. Trim. Securipalp.*, PP. 374, 390.

1932. *Coelophora* Mulsant : Korschefsky, *Coleoptm. Cat.*, Pars 120, P. 290

Key to the species of the genus *Coelophora* Muls. known from Tripura.

- 1(2) Pronotum yellowish with two median, broadly oval black spots near the base and two small round black spots one at each postero lateral corner; elytra yellowish brown, each elytron with six large, round black spots of which two semicircular and sutural, common to both the elytron
.....*C. bissellata* Muls.
- 2(1) Pronotum black in the median portion except the two sides and the narrow anterior margin which is pale yellow, elytra shining black (varying from light gray to deep black) except the apical portion and median oblique band like spot, one on each elytron, which is yellowish.....*C. saucia* Mulsant

22. *Coelophora bissellata* Mulsant

1850. *Coelophora bissellata* Mulsant, *Spec. Trim. Securipalp.*, P. 400, (*Type-loc.*—Bengal).

1932. *Coelophora bissellata* Mulsant : Korschefsky, *Coleoptm. Cat.*, Pars 120 : 291.

Material studied : 1 ex., Sepoyjola, Agartala, W. Tripura Dist., 17. xii. 1988, R. C. Basu coll.; 1 ex., Mohanpur, W. Tripura Dist., 7. vii. 1990 and 3 exs., Jatanbari, S. Tripura Dist., 10. vi. 1990, G. N. Saha coll.; 1 ex., Mekagame Vill. area, Ambassa, N. Tripura Dist., 23. xii. 1991, S. Ahmed coll.; 1 ex., Kanthalchari, Sabroom, 1. i. 1992 and 1 ex., Manughat, Sabroom, 5. i. 1992, S. Tripura Dist, B. Mitra coll.; 1 ex., Kanthalbari, Ambassa, 13. v. 1992 and 1 ex., Chintamanipur, Ambassa, 14. v. 1992, N. Tripura Dist., S. K. Chakraborty coll.; 1 ex., Kulai, Ambassa, N. Tripura Dist., 15. v. 1992, M. Sil Coll.; 1 ex., Agartala, W. Tripura Dist., 28.v. 1992, B.C. Das coll.

Distribution : India : Tripura, Meghalaya, Assam, Sikkim, West Bengal, U. P. and S. India.

Also known from Bhutan, Nepal, Borneo, Sumatra, Malacca, Philippines and New Guinea.

Remarks : Spot-patterns on elytra varies, sometimes without any spot on elytra. Widely distributed species. It is recorded for the first time from Tripura.

23. *Coelophora saucia* (Mulsant)

1850. *Lemnia saucia* Mulsant, *Spec. Trim. Securipalp.*, P. 380 (*Type-loc.*—India).
 1874. *Coelophora saucia* (Muls.) : Crotch, *Revis. Cocc.*, P. 148.
 1932. *Coelophora saucia* (Muls.) : Korschefsky, *Coleoptm. Cat.*, Pars 120 : 296.

Material studied : 1 ex., Fishery Rest House, Kumarghat, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty coll. ex. "at light"

Distribution : India : Tripura. Also known from Nepal.

Remarks : Recorded for the first time from Tripura.

Genus 11. *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.

24. *Menochilus sexmaculatus* (Fabricius)

1781. *Coccinella sexmaculata* Fabricius, *Spec. Ins.*, P. 96 (*Type-loc.*—East Indies).
 1850. *Chilomenes sexmaculatas* (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 : 1 ex., Kunjaban, Agartala, 19. ii. 1991 and 1 ex., Khowai, 4. iii. 1991, S. Tripura Dist. 5 exs., Ambassa, N. Tripura Dist., 2. iii. 1991, G. K. Srivastava coll. 1 ex., Mekagan vill. area, Ambassa, N. Tripura Dist., 20. xii.

1991, S. Ahmed coll. 4 exs., Kanthalchari, Sabroom, 1. 1. 1992 and 1 ex., Jalefa, Sabroom, 4. i. 1992, S. Tripura Dist.; 2 exs., Pecharthal, 20. v. 1992; 1 ex., Anandabazar, Dharmanagar, 26. v. 1992, N. Tripura Dist., B. Mitra coll. 1 ex., Kanthalchari, Sabroom, S. Tripura Dist. 6. i. 1992, M. Dutta coll. 1 ex., Kamalsagar, 7. v. 1992; 1 ex., Pulinpur (S.), 10. v. 1992, W. Tripura Dist.; 2 exs., Fishery Rest House, Kumarghat, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty coll. 1 ex., Selama, N. Tripura Dist., 26. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Meghalaya, West Bengal and Andaman Islands. Also known from Nepal, Indonesia, Philippines, Thailand, Celebes, New Guinea and Japan.

Remarks : Widely distributed species. Easily recognised by its straw yellow colour; pronotum with a black 'T' marking with the base black; each elytron with two wavy black band and a round black sub-apical spot; sutural margin black and broad. This species is recorded from Tripura for the first time.

Genus 12. *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* Dejean known from Tripura.

- 1(2) Elytra yellowish brown, without any spot or marking, sutural margin black, slightly thickened at middle; pronotum yellowish brown, with a narrow basal black marking and two discal small black spots.
*M. discolor* (Fab.)
 2(1) Elytra testaceous yellow, each elytron with a longitudinal black marking, starting from humeral callus and extending upto the sub-apical area, sutural margin and external margin black, narrow; Pronotum marked as above*M. vincta* (Gorham)

25. *Micraspis discolor* (Fabricius)

1798. *Coccinella discolor* Fabricius, *Suppl. Ent. Syst.*, P. 77. (Type-loc.—India).
1850. *Verania discolor* (Fab.) : Mulsant, *Spec. Trim. Securipalp.*, P. 369.
1965. *Micraspis discolor* (Fab.) : Kamiya, *Mem. Fac. Lib. Arts.*, Fukui Univ., Ser. II, Nat. Sci. No. 15, PP. 60.

Material studied : 3 exs., Charilam, 15. & 22. xi. 1969; 2 exs., Garjee, 24. xi. 1969; 7 exs., Abhaya, 4-9. xii. 1969; 4 exs., Chailengta, N. Tripura Dist., 23. xii. 1972, V. C. Agarwal & party coll. 3 exs., Baramura, N. Tripura Dist., 4. xii. 1988; 4 exs., Kailasahar, N. Tripura Dist. 7. xii. 1988; 12 exs., Manu, N. Tripura Dist., 8. xii. 1988; 4 exs., Unokoti, Kailasahar, 9. xii. 1988; 12 exs., Pecharthar, Dharmanagar, 11. xii. 1988; 5 exs., Panisagar, Dharmanagar, N. Tripura Dist. 12. xii. 1988; 8 exs., Kurti, Dharmanagar, 13. xii. 1988; 12 exs., Biltai, Dharmanagar, 14. xii. 1988; 9 exs., Dharmanagar, 14. xii. 1988; 23 exs., Jirania, Agartala, W. Tripura Dist; 16. xii. 1988; 4 exs., Sepoyjola, Agartala, 17. xii. 1988; 15 exs., Jogendranagar, Agartala, 18. xii. 1988. R. C. Basu coll., 1 ex., Hatipara, Salbagan, 29. xii. 1988; 2 exs., Anandapur, 30. xii. 1988 and 2 exs., Simna, 31. xii. 1988, Agartala, W. Tripura Dist.; 1 ex., Kalocherra, and 3 exs., Mohanpur, Agartala, 1. i. 1989; 5 exs., Brahmanchura, Teliamura, 4. i. 1989; 3 exs., Khoai, Teliamura, 5. i. 1989; 3 exs., Baramura, Teliamura, 6. i. 1989; 4 exs., Teliamura, 7. i. 1989; 5 exs., Maharaniapur, Teliamura, W. Tripura Dist.; 6 exs., Jirania, 10. i. 1989 and 3 exs., Champak Nagar, Agartala, 11. i. 1989; 2 ex., Sonamura, 14. i. 1989; 7 exs., Bishramganj, Agartala, 15. i. 1989; 2 exs., Bisalgarh, 16. i. 1989; 2 exs., Sepoyjola, Agartala, 17. i. 1989; 1 ex., Charilam, Agartala, 19. i. 1989; 6 exs., Melaghar, Agartala, 20. i. 1989 and 1 ex., Nalchar, Agartala, W. Tripura Dist., 21. i. 1989, R. S. Burman coll. 4 exs., Simna, 6. vi. 1990; 7 exs, Mohanpur, 7. vi. 1990; 4 exs., Sepoyjola, 15. vi. 1990; 1 ex., Nalcharbazar, 18. vi. 1990, W. Tripura Dist. and 1 ex., Jatanbari, S. Tripura Dist, 10. vi. 1990, G. N. Saha coll., 2 exs., Kunjaban, Agartala, W.

Tripura Dist. 19. ii. 1991 and 24 exs., Belonia, S. Tripura Dist., 25. ii. 1991; 2 exs., Ambassa, N. Tripura Dist., 1. iii. 1991, 4 exs., Khowai, W. Tripura Dist., 4. iii. 1991; 1 ex., on road to Ambassa, N. Tripura Dist., 6. iii. 1991, G. K. Srivastava coll. 10 exs., Teliamura, 2. xii. 1991; 3 exs., Khowai, 3. xii. 1991, and 7 exs., Jirania, Agartala, 4. xii. 1991, W. Tripura Dist.; 3 exs., Ambassa, N. Tripura Dist. 5. xii. 1991, K. K. Roy & party coll. 6 exs., Mohanpur, Agartala, 12. xii. 1991; 3 exs., S. Pulinpara, Teliamura, 14. xii. 1991; 6 exs., Ushagram, Agartala, 28. xii. 1991, W. Tripura Dist. and 2 exs., Chand Chhara, Ambassa, 19. xii. 1991; 8 exs., Halahali, Kamalpur, 24. xii. 1991, N. Tripura Dist., S. Ahmed coll. 3 exs. Jampujola, 7. xi. 1991 and 4 exs., Amarpur, Teliamura, W. Tripura Dist., 2. xi. 1991, B. N. Das & party coll. 1 ex., Pulinhath, 29. xii. 1991; 1 ex., Kanthalchari, 1. i. 1992; 11 exs., Jalefa, 4. i. 1992; 7 exs., Manughat, Sabroom, S. Tripura Dist.; 4 exs., Khasiamangal, 9. v. 1992; 4 exs., Hawabari, Teliamura, W. Tripura Dist. 11. v. 1992; 3 exs., N. Pabiachara, Kumarghat, 17. v. 1992; 4 exs., Pecharthar, 20. v. 1992; 10 exs., Unokoti, Kailashar, 22. v. 1992, 18 exs., Radhapur, 24. v. 1992 and 4 exs., Anandabazar, Dharmanagar 26. v. 1992, N. Tripura Dist., B. Mitra coll. 2 ex., Kanthalchari, Sabroom. S. Tripura Dist., M. Dutta coll. 2 ex., Khasia Mangal, Teliamura, W. Tripura Dist., 9. v. 1992 and 4 exs. Kulai, Ambassa, N. Tripura Dist., 15. v. 1992, M. Sil coll. 3 exs., Singerbill, 10. v. 1992; 6 exs., Belonia, 13. v. 1992; 3 exs., Sonamura, 14. v. 1992; 9 exs., Amarpur, 15. v. 1992; 2 exs. Udaipur, 16. v. 1992, S. Tripura Dist.; 1 ex., Jirania, 19. v. 1992; 6 exs., Mohorchapa, 20. v. 1992 and 3 exs., Teliamura, W. Tripura Dist.; 1 ex., Ambassa, 25. v. 1992 and 8 exs., Selama, 26. v. 1992, N. Tripura Dist.; 13 exs., Agartala, W. Tripura Dist., 28. v. 1992, B. C. Das coll. 1 ex., Pulinpur, 10. v. 1992; 6 exs., Hawabari, Teliamura, W. Tripura Dist.; 4 exs., Kumarghat, 13. v. 1992; 1 ex., Kulai, Ambassa, 15. v. 1992; 30 exs., Radhapur, Dharmanagar, N. Tripura Dist., 24. v. 1992, S. K. Chakraborty coll. 1 ex. Sepahijola, W. Tripura Dist., 14. ix. 1992, S. K. Saha & party

coll.

Distribution : India : Tripura, Meghalaya, West Bengal, Tamil Nadu, Goa and Andaman Islands. Also known from Thailand, China and Japan.

Remarks : Very widely distributed species. Recorded for the first time from Tripura.

26. *Micraspis vincta* (Gorham)

1895. *Verania vincta* Gorham, *Ann. Mus. Civ. Genova*, 34 (2) : 686. (Type-loc.—Burma).

1954. *Verania vincta* Gorham : Kapur, *Rec. Indian Mus.*, 52(2-4) : 335.

1968. *Micraspis vincta* (Gorham) : Sasaji, *Mushi*, Fukuoka, 42 : 132.

Material studied : 1 ex., Kulai, Ambassa, N. Tripura Dist., 15. v. 1992, M. Sil coll.

Distribution : India : Tripura, Assam, Bhutan-Frontier, Manipur, Meghalaya, West Bengal, Bihar and South India. Also known from Burma and Thailand.

Remarks : This is the first record of the species from Tripura.

Genus 13. *Coccinella* Linnaeus

1758. *Coccinella* Linnaeus, *Syst. Nat.*, ed. 10. P. 364.

1965. *Coccinella* Linn. : Kamiya, *Mem. Fac. Lib. Art.*, Fukui Univ., Ser. II, Nat. Sci., No. 15, P. 35.

Key to the species of the genus *Coccinella* Linn. known from Tripura.

- 1(2) Elytra yellowish brown, each elytron with three small oval black spots and a common pear shaped scutellar black spot, totalling to seven spots, in some examples the elytral spots are enlarged and confluent; pronotum black except the anterior corners which are flavus and quadrangular
..... *C. septempunctata* Linn.
- 2(1) Elytra testaceous yellow, each elytron with a triangular black marking on the sub humeral area, with a wavy, black, Post-

median band confluent with the black sutural margin, a subquadrate black spot at three-fourths the external margin, further two common spots, one immediately behind the scutellum and the other before the apex, present on the suture
..... *C. transversalis* Fab

27. *Coccinella septempunctata* Linnaeus

1758. *Coccinella 7-punctata* Linnaeus, *Syst. Nat.*, (ed. X), P. 365 (Type-loc.—Europe).

1977. *Coccinella septempunctata* Linn. : A. K. Ghosh, S. Biswas & A. R. Lahiri, *Bull. Meg. Sci. Soc.*, 2 : 12.

Material studied : 1 ex., Belonia, S. Tripura Dist., 25.ii.1991, G. K. Srivastava coll.; 1 ex., Unokoti, Kailasahar, N. Tripura Dist., 22. v. 1992, B. Mitra coll.; 2 exs., Radhapur, Dharmanagar, N. Tripura Dist., 24. v. 1992, S. K. Chakraborty coll.; 1 ex., Agartala, W. Tripura, 28. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Meghalaya, Mainpur, West Bengal. Also known from Nepal, Bhutan and Japan.

Remarks : This species is recorded for the first time from Tripura.

28. *Coccinella transversalis* Fabricius

1781. *Coccinella transversalis* Fabricius, *Spec. Ins.*, P. 97 (Type-loc.—Coromandel, S. India).

1980. *Coccinella transversalis* Fab. : Chunram & Sasaji, *Oriental Insects*. 14(4) : 485.

Material studied : 2 exs., Chailengta, Manu, N. Tripura Dist., 20. xii. 1972, V. C. Agarwal coll. 1 ex., Karamchara, N. Tripura Dist., 11. viii. 1979, K. P. Singh & party coll. 1 ex., Manu, Kailashar, 8. xii. 1988; 1 ex., Pecharthar, Dharmanagar, 11. xii. 1988, N. Tripura Dist. and 1 ex.; Sepoyjola, Agartala, W. Tripura Dist., 17. xii. 1988, R. C. Basu coll. 1 ex., Kalacherra, 1. i. 1989, R. S. Burman coll. 1 ex., Sonamura, S. Tripura Dist., 16. vi. 1990; 1 ex., Chebri, 25. vi. 1990 and 1 ex., Champaknagar, 27. vi. 1990, W. Tripura Dist., G. N. Saha coll. 9 exs., Kunjaban,

Agartala, 19. ii. 1991; 2 exs., Kalabagan, Agartala, 20. ii. 1991, W. Tripura Dist.; 1 ex., Udaipur, 21. ii. 1991; 2 exs., Shantibazar, 22. ii. 1991; 6 exs. Belonia, 25. ii. 1991, S. Tripura Dist.; 14 exs., Ambassa, 2. iii. 1991; 1 ex., on road to Ambassa, N. Tripura Dist., 6. iii. 1991; 12 exs., Khowai, W. Tripura Dist., 4. iii. 1991, G. K. Srivastava coll. 1 ex., Chandrapur, 28. xii. 1991 and 2 exs., Kanthalchari, Sabroom, 6. i. 1992, S. Tripura Dist. M. Dutta coll. 3 exs., Kamalsagar, 7. v. 1992; 3 exs., Hawabari, Teliamura, 11. v. 1992, W. Tripura Dist.; 2 exs., Kumarghat, 13. v. 1992 and 4 exs., Radhapur, Dharmanagar, N. Tripura Dist., 24. v. 1992, S. K. Chakraborty coll. 3 exs., Kanthalchari, Sabroom, 1. i. 1992; 1 ex., Jalefa, Sabroom, 4. i. 1992, S. Tripura Dist.; 3 exs., Pecharthal, 20. v. 1992; 2 exs., Unokoti, Kailasahar, 22. v. 1992; 1 ex., Radhapur, 24. v. 1992 and 1 ex. Anandabazar, Dharmanagar, N. Tripura Dist., B. Mitra coll. 1 ex., Kulai, Ambassa, N. Tripura Dist. 15. v. 1992, M. Sil coll. 1 ex., Teliamura, W. Tripura Dist. 21. v. 1992 and 2 exs., Sikaribari, N. Tripura Dist., 24. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Meghalaya, West Bengal, Kerala, Goa and Andaman Islands. Also known from South East Asia, Thailand, Japan and Australia.

Remarks : Very widely distributed species. Recorded first time from Tripura.

Genus 14. *Harmonia* Mulsant

1850. *Harmonia* Mulsant, *Spec. Trim. Securipalp.*, PP. 74-75.
1932. *Harmonia* Muls. : Korschefsky, *Coleoptm. Cat.*, Pars 120, P. 280.

29. *Harmonia arcuata* (Fabricius)

1787. *Coccinella arcuata* Fabricius, *Mantissa Insectorum*, etc., 1, P. 55 (Type-loc.—China).
1850. *Harmonia arcuata* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon*, 2(2) : 77.
1954. *Harmonia arcuata* (Fab.) : Kapur, *Rec. Indian Mus.*, 52(2-4) : 332.

Material studied : 1 ex., Lakshmipur, 6. xii. 1969, V. C. Agarwal coll.; 1 ex., Agartala, Cal. Univ. Campus, W. Tripura, 1984, B. K. Agarwal coll. 1 ex., Manu, Kailasahar, 8. xii. 1988; 1 ex., Biltai, Dharmanagar, 11. xii. 1988, N. Tripura Dist.; 1 ex., Sepoyjola, Agartala, 17. xii. 1988 and 1 ex., Jogendranagar, Agartala, W. Tripura Dist., R. C. Basu coll. 1 ex., Maharanipar, Teliamura, W. Tripura, 8. i. 1989, R. S. Burman coll. 3 exs., Manughat, Sabroom, S. Tripura Dist., 5. i. 1992; 2 exs., Hawabari, Teliamura, W. Tripura Dist., 11. v. 1992; 1 ex., Dulubari, Ambassa, 16. v. 1992 and 1 ex., Radhapur, Dharmanagar, 24. v. 1992, N. Tripura Dist., B. Mitra coll., 1 ex., Belonia, S. Tripura Dist., 13. v. 1992, B. C. Das coll.

Distribution : India : Tripura, Manipur, Meghalaya, West Bengal, Goa and Andaman Islands. Also known from Burma, China, Formosa, Phillippines, 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 humeral, two median, one transverse post median and one apical black spots, scutellum black, sutural margin black. This species is recorded for the first time from Tripura.

Tribe 7. PSYLLOBORINI

Genus 15. *Illeis* Mulsant

1850. *Illeis* Mulsant, *Spec. Trim. Securipalp.*, P. 1026.
1932. *Illeis* Muls. : Korschefsky, *Coleoptm. Cat.*, Pars 120, P. 558.

30. *Illeis indica* Timberlake

1943. *Illeis indica* Timberlake, *Bull. Hawaiian Sug. Plrs.*, (Ent. Series) No. 22 : 61 (Type-loc.—Lahore, Pakistan).
1966. *Illeis indica* Timb. : Kapur, *Proc. Nat. Sci. India*, 32B(3-4) : 180-181.

Material studied : 2 exs., Teliamura, Khoai, W. Tripura Dist., 5. i. 1989, R. S. Burman coll.; 1 ex., Shantibazar, S. Tripura Dist., 11. vi. 1990, G. N. Saha coll.; 1 ex., on road to Ambassa, N. Tripura Dist., 6. iii. 1991, G. K. Srivastava coll.; 1 ex., Kumarghat Forest range; 1 ex., Kumarghat, Fishery R. H.; and 1 ex., Dulubari, Ambassa, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty coll. 1 ex., N. Pabiachara, Kumarghat, N. Tripura Dist., 17. v. 1992, B. Mitra coll.

Distribution : India : Tripura, Meghalaya, West Bengal, Delhi and Andaman Islands. Also known from Pakistan and Thailand.

Remarks : Widely distributed species. Body light yellow and less convex, distinctly narrowed towards the apex; pronotum also narrowed anteriorly, two median black spot on pronotum; elytra without any spot, punctation fine; tip of siphon bifurcated. This species is recorded for the first time from Tripura.

Subfamily : 5. EPILACHNINAE

This subfamily includes phytophagous members of Coccinellidae under the only tribe *Epilachnini*. Characters of the tribe corresponds to the characters of subfamily, given in the subfamily key.

In 1947, Dieke proposed a classification of this subfamily with many synonymy. In 1961 Li & Cook proposed another classification of this subfamily basing on the Taiwan fauna. Kapur 1966 pointed out some discrepancies of this classification and proposed to follow the classification given by Dieke 1947 until more detail study is done on this subfamily. Here we follow the classification given by Dieke.

Tribe 8. EPILACHNINI

Key to the genera of the tribe Epilachnini known from Tripura.

- 1(2) Tarsal claw with a basal tooth which has a regular and strongly sclerotized outer edge; sixth abdominal sternite of female split lengthwise *Epilachna* Chevrolat

- 2(1) Tarsal claw without basal tooth; sixth abdominal sternite not split lengthwise, narrower, convex or weakly emarginate ...
..... *Afissa* Dieke

Genus 16. *Epilachna* Chevrolat

1837. *Epilachna* Chevrolat, in Dejean's *Cat. Coleopt.*, ed. 3, PP-460-461.

1947. *Epilachna* Chevrolat : Dieke, Smithson. Misc. Collns., 106(15) : 22.

Key to the species of the genus Epilachna Chevrolat known from Tripura.

- 1(2) Large size beetles, pronotum spotless or with spots; each elytron generally with seven black spots, may increase to twelve, of which one small spot is located behind the humeral callus. Male genitalia : siphon moderately curved gently narrowed to a tapered tip, a notch near the apex; parameres narrow, tips provided with short setae facing the median lobe; median lobe moderately broad at base, gradually narrowing towards the apex which bent abruptly at apical one-third, dorsal surface bears a number of large to small teeth in the middle. Female genital plate rather rectangular with a shallow semicircular emargination a little below the base
..... *E. processa* Weise
- 2(1) Medium sized beetles.
- 3(4) The external median black spot (Persistent spot No. 4) of the elytra generally touching the external margin of elytra; elytral spot distinct, numbers varies from six to fourteen on each elytron; pronotum generally with five sometimes seven black spots. Male genitalia; siphon 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 subtriangular with a rounded notch on the inner margin near base *E. dodecastigma* (Wied.)

4(3) The external median black spot (Persistent spot No. 4) of the elytra generally approaching but not touching the external margin of elytra.

5(6) Elytral apex without distinct sutural angle; pronotum spotless or with five to seven black spots; elytral spots varies from six to fourteen on each elytron. Male genitalia : Siphobent 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 knife-edge of nearly half the length of median lobe. Female genital plate subtriangular, with a deep cut marks near the base.
.....*E. septima* Dieke

6(5) Elytral apex with distinct sutural angle; pronotum as above; elytral spot as above. Male genitalia : Siphobent 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
.....*E. vigintioctopunctata* (Fab.)

31. *Epilachna dodecastigma* (Wiedemann)

1823. *Coccinella dodecastigma* Wiedemann, *Zool. Mag.*, Kiel, 2, PP. 73-74. (Type-loc.—Bengal)
1850. *Epilachna dodecastigma* (Wiede.) : Mulsant, *Ann. Soc. Agric. Lyon.*, 2, P. 789.
1966. *Epilachna dodecastigma* (Wiede.) : Kapur, *Proc. Nat. Inst. Sci. India*, 32B (3-4) : 150-151.

Material studied : 1 ex., Subal Singh Stream, 4. viii. 1979, K. P. Singh & party coll. 1 ex., Chintamanipur, Ambassa, 14. v. 1992 and 1 ex., Kulai, Ambassa, 15. v. 1992, S. K. Chakraborty coll., N. Tripura Dist.

Distribution : India : Tripura, Meghalaya, Sikkim, West Bengal and Andaman Islands. Also known from Indonesia, Burma and Vietnam.

Remarks : This is a new record of this species from Tripura.

32. *Epilachna processa* Weise

1908. *Epilachna wismanni* Mulsant ab. *processa* Weise, *Stettin. ent. Ztg.*, 69, P. 217 (Type-loc.—Burma).
1961. *Henosepilachna processa* (Weise) : Li & Cook, *Pacific Insects*, 3 P. 45-46.
1966. *Epilachna processa* Weise : Kapur, *Proc. Nat. Inst. Sci. India*, 32B (3-4) : 155.

Material studied : 1 ex., Ambassa, N. Tripura Dist., 2. iii. 1991, G. K. Srivastava coll.; 1 ex., Pulinpur, Teliamura, W. Tripura Dist., 10. v. 1992, S. K. Chakraborty coll.; 5 exs., Kulai, Ambassa, 15. v. 1992, M. Sil coll.; 4 exs., Kulai, Ambassa, 15. v. 1992, and 1 ex., Radhapur, Dharmanagar, 24. v. 1992, N. Tripura Dist., B. Mitra coll.; 1 ex., Sonamura, S. Tripura Dist., 15. ix. 1992, B. N. Das & party coll.

Distribution : India : Tripura, Meghalaya, Maharashtra, Andaman & Nicobar Islands. Also known from Burma, Malay and Taiwan.

Remarks : By shape, size and colouration this species is very close to *E. indica* Muls. Large size beetles. Recorded first time from Tripura.

33. *Epilachna septima* Dieke

1947. *Epilachna septima*, Dieke. *Smithson. Misc. Collns.*, 106, PP. 58-59 (Type-loc.—Indochina, Annam, Phuc-Son).
1957. *Epilachna keiseri*, Bielawski, *Verh. Naturf. Gen. Basel*, 68, PP. 73-76. (Type-loc.—Ceylon).
1966. *Epilachna septima*, Dieke : Kapur, *Proc. Nat. Inst. Sci. India*, 32B (3-4) : 151.

Material studied : 1 ex., Bisramgunj, Agartala, W. Tripura Dist., 15. i. 1989, R. S. Burman coll.; 3 exs., Sonamura, S. Tripura Dist., 15. ix. 1992, B. N. Das & party coll.

Distribution : India : Tripura, Meghalaya, Assam, West Bengal, Bihar, U. P., M. P., Maharashtra, Punjab, Andhra Pradesh, Tamil Nadu and Andaman Islands. Also known from Sri Lanka, Indonesia and Vietnam.

Remarks : This is a very common species all over India, generally feeding on plants of Fam. *Cucurbitaceae* and *Solanaceae*. Most commonly found on bitter-ground (*Momordica charantia*) and brinjal. It is recorded for the first time from Tripura.

34. *Epilachna vigintioctopunctata* (Fabricius)

1775. *Coccinella 28-punctata* Fabricius, *Syst. ent.*, P. 34, 54. (Type-loc.—Tranquebar).

1850. *Epilachna vigintioctopunctata* (Fab.) : Mulsant, *Ann. Soc. Agric. Lyon.*, 2(2) : 834.

1966. *Epilachna vigintioctopunctata* (Fab.) : Kapur, *Proc. Nat. Inst. Sci. India*, 32B (3-4) : 152-154.

Material studied : 1 ex., Garjee, 24. xi. 1969, V. C. Agarwal coll.; 1 ex., Vijaynagar, N. Tripura Dist., 5. viii. 1979, K. P. Singh & party coll.; 1 ex., Chebri, W. Tripura Dist., 25. vi. 1990, G. N. Saha coll.; 4 exs., Shantibazar, S. Tripura Dist., 22. ii. 1991; 5 exs., Ambassa, 2. iii. 1991 and 3 exs., on road to Ambassa, 6. iii. 1991, N. Tripura Dist., G. K. Srivastava coll.; 19 exs., Kulai, Ambassa, N. Tripura Dist.; 15. v. 1992, M. Sil coll. 1 ex., Pulinpur, Teliamura, 10. v. 1992 and 1 ex., Hawabari, Teliamura W. Tripura Dist., 11. v. 1992; 1 ex., Dulubari, Ambassa, 13. v. 1992; 2 exs., Chintamanipur, Ambassa, 14. v. 1992; 4 exs., Kulai, Ambassa, 15. v. 1992 and 1 ex., Radhapur, Dharmanagar, 24. v. 1992, N. Tripura Dist.; 1 ex., Agartala, W. Tripura Dist. 29. v. 1992, S. K. Chakraborty coll.

Distribution : India : Tripura, Meghalaya, 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, Taiwan, New Guinea, Australia and Tasmania.

Remarks : This species is rarely found with 28 spots on the elytra. Generally found with 12-

14 spots i.e. 6-7 spots on each elytron. Apparently *E. dodecastigma*, *E. septima* and *E. vigintioctopunctata* looks alike. *E. processa* is a bit larger in size. Spot patterns are of less help to identification of these species. Only the male genitalia and the female genital plate bears the distinction. This species is recorded for the first time from Tripura.

Genus 17. *Afissa* Dieke

1947. *Afissa* Dieke, *Smithson, Misc. Collns.*, 106(15) : 113.

35. *Afissa flavicollis* (Thunberg)

1781. *Coccinella flavicollis* Thunberg, *Nov. Insect. Spec.*, P. 18 (Type-loc.—East Indies).

1947. *Afissa flavicollis* (Thunberg) : Dieke, *Smithson, Misc. Collns.*, 106(15) : 135-137.

Material studied : 1 ex., Chailengta, Manu, N. Tripura Dist., 20. xii. 1972, V. C. Agarwal & party coll.; 1 ex., Subal Singh Forest, N. Tripura Dist., 4. viii. 1979, K. P. Singh & party coll.; 4 exs., Kumarghat Forest Range and 1 ex., Kumarghat Fishery R. H. Campus, Kumarghat, N. Tripura Dist., 13. v. 1992, S. K. Chakraborty Coll.; 1 ex., Churaibari, N. Tripura Dist., 27. v. 1992, M. Sil coll.; 1 ex., Belonia, S. Tripura Dist., 19. ix. 1992, S. K. Saha & party coll.

Distribution : India : Tripura, Meghalaya, West Bengal, and Goa. Also known from Sri Lanka, Burma, Borneo, Sumatra, Indonesia, Celebes, Phillippines, Taiwan, Thailand and Penang.

Remarks : This is the only species of the genus *Afissa* so far recorded from Tripura. This species are comparatively more yellowish than those species of *Epilachna*. The pronotum is yellowish, without any spot, each elytron bears five (2 + 2 + 1) large black spots. It is recorded for the first time from Tripura.

SUMMARY

The present paper deals with 804 exs. of thirty five species under seventeen genera and five subfamilies. All these thirty five species are

recorded for the first time from Tripura. A species *Platynaspis kapuri* has been described as new species. Keys to the subfamilies, tribes, genera and species have been provided. Relevant synonymies, collection data and geographical distribution have been included.

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Chart showing districtwise distribution of species recorded from Tripura.

Name of species	S. Tripura	W. Tripura	N. Tripura	Name of species	S. Tripura	W. Tripura	N. Tripura
1. <i>J. limbata</i> Mots.			+	16. <i>B. suturalis</i> Fab.	+	+	+
2. <i>J. pallidula</i> Mots.	+			17. <i>O. luteopustulata</i> Muls.	+	+	+
3. <i>P. nymphaeus</i> Kapur		+		18. <i>O. quadripunctata</i>		+	
4. <i>S. (Pullus) brunescens</i> Mots	+	+	+	19. <i>O. sauzeti</i> Muls.		+	
5. <i>S. (Pullus) fuscatus</i> Boheman	+	+	+	20. <i>C. bissellata</i> Muls.	+	+	+
6. <i>S. (Pullus) posticalis</i> Sicard			+	21. <i>C. saucia</i> Muls.			+
7. <i>S. (Pullus) pyrocheilus</i> Mulsant		+	+	22. <i>M. sexmaculatus</i> (Fab.)	+	+	+
8. <i>S. (Pullus) quadrillum</i> Mots.		+	+	23. <i>M. discolor</i> (Fab.)	+	+	+
9. <i>C. bimaculatus</i> Kapur		+		24. <i>M. vineta</i> (Gorham)			+
10. <i>C. complexus</i> var. <i>posticus</i> Kapur			+	25. <i>C. septempunctata</i> Linn.	+	+	+
11. <i>C. orbiculus</i> var. <i>fulvocinctus</i> Muls.		+	+	26. <i>C. transversalis</i> Fab.	+	+	+
12. <i>P. circumflexa</i> (Mots.)			+	27. <i>H. arcuata</i> (Fab.)	+	+	+
13. <i>P. kapuri</i> Sp. n.	+			28. <i>I. indica</i> Timb.	-	+	+
14. <i>C. braeti</i> Weise			+	29. <i>E. dodecastigma</i> (Wied.)			+
15. <i>C. nigratus</i> (Fab.)	+	+		30. <i>E. processa</i> Weise	+	+	+
				31. <i>E. septima</i> Dieke	+	+	
				32. <i>E. vigintioctopunctata</i> (Fab.)	+	+	+
				33. <i>A. flavicollis</i> (Thunberg).	+		+

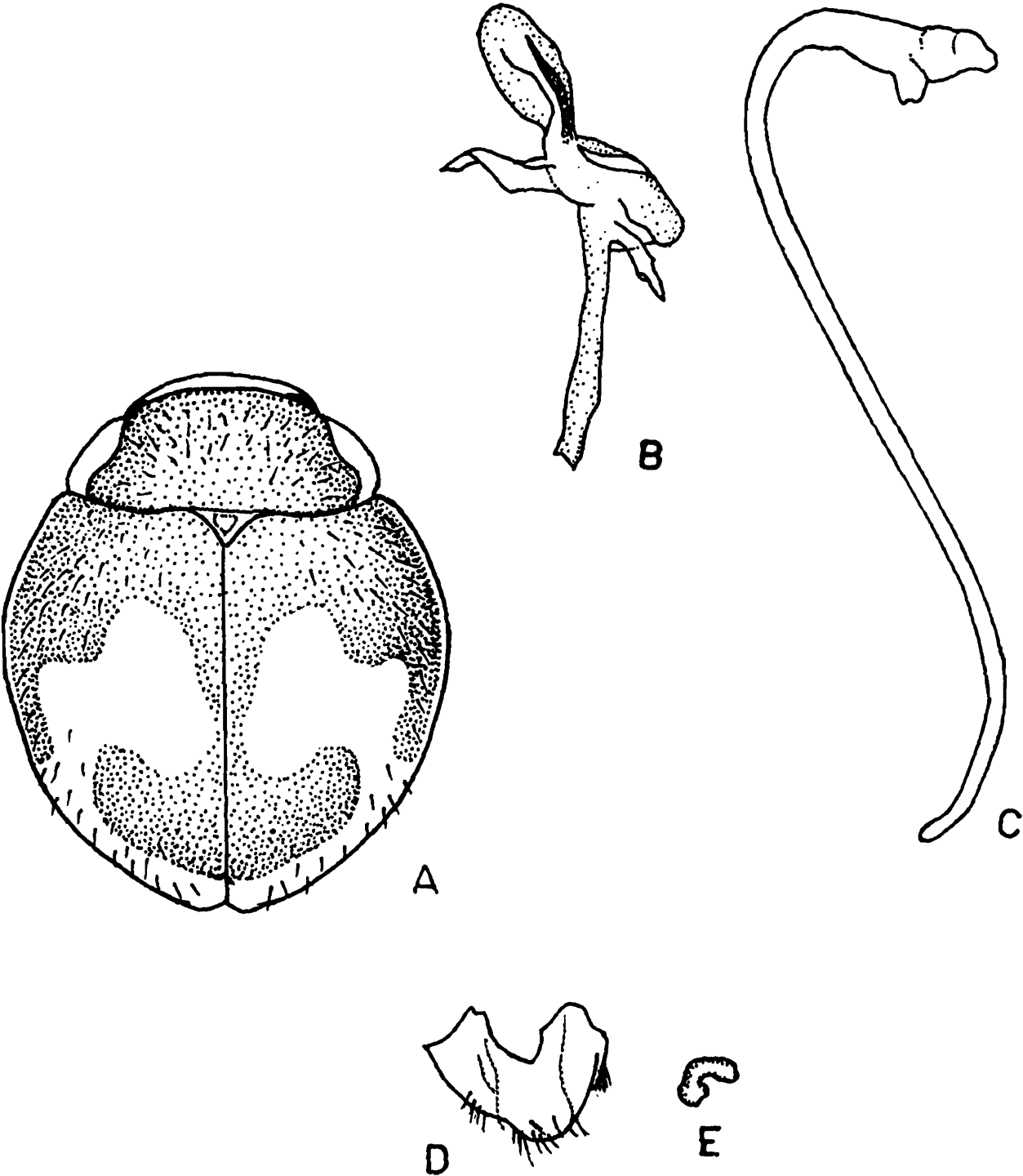


Fig. 1. *Platynaspis kapuri*, sp. n. A, outline showing the colour pattern. B, male genitalia without the siphus. C, the siphus. D, ninth and tenth abdominal tergites. E, spermatheca.

COLEOPTERA : CERAMBYCIDAE

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INTRODUCTION

Members of the family Cerambycidae is commonly known as longicorn or long horned beetles. Cerambycidae together with Chrysomelidae and Bruchidae form the Superfamily Chrysomeloidea. Which includes vast assemblage of Phytophagus and Xylophagus insects. The members of the family are characterised by (1) elongate body with long antennae, capable of being flexed backwards and usually inserted on prominent tubercles. (2) tibiae with two spurs and claws are nearly always simple. Some of the members are among the largest of the insects and some are of attractive colouration.

The family Cerambycidae is one of the largest families of coleoptera and contains 35,000 species under 4000 genera in 11 subfamilies from the world. (Lawrence 1982). The family is distributed through out the world, though predominant in tropics. Members of the family are economically very important as they are capable of damaging every part of the plant, specially woody vegetation. As a result some are very serious pest of agricultural, horticultural, forest trees and valuable timbers.

In India various aspects of the family have attracted attention of many workers from India and abroad, Gahan (1906), Stebbing (1914), Beeson (1941), Bhasin and Roonwal (1954) and Breuning (1960, 1963, 1964, 1965, 1966) have made valuable contributions of the group. Inspite of all the works mentioned above one complete taxonomic of work dealing with entire family is still not available in India.

As for number of species over 1200 species are known to occur in India (Beeson 1941). Another little over 300 species were added by Breuning (1960-66). The number of species thus known from India are about 15,00. As regards Cerambycid fauna of Tripura is concerned our present state of knowledge is very incomplete. In fact prior to this study no species was recorded from the state.

Present study is based on collections made by different survey parties of Zoological Survey of India including recent mopping survey.

Distributional data of the species has been given from the published records as well as the actual study of the specimens.

No keys has been provided as keys to the subfamilies, tribes, and genera have already provided in the fauna of Meghalaya.

Systematic List of Cerambycidae Recorded From Tripura, India

Family CERAMBYCIDAE

Subfamily CERAMBYCINAE

Genus 1. *Anubis* Thomson 1864

Species 1. *Anubis inermis* (White)

Genus 2. *Chelidonium* Thomson 1864

Species 2. *Chelidonium gibbicole* (White)

Genus 3. *Nocerius* Pascoe

Species 3. *Nocerius* sp.

Genus 4. *Stromatium* Serville 1834Species 4. *Stromatium barbaratum* FabriciusGenus 5. *Xystrocerca* Serville 1834Species 5. *Xystrocerca globosa* Oliver

Subfamily LAMIINAE

Genus *Centrura* sp Gnerintmenneville, 1843Species 6. *Centrura* sp.Genus 7. *Glenea* Newman, 1842Species 7. *Glenea indiana* ThomsonSpecies 8. *Glenea assimilis* GahanGenus 8. *Macrochenus* Guerin 1843Species 9. *Macrochenus guerini* WhiteGenus 10. *Olnocamptus* ChevrolatSpecies 10. *Olenocamptus* sp.Species 11. *Olenocamptus bilobosus* FabriciusGenus 9. *Oberia* Mulsant 1839Species 12. *Oberia posticata* Boh.Species 13. *Oberia* sp.Genus *Anubis* Thomson 18641864. *Anubis* Thomson, Syst. Ceramb., : 177.*Anubis inermis* (White), 18531853. *Polyzonus inermis* White, Cat Coleopt. B. M., Longic. : 171.1906. *Anubis inermis*, Gahan, *Fauna Brit. India*, 1 : 220-221.*Material examined* : 1 ex, 17.v. 1978, Abhoya Tripura. J. K. Jonathan Coll.*Distribution* : India : Tripura, Sikkim, Darjeeling, Also known from Mynamar, Malaypeninsula and S. China.*Remarks* : The species is recorded for the first time from Tripura.Genus *Chelidonium* Thomson 18641864. *Chelinodium* Thomson, Syst. Ceramb. : 177.*Chelidonium gibbicole*, (White). 1853.1853. *Callichroma gibbicolle* white, Cat. Coleopt. B. M. Longic., 160.1906. *Chelidonium gibbicole*, Gahan, *Fauna Brit. India*, 1 : 213.*Material examined* : 1ex., 8. viii. 1979. Santibazar, I. B. Camp; Tripura. K. P. Sing coll.*Distribution* : India : Tripura, Assam. Also Known from Bangladesh and China.*Remarks* : The species is being recorded for the first time from Tripura.Genus *Nocerius* Pascoe1857. *Nocerius* Pascoe, Trans. Ent. Soc. London : 95. *Nocerius* Sp.*Material examined* : 1ex., 25. v. 1992, Sikaribari, N. Tripura. B. C. Das and Party coll.Genus *Stromatium* serville, 18341834. *Stromatium* Serville, Ann. Soc. Ent. Fr., P. 80.*Stromatium barbaratum* Fabricius1775. *Stromatium barbaratum* Fabricius. Syst. Ent. P. 189.1906. *Stromatium barbaratum*, Gahan, *Fauna, Brit. India*. Coleopt. I : 114-115.*Material examined* : 1ex., 14. x. 1974. Kungmura, Tripura. M. S. Shisodia coll. 1 ex., 23.5.1978. Ambassa, Tripura. J. K. Jonathan coll. 1 ex., 18.5. Belonia Tripura. J. K. Jonathan Coll.*Distribution* : India : Tripura, Maghalaya, Andaman Is., West Bengal, Assam, Also Known from Sri Lanka, Mauritius, Bourbon, Madagascar.*Remarks* : The species is recorded for the first time from Tripura.

The species has a wide range of distribution and is important as a pests of packing cases and common pests of furniture and wood work in houses, More informations regarding the species has been given in the state fauna of Meghalaya.

Genus *Xystrocera serville* 18341834. *Xystrocera* Serville Ann. Soc. Ent. Fr. P. 69.*Xystrocera globosa* (Oliver)1795. *Cerambyx globosa* Oliver, Entom. IV, no 67, p. 27.1906. *Xystrocera globosa*, Gahan, Fauna Brit. India Coleoptera I : 106-107.*Material examined* : 1ex., 13. xi. 1991. Belonia, South Tripura B. N. Das and Party coll.*Distribution* : India : Tripura, Assam, West Bengal. Maharashtra, Karnatak, Tamil Nadu. Also Known from Sri Lanka, Mynamar. Malayapeninsula, Philippines, Egypt, Mauritius, Hawaian Islands.*Remarks* : The species is recorded for the first time from Tripura.Genus *Centrura* Guérin. Ménéville 18431843. *Centrura* Guérin. Ménéville, Species et Iconographic, I coleopteres.*Centrura* sp.*Material examined* : 1ex., 2. x. 1977. Chimbagan, North Tripura, N. Muralidharan coll.Genus *Glenea* Newman 18421842. *Glenea* Newman, Entomology, I, p. 301.*Glenea indiana* Thomson1857. *Glenea indiana* Thomson, Archives Entomol.*Material examined* : 1ex., 17. v. 1978. Abhoya, Tripura J. K. Jonathan coll., 1ex., 21. ix. 77. Buramura, Tripura N. Muralidharan coll.; 1ex., 13. vi. 1990. Nulanbazar, S. Tripura, G. N. saha and party coll.*Distribution* : India : Tripura; Meghalaya. Also Known from Mynamar.*Remarks* : The species is recorded for the first time from Tripura.*Glenea assimilis* Gahan1897. *Glenea assimilis* Gahan, Ann. Mag. Nat. Hist (6) XIX, 1848*Material examined* : 1ex., 12. x. 1977. Thakachera, Aneupur, N. Muralidharan coll.*Distribution* : India, Tripura, Assam. Also Known from Bangladesh and Formosa.*Remarks* : This is the first record of the species from Tripura.Genus *Macrochenus* Guérin. Ménéville 18431843. *Macrochenus* Guérin. Ménéville, Species et Iconographic I Coleopteres.*Macrochenus guerini* White1858. *Macrochenus guerini* White, Ann. Mag. Nat. Hist. (3)2, p. 274.*Material examined* : 1ex., 14. xi. 1974, Kungmura, Tripura, M. S. Shisodia coll.*Distribution* : India : Tripura, Meghalaya. Also Known from Bangladesh.Genus *Oberia* Mulsant1839. *Oberia* Mulsant, Col. France. Logis., p. 192, 194.*Oberia posticata* Gahan1895. *Oberia postica* Gahan, Ann. Mus. Civ. Genova, 34, p. 96.*Material examined* : 1ex., 17. v. 1978. Abhoya, Tripura J. K. Jonathan coll.*Distribution* : India : Tripura.*Remarks* : The species is recorded for the first time from Tripura.*Oberia* sp.*Material examined* : 1ex., v. 78. Buramura, Tripura, J. K. Jonathan coll.Genus *Olenocamptus* Chevrolat.1863. *Olenocamptus* Chevrolat, Mem. Soc. R. Sci. de Liege, 8 : 340.*Olenocamptus bilobosus* Fabricius1807. *Olenocamptus bilobosus* Fabricius, Syst. El. 2, p. 324.*Material examined* : 1ex., 31. x. 1974. Agartala, Tripura M. S. Shisodia coll.

Distribution : India : Tripura. Also known from Srilanka, Mynamar, Malay, Formosa and Sund Island.

Remarks. : The species is known for the first time from Tripura.

Olenocamptus sp.

Material examined : 1 ex., 16. vi., 1990. Sonamura, South Tripura, B. N. Saha and party coll.

first time from the state. Reference material studied and distribution of the species within and outside the state have been provided under each species. Keys have not been given as keys to the subfamilies, tribes and genera have been provided while dealing with Cerambycid Fauna of Meghalaya.

SUMMARY

The present paper deals with the Cerambycid fauna of Tripura. All the taxa are recorded for the

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INSECTA : COLEOPTERA : CHRYSOMELIDAE

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INTRODUCTION

The present work is based on the collection of Chrysomelidae, made by various survey parties of Zoological Survey of India, from Tripura mainly during nineties and a lot collected by V. C. Agarwal and party during 1969-70.

Jacoby (1908), Maulik (1919, 1926, 1936) and Scherer (1969) had done some monographic works on Indian Chrysomelidae but none of them studies extensively the fauna of Tripura. The only work published so far is a small one by the present author along with two other co-workers (Basu, Bhaumik and Sengupta, 1981).

Nearly 1500 species were recorded so far from India of which 21 species were from Tripura. The present collection comprises 1046 examples spreading over 64 species in 43 genera under 9 subfamilies, namely Criocerinae, Clytrinae, Cryptocephalinae, Eumolpinae, Chrysomelinae, Galerucinae, Alticinae, Hispinae and Cassidinae. Of these species dealt with here 41 species are new records from Tripura State.

To avoid repetition, all the keys, diagnostic characters of the species etc. are not provided here which have already been provided in Fauna of West Bengal Basu (1996) and Fauna of Meghalaya (in Press).

Systematic arrangement : The subfamilies, which have been included here, are treated in the following order :

1. Criocerinae
2. Clytrinae
3. Cryptocephalinae

4. Eumolpinae
5. Chrysomelinae
6. Galerucinae
7. Alticinae
8. Hispinae
9. Cassidinae

SYSTEMATIC ACCOUNT

Family CHRYSOMELIDAE

Subfamily (i) CRIOCERINAE

1. *Lema coromandelina* (Fabricius)
2. *L. lacertosa* Lacordaire
3. *L. occipitalis* Jacoby
4. *Lilioceris impressa* (Fabricius)

Subfamily (ii) CLYTRINAE

5. *Aspidolopha melanophthalma* Locordaire
6. *Smaragdina divisa* (Duvivier)

Subfamily (iii) CRYPTOCEPHALINAE

7. *Cryptocephalus vittipennis* Suffrian
8. *C. senarius* Suffrian

Subfamily (iv) EUMOLPINAE

9. *Chrysolampra flavipes* Jacoby
10. *Patria kanaraensis* (Jacoby)
11. *Nodina indica* Jacoby
12. *Basilepta* sp.
13. *Scelodonta indica* Duvivier

14. *Colasposoma semicostatum* Jacoby
15. *C. splendidum* (Fabricius)
16. *Pachnephorus lewisii* Baly
17. *P. impressus* Rosenh
18. *Tricliona* sp.
19. *Platycorynus pyrophorus* (Parry)
20. *P. peregrinus* (Herbst)
21. *P. asphodelus* (Marshall)

Subfamily (v) CHRYSOMELINAE

22. *Chrysolina aurata aurata* (Suffrian)
23. *Plagiodera rufescens* (Gyllenhal)
24. *Lycaria westermanni* Stal

Subfamily (vi) GALERUCINAE

25. *Galerucella grisescens* (Joannis)
26. *Oides maculata* (Olivier)
27. *Hoplasoma nilgiriensis* Jacoby
28. *H. unicolor* (Illiger)
29. *Aulacophora foveicollis* (Lucas)
30. *A. lewisii* Baly
31. *A. frontalis* Baly
32. *Haplosomoides rasha* Maulik
33. *Medythia nigrobilineata* (Motschulsky)
34. *Monolepta madrasensis* Wilcox
35. *M. signata* (Olivier)
36. *Palpoxena malayana* Jacoby
37. *Dercetina flacocincta* (Hope)
38. *D. histrio* (Baly)
39. *D. orientalis* (Jacobus)
40. *Pseudoides flavovittis* (Motschulsky)

Subfamily (vii) ALTICINAE

41. *Nonarthra variabilis* Baly
42. *Hyphasis* sp.

43. *Hemipyxis fulvipennis* (Illiger)
44. *H. brevicollis* (Jacobus)
45. *Longitarsus belgaumensis* Jacoby
46. *L. indicus* Basu, Bhaumik & Sengupta
47. *Luperomorpha vittata* Duvivier
48. *Phyllotreta striolata* (Fabricius)
49. *P. chotanica* Duvivier
50. *P. tripuraensis* Basu, Bhaumik & Sengupta
51. *Chaetocnema* (*Chaetocnema*)
concinipennis Baly
52. *C. (C.) cognata* Baly
53. *C. (Tlanoma) basalis* (Baly)
54. *C. (T.) discreta* (Baly)
55. *C. (T.) indica* Weise
56. *Nisotra gemella* (Erichson)
57. *Altica cyanea* (Weber)

Subfamily (viii) HISPINAE

58. *Estigmena chinensis* Hope
59. *Dicladispa armigera* (Olivier)
60. *Dactylispa daipa* Maulik
61. *Rhadinosa laghua* Maulik

Subfamily (ix) CASSIDINAE

62. *Lacoptera quadrimaculata* (Thunberg)
63. *Chiridopsis scalaris* (Weber)
64. *Cassida circumdata* Herbst
65. *C. catenata* Boheman

Subfamily (i) CRIOCERINAE

Genus *Lema* Fabricius

1798. *Lema* Fabricius, *Ent. Syst. Suppl.* : 90.
1908. *Lema* : Jacoby, *Fauna Brit. India, Col., Chry.*,
1 : 15.

Eighty species of this genus were recorded from India but there was no record from Tripura.

1. *Lema coromandelina* (F.)

1798. *Leptura coromandelina* Fabricius, *Ent. Syst. Suppl.* : 154.
 1801. *Lema coromandelina* : Fabricius, *Syst. Eleuth.*, 1 : 475.
 1908. *Lema coromandelina* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 25.

Material examined : West Tripura dist. : Mohanpur, 2. vi. 1990 (1ex.), G. N. Saha coll.; Garbhabasti, 13. II. 1992 (1ex.), R. S. Barman coll.; S. Tripura : Baxanagar, 15. vi. 1990 (1ex.) G. N. Saha coll.

Distribution : India : Tripura (W. Tripura dist. and S. Tripura dist.), Himachal Pradesh, Karnataka, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere: Borneo, Cambodia, China, Java, Laos, Nepal, Phillippines, Sri Lanka, Sumatra, Taiwan, Thailand and Vietnam.

Remarks : First record from Tripura.

2. *Lema lacertosa* Lacordaire

1845. *Lema lacertosa* Lacordaire, *Mon. Phytoph.*, 1 : 339.
 1908. *Lema lacertosa* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 35.

Material examined : N. Tripura : Manu, 23. II. 1983 (1ex.), A. K. Sanyal coll.; Chailengta, 22. xii. 1972 (1ex.), V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura), Orissa and West Bengal. Elsewhere : Burma, China, Laos, Malayasia, Malaya, Singapore and Vietnam.

Remarks : First record from Tripura.

3. *Lema occipitalis* Jacoby

1908. *Lema occipitalis* Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 52.

Diagnostic characters : General colour reddish; the anterior portion and the sides of head and the antennae black; elytra black with a yellowish brown band from base to apex; breast, kness, the tibiae and tarsi black; length 4.5 mm.

Material examined : S. Tripura : Belonia, 19. ix. 1992 (1ex.), B. N. Das & S. K. Saha : W. Tripura : Rangamura, 20. ix. 1992 (1ex.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (W. Tripura and S. Tripura), and Assam.

Remarks : First record from Tripura.

Genus *Lilioceris* Reitter

1912. *Lilioceris* Reitter, *Fauna Germanica*, 4 : 79.
 1908. *Crioceris* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 71 (Part).
 1961. *Lilioceris* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1A : 42.

Twenty two species of this genus were recorded sofar from India but there was no record from Tripura. The present paper includes one species from the area.

4. *Lilioceris impressa* (Fabricius)

1787. *Crioceris impressa* Fabricius, *Mant. Ins.*, 1 : 88.
 1908. *Crioceris impressa* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 72.
 1929. *Lilioceris impressa* : Winkler, *Cat. Col. Reg. Palaerc.*, 2 (10) : 1234.

Material examined : S. Tripura : Nutanbazar, 13. vi. 1990(2 exs.), G. N. Saha coll.

Distribution : India : Tripura (S. Tripura), Andaman and Nicobar Is., Meghalaya, Sikkim and West Bengal. Elsewhere : Burma, Cambodia, China, Hainen, Japan, Laos, Malaya, Nepal, Phillippines, Sri Lanka, Sumatra, Taiwan, Thailand and Vietnam.

Remarks : First record from Tripura.

Subfamily (ii) CLYTRINAE

Genus *Aspidolopha* Lacordaire

1848. *Aspidolopha* Lacordaire, *Mon. Phytoph.*, 2 : 252.
 1908. *Aspidolopha* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 134.

Thirteen species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

5. *Aspidolopha melanophthalma* Lacordaire

1848. *Aspidolopha melanophthalma* Lacordaire, *Mon. Phytoph.*, 2 : 254.
1908. *Aspidolopha melanophthalma* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 144.

Material examined : W. Tripura : Balamura, 30. ix. 1977 (1 ex.), N. Muraleedharan coll.

Distribution : India : Tripura (W. Tripura), Meghalaya and West Bengal. Elsewhere : Borneo, Burma, Cambodia, China, Indonesia, Laos, Malaya, Sri Lanka, Sumatra, Thailand and Vietnam.

Remarks : First record from Tripura.

Genus *Smaragdina* Chevrolat

1837. *Smaragdina* Chevrolat, *Cat. Col.*, ed. 3 : 420.
1848. *Gynandrophthalma* Lacordaire, *Mon. Phytoph.*, 2 : 256.
1953. *Smaragdina* : Monros, *Col. Bull.*, 7 (6) : 46 (=Gynandrophthalma).

Thirty two species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from Tripura.

6. *Smaragdina divisa* (Duvivier)

1889. *Gynandrophthalma divisa* Duvivier, *Ann. Mus. Civ. Genova*, 27 : 156.
1908. *Gynandrophthalma divisa* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 117.
1981. *Smaragdina divisa* : Kimoto & Gressitt, *Pac. Ins.*, 23 (3-4) : 319.

Material examined : W. Tripura : Chebari, 25. vi. 1990 (1 ex.), Ompi, 25. vi. 1990 (1 ex.), all G. N. Saha coll.

Distribution : India : Tripura (W. Tripura), Maharashtra, Meghalaya, Kerala/Tamil Nadu (recorded as Coromandel) and West Bengal.

Remarks : First record from Tripura.

Subfamily (iii) CRYPTOCEPHALINAE

Genus *Cryptocephalus* Geoffroy

1762. *Cryptocephalus* Geoffroy, *Ins. Paris*, 1 : 231.
1908. *Cryptocephalus* : Jacoby, *Fauna Brit. India, Col. Chry.*, 1 : 192.

Ninety six species of this genus were recorded from India but there was no record from Tripura. The present paper includes two species from the area.

7. *Cryptocephalus vittipennis* Suffrian

1854. *Cryptocephalus vittipennis* Suffrian, *Linn. ent.*, 9 : 31.
1908. *Cryptocephalus vittipennis* : Jacoby, *Fauna Brit. India, Col. Chry.*, 1 : 230.

Material examined : N. Tripura : Singerbill, 10. v. 1992 (1 ex.), B. C. Das coll.; Ambassa, Kulai, 15. v. 1992 (6 exs.), B. Mitra coll. W. Tripura : Teliamura, 21. v. 1992 (1 ex.), B. C. Das coll.

Distribution : India : Tripura (N. Tripura and W. Tripura), Bihar, Haryana, Uttar Pradesh and West Bengal. Elsewhere : Pakistan.

Remarks : First record from Tripura.

8. *Cryptocephalus senarius* Suffrian

1860. *Cryptocephalus senarius* Suffrian, *Linn. Ent.* 14 : 22.
1908. *Cryptocephalus senarius* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 260.

Diagnostic characters : Generally dorsal side red., three spots on elytra, sutural margin and ventral side black. Sometimes (i) elytra with a transverse band at base and a spot, (ii) another band at apical area of elytra, (iii) Both the bands almost connected by longitudinal stripes, (iv) elytra black with their epipleural lobes and the suture anteriorly brownish; length 3.0-5.0.

Material examined : *N. Tripura* : Singerbill, 10. v. 1992 (2 exs.), B. C. Das coll; Seloma, 26. v. 1992 (5 exs.), B. C. Das coll.; Khowai, 3. xii. 1991 (1 ex.), K. K. Roy coll.; *S. Tripura* : Sonamura, 14. v. 1992 (2 exs.), B. C. Das coll.

Distribution : India : Tripura (N. Tripura and S. Tripura), Gujarat and Karnataka. Elsewhere : No report.

Remarks : First record from Tripura.

Subfamily (iv) EUMOLPINAE

Genus *Chrysolampra* Baly

1859. *Chrysolampra* Baly; *Ann. Mag. nat. Hist.* (3)4 : 126.
1908. *Chrysolampra* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 285.

So far four species were recorded from India of which none was from Tripura. In the present paper one species is reocorded here for the first time.

9. *Chrysolampra flavipes* Jacoby

1899. *Chrysolampra flavipes* Jacoby, *The Entomologist*, 32 : 70.
1908. *Chrysolampra flavipes* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 286.

Material examined : *N. Tripura* : Kumarghat, 19. v. 1992 (4 exs.), Bagbasa, 25. v. 1992 (1 ex.), all S. K. Chakraborty coll.; *S. Tripura* : Baguna, 17. vi. 1990 (1 ex.), G. N. Saha coll.

Distribution : India : Tripura (N. Tripura and S. Tripura) and Meghalaya.

Remarks : First record from Meghalaya.

Genus *Pagria* Lefevre

1884. *Pagria* Lefevre, *Bull. Soc. ent. France* : 67.
1908. *Pagria* : Jacoby, *Fauna Brit. India. Col., Chry.*, 1 : 356.

Six species of this genus were recorded from India of which one species was from Tripura.

10. *Pagria kanaraensis* (Jacoby)

1895. *Nodostoma kanaraensis* Jacoby, *Ann. Soc. ent. Belg.*, 39 : 279.
1908. *Pagria kanaraensis* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 360.

Material examined : *S. Tripura* : Garjee, 1. xii. 1969 (7 exs.), Perathia, 30. xi. 1969 (10 exs.), V. C. Agrawal coll.; Belonia, 19. ix. 1992 (2 exs.), B. N. Das coll.; *N. Tripura* : Chailengta (Manu), 21. xii. 1972 (2 exs.), V. C. Agarwal coll.; *W. Tripura* : Abhoya (Barpathari), 4. xii. 1969 (9 exs.), Abhoya Rest House, 10. xii. 1969 (1 ex.), all V. C. Agarwal coll.

Distribution : India : Tripura (North Tripura, West Tripura and South Tripura), Karnataka, Maharashtra, Meghalaya and West Bengal. Elsewhere : No report.

Genus *Nodina* Motschulsky

1858. *Nodina* Motschulsky, *Etud. ent.*, 7 : 108.
1908. *Nodina* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 292.

Fourteen species of this genus were recorded from India but there was no record from Tripura. The present collection includes one species from the area.

11. *Nodina indica* Jacoby

1895. *Nodina indica* Jacoby, *Ann. Soc. ant. Belo.*, 39 : 271.
1908. *Nodina indica* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 292.

Material examined : *S. Tripura* : Shalgara, 13. ix. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (S. Tripura), Arunachal Pradesh, Maharashtra and West Bengal. Elsewhere : No report.

Remarks : First record from Tripura.

Genus *Basilepta* Baly

1860. *Basilepta* Baly, *J. ent.*, 1 : 23.
1860. *Nodostoma* Motschulsky, *In Schrenk, Reise u. Forsch. Amur.*, 2(2) : 176.

1908. *Nodostoma* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 301.

1922. *Basilepta* : Weise, *Tijdschr. ent.*, 65 : 47 (=Nodostoma Mts.).

Sixty-nine species of this genus were recorded from India but there was no record from Tripura. The present collection includes one example which could not be identified.

12. *Basilepta* sp.

Material : West Tripura : Rangamura, 20. ix. 1992 (1 ex.), B. N. Das. Coll.

Genus *Scelodonta* Westwood

1837. *Scelodonta* Westwood, *Proc. Zool. Soc. Lond.*, 5 : 129.

1908. *Scelodonta* : Jacoby, *Fauna Brit. India, Col. Chry.*, 1 : 382.

Out of eleven Indian species none was recorded from Tripura. The present paper includes one species from the state.

13. *Scelodonta indica* Duvivier

1891. *Scelodonta indica* Duvivier, *Bull. Soc. ent. Belg.*, 35 : 39.

1908. *Scelodonta indica* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 383.

Material examined : S. Tripura : Natunbazar, 13. vi. 1990 (1 ex.), G. N. Saha coll.; W. Tripura : Chakma Forest, 15. xii. 1991 (1 ex.), S. Ahmed coll.

Distribution : India : Tripura (W. Tripura and S. Tripura), Bihar, Meghalaya, Orissa and West Bengal, Elsewhere : No report.

Remarks : First record from Tripura.

Genus *Colasposoma* Castelnau

1833. *Colasposoma* : Castelnau, *In Silbermann, Rev. ent.*, 1 : 22.

1908. *Colasposoma* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 439.

Twenty-four species of this genus were recorded from India but there was no record from Tripura. The present paper deals with two species which are all first time recorded from the area.

14. *Colasposoma semicostatum* Jacoby

1908. *Colasposoma semicostatum* Jacoby, *Fauna Brit. India Col., Chry.*, 1 : 443.

1994. *Colasposoma semicostatum* : Basu, *Zool. Surv. India, State Fauna series 4 : Fauna Meghalaya, Part 5* : (In press).

Material examined : W. Tripura Khasia Mongal, 9. v. 1992 (1 ex.), B. Mitra coll.

Distribution : India : Tripura (W. Tripura), Assam, Meghalaya, Sikkim, Uttar Pradesh and West Bengal, Elsewhere : Nepal.

Ramrks : First record from Tripura.

15. *Colasposoma splendidum* (Fabricius)

1792. *Colasposoma splendidum* Fabricius, *Syst. ent.*, 1 : 324.

1908. *Colasposoma splendidum* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 451.

Material examined : N. Tripura : Ambassa, Kanthalbari, 13. v. 1992 (1 ex.), S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura) and Meghalaya. Elsewhere : Indonesia and Malaya.

Ramrks : First record from Tripura.

Genus *Pachnephorus* Chevrolat

1837. *Pachnephorus* Chevrolat, *In Dejean, Cat. Col.*, ed. 3 : 403.

1908. *Pachnephorus* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 460.

Two species of this genus were recorded from India but there was no record from Tripura.

16. *Pachnephorus lewisii* Baly

1878. *Pachnephorus lewisii* Baly, *J. Linn. Soc. Lond., Zool.*, 14 : 357.

1982. *Pachnephorus lewisii* : Kimoto & Gressitt, *Esakia* (18) : 92.

Material examined : W. Tripura : Teliamura, 15. ii. 1983 (1 ex.), A. K. Sanyal coll.

Distribution : India : Tripura (W. Tripura), Bihar, Orissa and West Bengal. Elsewhere : Burma, Cambodia, China, Korea, Laos, Nepal, Pakistan, Sumatra, Taiwan, Thailand and Vietnam.

Remarks : First record from Tripura.

17. *Pachnephorus impressus* Rosenh

1856. *Pachnephorus impressus* Rosenh, *Thiere Andal.* : 310.
1908. *Pachnephorus impressus* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 461.

Material examined : S. Tripura : Belonia, 21. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (S. Tripura) and West Bengal. Elsewhere : Phillippines, Europe and Africa.

Remarks : First record from Tripura.

Genus *Tricliona* Lefevre

1885. *Tricliona* Lefevre, *Bull. Soc. ent. France* (6) 5 : 147.
1908. *Tricliona* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 467.

Fourteen species of this genus were recorded from India but it was unknown from Tripura. The present collection includes one example whose specific identification could not be ascertained.

18. *Tricliona* sp.

Material examined : W. Tripura : Sephaijola, 14. vi. 1990 (1 ex.), G. N. Saha coll.

Genus *Platycorynus* Chevrolat

1837. *Platycorynus* Chevrolat, In Dejean, *Col. Cat.* ed. 3 : 413.
1848. *Corynodes* Hope, *Col. Man.*, 3 : 162.
1908. *Corynodes* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 492.

1961. *Platycorynus* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1A : 286.

Twenty eight species of this genus were recorded from India but there was no record from Tripura. The present work deals with three species which are all new records from the state.

19. *Platycorynus pyrophorus* (Parry)

1843. *Eumolpus pyrophorus* Parry, *Proc. ent. Soc. Lond.* : 87.
1866. *Corynodes pyrophorus* : Marshall, *J. Linn. Soc. Lond.*, 8 : 34.
1908. *Corynodes pyrophorus* : Jacoby, *Fauna Brit. India, Col., Chry.*, 1 : 492
1961. *Platycorynus pyrophorus* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1A : 294.

Material examined : N. Tripura : Ambassa, 25. v. 1978 (1 ex.), J. K. Jonathan coll.

Distribution : India : Tripura (N. Tripura), Assam, Sikkim and West Bengal. Elsewhere : Burma, China, Laos, Nepal and Vietnam.

Remarks : First record from Tripura.

20. *Platycorynus peregrinus* (Herbst)

1883. *Cryptocephalus peregrinus* Herbst, In Fuessly, *Arch. Ins.* : 63.
1865. *Corynodes peregrinus* : Marshall, *J. Linn. Soc. Lond.*, 8 : 34.
1908. *Corynodes peregrinus* : *Fauna Brit. India, Col., Chry.*, 1 : 493.
1961. *Platycorynus peregrinus* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1A : 294.

Material examined : W. Tripura : Simna, 6. vi. 1990 (23 exs.), Teliamura, Bawatia, 8. vi. 1990 (22 exs.), all G. N. Saha coll.; S. Tripura : Santibazar, 11. vi. 1990 (22 exs.), Mongiabari, 24-26. vi. 1990 (13 exs.), all G. N. Saha coll.; W. Tripura : Sephaijola, 11. v. 1992 (13 exs.), Singirbill, 10. v. 1992 (1 ex.), all B. N. Das coll.; N. Tripura : Ambassa, 25. v. 1978 (2 exs.), J. K. Jonathan coll.

Distribution : India : Tripura (North, West and South Tripura), Meghalaya, Orissa, Sikkim and West Bengal. Elsewhere : Burma, Cambodia, China, Laos, Malacca, Malaya, Nepal, Sri Lanka, Thailand and Vietnam.

Remarks : First record from Tripura.

21. *Platycorynus asphodelus* (Marshall)

1865. *Corynodes asphodelus* Marshall, *J. Linn. Soc. Lond.*, 8 : 43.
 1908. *Corynodes asphodelus* : Jacoby, *Fauna Brit. India, Col. Chry.*, 1 : 504.
 1994. *Platycorynus asphodelus* : Basu, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya, Part 5* : (In press)

Material examined : *S. Tripura* : Garjee, 12. v. 1978 (1 ex.), J. K. Jonathan coll., Rampur, 13. x. 1977 (1 ex.), N. Muraleedharan coll.; *W. Tripura* : Teliamura, Bankumari, 15. ii. 1993 (1 ex.), A. K. Sanyal coll.; *N. Tripura* : Bagbasa, Jaithang viii., 25. v. 1992 (1 ex.), S. K. Chakraborty coll.

Distribution : India : Tripura (North, South and W. Tripura); Assam. Elsewhere : Bangladesh and Nepal.

Remarks : First record from Tripura.

Subfamily (V) CHRYSOMELINAE

Genus *Chrysolina* Motschulsky

1860. *Chrysolina* Motschulsky, *Schrenck's Reisen Amurl.*, 2 : 206.
 1926. *Chrysolina* : Maulik, *Fauna Brit. India. Col., Chry. (Chry. & Halti.)* : 17.

Twenty one species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

22. *Chrysolina aurata aurata* (Suffrian)

1951. *Chrysomela aurata* Suffrian, *Linn. Ent.*, 5 : 102.
 1926. *Chrysolina aurata* : Maulik, *Fauna Brit. India, Col., Chry. (Chry. & Halti.)* : 41.

1963. *Chrysolina aurata aurata* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 18 : 313.

Material examined : *W. Tripura* : Ampri, 17. i. 1971 (2 exs.), V. C. Agrawal coll.

Distribution : India : Tripura (*W. Tripura*), Bihar, Manipur, Meghalaya, Sikkim and Uttar Pradesh. Elsewhere : Burma.

Remarks : First record from Tripura.

Genus *Plagioderia* Chevrolat

1837. *Plagioderia* Chevrolat, In Dejean, *Cat. Col. ed.* 3 : 404.
 1926. *Plagioderia* : Maulik, *Fauna Brit. India, Col., Chry. (Chryso. & Halti.)* : 60.

Five species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

23. *Plagioderia rufescens* (Gyllenhal)

1808. *Chrysomela rufescens* Gyllenhal, In *Schönh. Syn. Ins.*, 1(2) : 267.
 1926. *Plagioderia rufescens* : Maulik, *Fauna Brit. India, Col., Chry. (Chryso. & Halti.)* : 64.

Material examined : *S. Tripura* : Belonia, 19. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (*S. Tripura*), Himachal Pradesh, Orissa, Punjab, Sikkim, Uttar Pradesh and West Bengal. Elsewhere : Burma and Sri Lanka.

Remarks : First record from Tripura.

Genus *Lycaria* Stal

1857. *Lycaria* Stal, *Ofv. Vet.-AK. Forh.*, 14 : 59.
 1926. *Lycaria* : Maulik, *Fauna Brit. India. Col., Chry. (Chryso. & Halti.)* : 85.

It is a monotypic genus and it was not recorded earlier from Tripura.

24. *Lycaria westermanni* Stal

1857. *Lycaria westermanni* Stal, *Ofv. Vet.-AK. Forh.*, 14 : 59.

1926. *Lycaria westermanni* : Maulik, *Fauna Brit. India, Col., Chry. (Chryso. & Hali.)* : 85.

Diagnostic characters : Ovate, strongly convex. Colour yellow brown to dark brown, six apical segments of antennae blackish; anterior coxal cavities closed behind; epipleuron horizontal; claws split or cut in the middle; Length 7.5-8.0 mm.

Material examined : *N. Tripura* : Bagbasa, Jaithan vill., 25. v. 1992 (3 exs.), S. K. Chakraborty coll.; *S. Tripura* : Natunbazar, 13 vi. 1990 (1 ex.), G. N. Saha coll.

Distribution : India : Tripura (N. Tripura and S. Tripura) and Assam. Elsewhere : Burma, Cambodia, Thailand and Vietnam.

Remarks : First record from Tripura.

Subfamily (VI) GALERUCINAE

Genus *Galerucella* Crotch

1873. *Galerucella* Crotch, *Proc. Acad. Sci. Philad.* : 55.
1936. *Galerucella* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 214.

Four species of this genus were recorded from India but none was from Tripura. The present paper includes one species from the area.

25. *Galerucella grisescens* (Joannis)

1866. *Galeruca grisescens* Joannis, *Abeille*, 3 : 98.
1878. *Galerucella placida* Bely, *Cist. Ent.*, 2 : 381.
1989. *Galerucella grisescens* : Kimoto, *Esakia*, 27 : 21 (Synonymized).

Material examined : *W. Tripura* : Teliamura, 21. v. 1992 (2 exs.), Jirania, 10. v. 1992 (1 ex.) & 19. v. 1992 (1 ex.), all B. C. Das coll.; *N. Tripura* : Manu, 27. ii. 1992 (10 exs.), R. S. Barman coll.; *S. Tripura* : Udaipur, Chanban, 17. v. 1992 (1 ex.), Amarapur, 15. V. 1992 (2 exs.) all B. C. Das coll.

Distribution : India : Tripura (West, North and South Tripura), Bihar, Jammu & Kashmir, Meghalaya, Punjab, Kerala/Tamil Nadu (Coromandel), Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Bangladesh, Bhutan, Burma, Java, Nepal and Sumatra.

Remarks : First record from Tripura.

Genus *Oides* Weber

1801. *Oides* Weber, *Obs. Ent.*, : 26.
1936. *Oides* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 105.

Eleven species of this genus were recorded so far from India but there was no record from Tripura. The present paper records one species from the state.

26. *Oides maculata* (Olivier)

1807. *Adorium maculata* Olivier, *Entomologie*, 5 : 611.
1936. *Oides maculata* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 113.

Material examined : *N. Tripura* : Kumarghat, 17. v. 1992 (1 ex.), B. Mitra coll.

Distribution : India : Tripura (N. Tripura), Andaman Is., Assam, Bihar, Meghalaya, Sikkim, Uttar Pradesh and West Bengal. Elsewhere : Burma, Cambodia, Java, Malaya and Penung.

Remarks : First record from Tripura.

Genus *Hoplasoma* Jacoby

1884. *Hoplasoma* Jacoby, *Notes Leyd. Mus.*, 6 : 233.
1936. *Hoplasoma* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 151.

Seven species of this genus were recorded from India of which only two species were from Tripura.

27. *Hoplasoma nilgiriensis* Jacoby

1904. *Hoplasoma nilgiriensis* Jacoby, *Ann. Soc. ent. Belg.*, 48 : 396.
1936. *Hoplasoma nilgiriensis* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 160.

Material examined : *W. Tripura* : Agartala, Chandmari, 10. xii. 1969 (1 ex.), V. C. Agarwal coll.; *N. Tripura* : Rangamura, 20. ix. 1992 (1 ex.), B. N. Das and S. K. Saha coll.

Distribution : India : Tripura (N. Tripura and W. Tripura), Kerala and Tamil Nadu.

28. *Hoplasoma unicolor* (Illiger)

1800. *Galleruca unicolor* Illiger, In Wiedem., *Arch. fuer. Zool. u. Zoot.*, 1(2) : 135.
 1889. *Hoplasoma unicolor* : Allard, *Ann. Soc. ent. Fr.* (6) 8 : 327.
 1936. *Hoplasoma unicolor* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 161.

Material examined : N. Tripura : Chailengta, 20. xii. 1972 (1 ex.), V. C. Agrawal coll.; Teliamura, 2. xii. 1991 (1 ex.), K. K. Roy coll., Beliamura, 30. ix. 1977 (2 exs.), N. Muraleedharan coll.; Anandabazar, 26. v. 1992 (1 ex.), M. Sil coll.; Sonamura, 15. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll., Kumarghat, 19. v. 1992 (1 ex.), S. K. Chakraborty coll.; W. Tripura : Agartala, 16. xi. 1969 (1 ex.), V. C. Agarwal coll., Jirania, 10. v. 1992 (1 ex.), B. C. Das coll., Singerbill, 10. v. 1992 (2 exs.), B. C. Das coll., Simna, 6. vi. 1990 (8exs.), G. N. Saha coll., 10. ix. 1992 (1 ex.), B. N. Das coll., Mohanpur, 7. v. 1990 (32 exs.), B. N. Das coll., Kamalsagar, 7. v. 1992 (3 exs.), B. Mitra coll.; S. Tripura : Nutanbazar, 13. vi. 1990 (17 exs.), G. N. Saha coll., Udaipur, Chanban, 17. v. 1992 (1 ex.), B. C. Das coll.

Distribution : India : Tripura (North, South and West Tripura), Andaman Is., Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Bhutan, China, Malaya, Nepal, Phillippines and Sunda Is.

Genus *Aulacophora* Chevrolat

1837. *Aulacophora* : Chevrolat, In Dejean, *Cat. Col. ed.* 2 : 378.
 1936. *Aulacophora* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 167.

Nineteen species of this genus were recorded from India of which two species were from Tripura. The present paper adds another species from the state.

29. *Aulacophora foveicollis* (Lucas)

1849. *Galeruca foveicollis* Lucas, *Explor. Alger. Ent.* : 542.
 1879. *Aulacophora foveicollis* : Baly, *Cist. Ent.*, 2 : 445.
 1936. *Aulacophora foveicollis* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 173.

Material examined : S. Tripura : Dolbari, 3. i. 1992 (1 ex.), Kanthalchari, 1. i. 1992 (1ex.), Manughat, 5. i. 1992 (1 ex.), all M. Datta coll., Dolbair, Sabroom, 3. i. 1992 (15 exs.), B. Mitra & M. Datta coll.; N. Tripura : Zirania, 4. xii. 1991 (1 ex.), Teliamura, 2. xii. 1991 (1 ex.), all K. K. Roy coll., Teliamura, 21. v. 1992 (3 exs.), B. C. Das coll., Selama, 26. v. 1992 (1 ex.), B. C. Das coll., Ambassa, Kulai, 15. v. 1992 (2 exs.), B. Mitra coll., Kumarghat, 17. v. 1992 (1 ex.), B. Mitra coll., Ambassa Kanthalbari, 13. v. 1992 (1 ex.), S. K. Chakraborty coll.; W. Tripura : Kalitila, 16. ii. 1991 (1ex.), S. Ahmed coll., Singerbill, 10. v. 1992 (1ex.), B. C. Das coll., Kamalsagar, 7. v. 1992 (3 exs.), S. K. Chakraborty coll., same data (2 exs.), B. Mitra coll.

Distribution : India : Tripura (North, South and West Tripura), Arunachal Pradesh, Assam, Andaman Is., Bihar, Gujarat, Kerala, Maharashtra, Meghalaya, Orissa, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Bangladesh, Burma, Nepal, Sri Lanka and also in Europe.

30. *Aulacophora lewisii* Baly

1886. *Aulacophora lewisii* Baly, *J. Linn. Soc. Lond.*, 20 : 5, 24.
 1963. *Aulacophora lewisii* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1B : 488.

Material examined : S. Tripura : Belonia, 19. ix. 1992 (6 exs.), B. N. Das & S. K. Saha coll.; W. Tripura : Kamalsagar, 7. v. 1992 (2 exs.), S. K. Chakraborty coll., same data (1 ex.), B. Mitra coll., Chebari, 25. vi. 1990 (2exs.), G. N. Saha coll.

Distribution : India : Tripura (South Tripura and West Tripura), Assam, Bihar, Gujarat,

Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Bhutan, Burma, China, Japan, Sri Lanka and Taiwan.

Remarks : First record from Tripura.

31. *Aulacophora frontalis* Baly

1888. *Aulacophora frontalis* Baly, *J. Linn. Soc. London*, 20 : 176, 181.

1936. *Aulacophora frontalis* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 183.

Material examined : N. Tripura : Kumarghat, Fatik Roy, 25. xii. 1972 (1 ex.), V. C. Agarwal coll.

Distribution : India : Tripura (N. Tripura), Karnataka, Maharashtra, Tamil Nadu and West Bengal.

Genus *Haplosomoides* Duvivier

1890. *Haplosomoides* Duvivier, *Ann. Soc. ent. Belg.*, 34 : 35.

1963. *Haplosomoides* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 18 : 517.

Nine species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the state.

32. *Haplosomoides rasha* Maulik new combination

1936. *Hoplasomedia rasha* Maulik, *Fauna Brit. India. Col., Chry. (Gal.)* : 497.

Diagnostic characters : General colour dark brown, under side black; head and pronotum shining, elytra dull and distinctly punctate; length 6.0-7.0 mm.

Material examined : S. Tripura : Nutanbazar, 13. vi. 1990 (2 exs.), Aniripur, 12 vi. 1990 (1 ex.), all G. N. Saha coll.; W. Tripura : Chebri, 15. vi. 1990 (1 ex.), G. N. Saha coll.

Distribution : India : Tripura (S. Tripura and W. Tripura), and Assam. Elsewhere : No report.

Remarks : First record from Tripura.

Genus *Medythia* Jacoby

1887. *Medythia* Jacoby, *Notes Leyden Mus.*, 9 : 242.

1981. *Medythia* : Kimoto, *Ent. Rev. Japan*, 35 (1&2) : 7.

Two species of this genus were recorded from India but none was from Tripura. The present paper includes one species from the area.

33. *Medythia nigrobilineata* (Motschulsky)

1860. *Cnecodes nigrobilineata* Motschulsky, *Etudes Ent.*, 9 : 26.

1936. *Monolepta nigrobilineata* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 396.

1981. *Medythia nigrobilineata* : Kimoto, *Ent. Rev. Japan*, 35(1&2) : 9.

Material examined : S. Tripura : Belonia, 19. ix. 1992 (4 exs.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (S. Tripura), Bihar, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Remarks : First record from Tripura.

Genus *Monolepta* Erichson

1843. *Monolepta* Erichson, *Archiv. f. Naturgesch.* 9(1) : 265.

1936. *Monolepta* : Maulik, *Fauna Brit. India. Col., Chry. (Gel.)* : 373.

Fifty species of this genus were recorded from India of which two species were from Tripura.

34. *Monolepta madrasensis* Wilcox

1915. *Monolepta lineata* Weise, *Ergebnisse 2. Deut. Zentr. Afr. Exp., Zool.*, 1 : 177 (nec *lineata* Karsch, 1882).

1936. *Monolepta lineata* : Maulik, *Fauna Brit. India. Col., Chry. (Gal.)* : 398.

1973. *Monolepta madrasensis* : Wilcox, *Col. Cat. Suppl.* 78(3) : 562. (New name for *lineata* Weise.).

Material examined : N. Tripura : Chailengta, 23. xii. 1972 (1 ex.), V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura), Tamil Nadu and West Bengal. Elsewhere : Bhutan, Nepal and Thailand.

35. *Monolepta signata* (Olivier)

1808. *Galeruca signata* Olivier, *Entomologie*, 6 : 665.
 1889. *Monolepta signata* : Jacoby, *Ann. Mus. Civ. Genova*, 27 : 229.
 1936. *Monolepta signata* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 416.

Material examined : N. Tripura : Ambassa, 15. v. 1992 (1 ex.), B. Mitra coll., 5. xii. 1991 (1 ex.), K. K. Roy coll., 9. ii. 1971 (2 exs.) 4. i. 1972 (10 exs.), Fatik Roy, 25. ii. 1972 (34 exs.), Saydabari, 29. xii. 1972 (1 ex.), Chailengta, 8. xii. 1972 (9 exs.), all V. C. Agrawal coll.; Zirania, 4. ii. 1991 (3 exs.), K. K. Roy coll.; Manu, 22. ii. 1992 (2 exs.), R. S. Barman coll.; Pacharthall, 20. v. 1992 (4 exs.), B. Mitra coll.; W. Tripura : Kalitila, 6. xii. 1991 (1 ex.), S. Ahmed coll.; Agartala, 5. ii. 1983 (1 ex.), A. K. Sanyal coll.; 28. v. 1992 (1 ex.), B. C. Das coll.; Singerbill, 10. v. 1992 (2 exs.), B. C. Das coll.; Teliamura, 27. i. 1971 (1 ex.), V. C. Agrawal coll.; Hawabari, 11. v. 1992 (2 exs.), B. Mitra coll.; S. Tripura : Garjee, 12. v. 1978 (2 exs.), J. K. Jonathan coll.; 1. xii. 1969 (11 exs.) V. C. Agrawal coll.; Perathia, 30. xi. 1969 (3 exs.), V. C. Agrawal coll.; Belonia, 19. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.; Birchandra Nagar, 30. ii. 1991 (1 ex.), M. Datta coll.; Kanthalchari, 2. i. 1992 (2 exs.), M. Datta coll.

Distribution : India : Tripura (North, West and South Tripura), Arunachal Pradesh, Assam, Gujarat, Haryana, Kerala, Karnataka, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Genus *Palpoxena* Baly

1861. *Palpoxena* Baly, *J. Ent.*, 1 : 203.
 1936. *Palpoxena* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 568.

Sixteen species of this genus were recorded from India but there was no record from Tripura.

The present paper deals with one specimens which could not be identified completely.

36. *Palpoxena ? malayana* Jocaby

Material examined : N. Tripura : Kumarghat, 19. v. 1992 (1 ex.), S. K. Chakraborty coll.

Remarks: Identification could not be confirmed due to the lack of literature.

Genus *Dercetina* Gressitt & Kimoto

1865. *Dercetis* Clark, *Ann. Mag. nat. Hist.*, (3) 15 : 146 (nec *Dercetis* Muenster & Agassiz, 1834).
 1936. *Dercetis* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 348.
 1963. *Dercetina* Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1B : 704 (new name for *Dercetis* Clark).

Twenty species of this genus were recorded from India but there was no record from Tripura. The present paper includes three species from the state.

37. *Dercetina flavocincta* (Hope)

1831. *Gallaruca flavocincta* Hope, In Gray, *Zool. Miscell.* : 29.
 1936. *Dercetis flavocincta* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 355.
 1967. *Dercetina flavocincta* : Kimoto, *Esakia* (8) : 70.

Material examined : N. Tripura : Anandabazar, 26. v. 1992 (1 ex.), S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura), Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and West Bengal. Elsewhere : Nepal.

Remarks : First record from Tripura.

38. *Dercetina histrio* (Baly)

1879. *Antipha histrio* Baly, *Cist. Ent.*, 2 : 456.
 1936. *Dercetis histrio* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 358.
 1996. *Dercetina histrio* : Basu, *State Fauna Series, Zool. Surv. India, Fauna West Bengal* (6B) : 725.

Material examined : *S. Tripura* : Kanthalchari, 2. i. 1992 (1 ex.), M. Datta coll.; Shalgara, 13. ix. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (S. Tripura), Assam, Meghalaya and West Bengal. Elsewhere : Bangladesh.

Remarks : First record from Tripura.

39. *Dercetina orientalis* (Jacoby) new combination

1904. *Antipha orientalis* Jacoby, *Ann. Soc. ent. Belg.*, 48 : 400.

1936. *Dercetis orientalis* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 364.

Diagnostic characters : Antenna, prothorax and underside pale to dark brown; head with a large black patch on the vertex; elytra brown to red with a marginal black band at the base including scutellum; length 5.0- 6.0 mm.

Material examined : *S. Tripura* : Garjee, 12. v. 1978 (1 ex.), J. K. Jonathan coll.

Distribution : India : Tripura (S. Tripura) and Tamil Nadu.

Remarks : First record from Tripura.

Genus *Pseudoides* Jacoby

1892. *Pseudoides* Jacoby, *Ann. Mus. Civ. Genova*, 32 : 966.

1936. *Pseudoides* : Maulik, *Fauna Brit. India, Col. Chry. (Gal.)* : 302.

This is a monotypic genus only recorded from West Bengal.

40. *Pseudoides flavovittis* (Motschulsky)

1858. *Calomicrus flavovittis* Motschulsky, *Etud. Ent.*, 7 : 101.

1892. *Pseudoides bivittata* Jacoby, *Ann. Mus. Civ. Genova*, 32 : 966.

1936. *Pseudoides bivittata* : Maulik, *Fauna Brit. India, Col., Chry. (Gal.)* : 303.

1971. *Pseudoides flavovittis* : Wilcox, *Col. Cat. Suppl. ed. 2. Galerucinae* : 153 (= *bivittata* Jac.).

Material examined : *N. Tripura* : Beliamura, 30. ix. 1977 (12 exs.), N. Muraleedharan coll.; *W. Tripura* : Chebri, 25. vi. 1990 (1 ex.), Ompi, 23. vi. 1990 (4 exs.), Simna, 6. vi. 1990 (2 exs.), Mohanpur, 7. vi. 1990 (3 exs.), Sephoijola, 14. vi. 1990 (3 exs.), all G. N. Saha coll.; *S. Tripura* : Jolaghati, 20. vi. 1990 (4 exs.), G. N. Saha coll.

Distribution : India : Tripura (North, South and West Tripura), and West Bengal. Elsewhere : Bhutan, Burma, Cambodia, Nepal and Vietnam.

Remarks : First record from Tripura.

Subfamily (VII) ALTICINAE

Genus *Nonarthra* Baly

1862. *Nonarthra* Baly, *J. Ent.*, 1 : 455.

1969. *Nonarthra* : Scherer, *Pac. Ins. Monogr.*, 22 : 239.

Three species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

41. *Nonarthra variabilis* Baly

1862. *Nonarthra variabilis* Baly, *J. Ent.*, 1 : 456.

1969. *Nonarthra variabilis* : Scherer, *Pac. Ins. Monogr.*, 22 : 239.

Material examined : *W. Tripura* : Simna, 6. vi. 1990 (3 exs.), G. N. Saha coll.

Distribution : India : Tripura (W. Tripura), Assam, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and West Bengal. Elsewhere : Afghanistan, Burma, China, Hainan Is., Nepal, Sri Lanka, Taiwan and Vietnam.

Remarks : First record from Tripura.

Genus *Hyphasis* Harold

1877. *Hyphasis* Harold, *Deut. Ent. Zeit.*, 21 : 434.

1903. *Hyphasoma* Jacoby, *Ann. Soc. ent. Belg.*, 47 : 110.

1969. *Hyphasis* : Scherer, *Pac. Ins. Monogr.* 22 : 176 (= *Hyphasoma*)

Eighteen species were recorded from India but there was no record from Tripura.

42. *Hyphasis* sp. (nr. *inornata* Jac.)

Material examined : W. Tripura : Ompi, 23. vi. 1990 (1 ex.), G. N. Saha coll.

Genus *Hemipyxis* Dejean

1837. *Hemipyxis* Dejean, *Cat. Col.*, ed. 3 : 411.

1864. *Sebaethe* Baly, *Ann. Mag. nat. Hist.*, (3) 14 : 438.

1963. *Hemipyxis* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 1B : 837.

Twenty one species of this genus were recorded from India but there was no representation from Tripura. The present paper includes two species from the state.

43. *Hemipyxis fulvipennis* (Illiger)

1807. *Haltica fulvipennis* Illiger, *Mag. Inskde.*, 6 : 156.

1808. *Altica troglodytes* Olivier, *Entomologie*, 6 : 700.

1876. *Sphaeroderma fulvipennis* : Gemminger & Harold, *Cat. Col.*, 12 : 3548.

1969. *Sebaethe fulvipennis* : Scherer, *Pac. Ins. Monogr.*, 22 : 190 (=troglodytes)

1994. *Hemipyxis fulvipennis* : Basu, *Rec. Zool. Surv. India, State Fauna Series 4*, part 5 : (In press).

Material examined : S. Tripura : Nutan Bazar, 13. vi. 1990 (4 exs.), G. N. Saha coll.; W. Tripura : Chebri, 25. vi. 1990 (1ex.), G. N. Saha coll.

Distribution : India : Tripura (W. Tripura and S. Tripura), Assam, Bihar, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Burma, China, Nepal and Vietnam.

Remarks : First record from Tripura.

44. *Hemipyxis brevicollis* (Jacoby) new combination

1903. *Sebaethe brevicollis* Jacoby, *Ann. Soc. ent. Belg.*, 47 : 106.

1969. *Sebaetha brevicollis* : Scherer, *Pac. Ins. Monogr.*, 22 : 192.

Diagnostic characters : General colour completely red brown with the antennal segment

4-11 black; elytral margins somewhat explanate and delimited along the inner side by a line; length 5.0-6.0 mm.

Material examined : N. Tripura : Beliamura, 30. ix. 1977 (1 ex.), N. Muraleedharan coll.

Distribution : India : Tripura (N. Tripura) and Tamil Nadu.

Remarks : First record from Tripura.

Genus *Longitarsus* Latreille apud Berthold

1827. *Longitarsus* Berthold, In Latreille, *Nat. Fam. Thierreichs* : 410.

1969. *Longitarsus* : Scherer, *Pac. Ins. Monogr.*, 22 : 55.

Thirty three species of this genus were recorded from India of which only two species were from Tripura.

45. *Longitarsus belgaumensis* Jacoby

1896. *Longitarsus belgaumensis* Jacoby, *Ann. Soc. ent. Belg.*, 40 : 260.

1981. *Longitarsus belgaumensis* : Basu, et al., *Rec. Zool. surv. India*, 78 : 55.

Material examined : N. Tripura : Sayda Bari, 29. iii. 1972 (1 ex.), V. C. Agrawal coll., Chailengta (Manu), 17. xii. 1972 (1 ex.), V. C. Agarwal coll.

Distribution : India : Tripura (N. Tripura), Assam, Andhra Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Manipur, Orissa, Sikkim, Tamil Nadu and Uttar Pradesh. Elsewhere : Bhutan, Nepal, Sri Lanka and Vietnam.

46.. *Longitarsus indicus* Basu, Bhaumik & Sengupta

1981. *Longitarsus indicus* Basu, et al., *Rec. Zool. Surv. India* 78 : 54.

Material examined : S. Tripura : Garjee, 28. xi. 1969 (1 ex.), Abhoya Rest House, 10. xii. 1969 (1 ex.), all V. C. Agrawal coll.

Distribution : India : Tripura (S. Tripura).

Genus *Luperomorpha* Weise

1887. *Luperomorpha* Weise, *Archiv Naturg.*, **53**(1) : 202.
 1969. *Luperomorpha* : Scherer, *Pac. Ins. Monogr.*, **22** : 48.

Eight species of this genus were recorded from India of which only one species was recorded from Tripura.

47. *Luperomorpha vittata* Duvivier

1892. *Luperomorpha vittata* Duvivier, *Ann. Soc. ent. Belg.*, **36** : 427.
 1981. *Luperomorpha vittata* : Basu et al, *Rec. Zool. Surv. India*, **78** : 56.

Material examined : *N. Tripura* : Pacharthal, 20. v. 1992 (1 ex.), B. Mitra coll., Chailengta, 20. xii. 1972 (1 ex.), V. C. Agrawal coll.; *S. Tripura* : Shalgara, 13. ix. 1992 (1 ex.), B. N. Das coll., Garjee, 26. xi. 1969 (31 exs.), V. C. Agarwal coll.; *W. Tripura* : Agartala, Indranagar, 11. xi. 1969 (9 exs.), V. C. Agarwal coll.

Distribution : India : Tripura (North, South and W. Tripura), Bihar, Himachal Pradesh, Madhya Pradesh and West Bengal.

Genus *Phyllotreta* Stephens

1839. *Phyllotreta* Stephens, *Manu. Brit. Col.* : 291.
 1969. *Phyllotreta* : Scherer, *Pac. Ins. Monogr.*, **22** : 33.

Eight species of this genus were recorded from India, of these three species were from Tripura.

48. *Phyllotreta striolata* (Fabricius)

1801. *Crioceris striolata* Fabricius, *Index. Syst. Eleuth.* : 38.
 1950. *Phyllotreta striolata* : Yuasa, *Iconogr. Ins. Japon.* : 1207.
 1981. *Phyllotreta striolata* : Basu, et al, *Rec. Zool. Surv. India*, **78** : 56.

Material examined : *N. Tripura* : Chailengta, 19-21. xii. 1972 (66 exs.), Chailengta (Manu), 19. xii. 1972 (2 exs.), Khowaipur, 10. xii. 1972 (1 ex.), Ambassa, 4. i. 1973 (2 exs.), Fatik Roy (Kumarghat), 25. xii. 1972 (6 exs.), all V. C.

Agrawal coll.; *S. Tripura* : Kanthalchhari, 2. i. 1992 (1 ex.), M. Datta coll.

Distribution : India : Tripura (N. Tripura and S. Tripura) and Sikkim. Elsewhere : China, Hainan I., Korea, Nepal, Ryukyu Is., Sikkim, Sumatra, Thailand and Tibet.

49. *Phyllotreta chotanica* Duvivier

1892. *Phyllotreta chotanica* Duvivier, *Ann. Soc. ent. Belg.*, **36** : 426.
 1981. *Phyllotreta chotanica* : Basu et al, *Rec. Zool. Surv. India*, **78** : 57.

Material examined : *N. Tripura* : Fatik Roy (Kumarghat), 25. xii. 1972 (1 ex.), V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura) and West Bengal.

50. *Phyllotreta tripuraensis* Basu, Bhaumik & Sengupta

1981. *Phyllotreta tripuraensis* Basu, et al, *Rec. Zool. Surv. India*, **78** : 57.

Material examined : *N. Tripura* : Fatik Roy 25. xii. 1972 (59 exs.), Ambassa, 4. i. 1973 (48 exs.), 7. i. 1973 (2 exs.), Chailengta, 21. xii. 1972 (21 exs.), 20. xii. 1972 (8 exs.), 23. xii. 1972 (1 ex.), Chailengta (Manu), 10 xii. 1972 (5 exs.), all V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura).

Genus *Chaetocnema* Stephens

1831. *Chaetocnema* Stephens, *Illus. Brit. Ent. Mandib.*, **4** : 325.
 1969. *Chaetocnema* : Scherer, *Pac. Ins. Monogr.*, **22** : 154.

Eighteen species of this genus were recorded from India of Which five species were from Tripura.

51. *Chaetocnema (Chaetocnema) concinnipennis* Baly

1877. *Chaetocnema concinnipennis* Baly, *Trans. ent. Soc. Lond* : 170.

1969. *Chaetocnema* (*Chaetocnema*) *concinnipennis* : Scherer, *Pac. Ins. Monogr.*, 22 : 161.

Material examined : *N. Tripura* : Chailengta (Manu), 17. xii. 1972 (1 ex.), Ambassa, 2. i. 1973 (1 ex.), Chailengta, 17. xi. 1969 (1 ex.), all V. C. Agrawal coll.; *S. Tripura* : Garjee, 29. xii. 1969 (1 ex.), V. C. Agrawal coll.; Belonia, 19. ix. 1992 (23 exs.), B. N. Das & S. K. Saha coll.; *W. Tripura* : Sepahijola, 14. ix. 1992 (2 exs.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (*N. Tripura*, *W. Tripura* and *S. Tripura*), Assam, Bihar, Gujarat, Orissa, Sikkim, Tamil Nadu and West Bengal. Elsewhere : Bangladesh, China, Hainan I., Japan, Nepal, Sri Lanka, Taiwan and Vietnam.

52. *Chaetocnema* (*Chaetocnema*) *cognata* Baly

1877. *Chaetocnema cognata* Baly, *Trans. ent. Soc. Lond.* : 68.

1969. *Chaetocnema* (*Chaetocnema*) *cognata* : Scherer, *Pac. Ins. Monogr.*, 22 : 160.

Material examined : *N. Tripura* : Chailengta (Mann), 17-18. xii. 1972 (3 exs.), V. C. Agarwal coll.; *S. Tripura* : Garjee, 28. xi. 1969 (1 ex.), V. C. Agrawal coll.; *W. Tripura* : Sonamura, 16. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (*N. Tripura* and *S. Tripura*), Bihar, Karnataka, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Bangladesh, Bhutan and Sri Lanka.

53. *Chaetocnema* (*Tlanoma*) *basalis* (Baly)

1877. *Plectroscelis basalis* Baly, *Trans. ent. Soc. Lond.* : 310.

1899. *Chaetocnema basalis* : Shipley, *Cambridge Phil. Soc.*, 6 : 338.

1951. *Chaetocnema* (*Tlanoma*) *basalis* : Heikertinger, *Kol. Rundsch.*, 32 : 72.

Material examined : *N. Tripura* : Chailengta (Manu), 17. xii. 1972 (25 exs.), 12. xii. 1972 (1 ex.), 30. xii. 1972 (1 ex.), 18. xii. 1972 (1 ex.), 23. xii. 1972 (18 exs.), 20. xii. 1972 (1 ex.), 21.

xii. 1972 (1 ex.), Khowaipur, 15. xii. 1972 (2 exs.), Ganganagar, 15. xii. 1972 (5 exs.), Ambassa, 4. i. 1973 (1 ex.), Kumarghat, 28. xii. 1972 (2 exs.), all V. C. Agrawal coll.; *S. Tripura* : Perathia, 30. xii. 1969 (3 exs.), Hathalia, 15. xii. 1969 (14 exs.), Garjee, 28. xi. 1969 (1 ex.), all V. C. Agrawal coll., Belonia, 19. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.; *W. Tripura* : Abhoya (Barpathari), 4. xii. 1969 (3 exs.), V. C. Agrawal coll., Rangamura, 20. ix. 1992 (2 exs.), Sepathijola, 14. ix. 1992 (1 ex.), all B. N. Das and S. K. Saha coll.

Distribution : India : Tripura (North, South and West Tripura), Assam, Karnataka, Maharashtra, Tamil Nadu and West Bengal. Elsewhere : Afghanistan, Bangladesh, Bhutan, Borneo, Burma, China, Pakistan, Phillippines, Sri Lanka, Sumatra, Taiwan, Thailand and Vietnam.

54. *Chaetocnema* (*Tlanoma*) ? *discreta* (Baly)

1876. *Plectroscelis discreta* Baly, *Trans. Ent. Soc. Lond.* : 596.

1933. *Chaetocnema discreta* : Chen, *Sinensia* 3(9) : 229.

1951. *Chaetocnema* (*Tlanoma*) *discreta* : Heikertinger, *Kol. Rundsch.*, 32 : 70, 72, 75.

1981. *Chaetocnema* (*T.*) *longipinctata* : Basu et al, *Rec. Zool. Surv. India* 78 : 52.

Material examined : *N. Tripura* : Ganganagar, 11. xii. 1972 (1 ex.), V. C. Agrawal coll.

Distribution : India : Tripura (*N. Tripura*), Sikkim and West Bengal. Elsewhere : China, Japan and Vietnam.

Remarks : First record from Tripura. Identification couldnot be confirmed for want of literatures.

55. *Chaetocnema* (*Tlanoma*) *indica* Weise

1916. *Chaetocnema indica* Weise, *Deut. ent. Z.* : 39 (nom. nov. for *minuta* Jac.).

1896. *Chaetocnema minuta* Jacoby, *Ann. Soc. ent. Belg.*, 40 : 271.

1969. *Chaetocnema* (*Tlanoma*) *indica* : Scherer, *Pac. Ins. Monogr.*, 22 : 162.

Material examined : *N. Tripura* : Khowaipur, 10. xii. 1972 (1 ex.), Ganganagar, 11. xii. 1972 (1 ex.), all V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura), Assam, Andhra Pradesh, Gujarat, Jammu & Kashmir, Karnataka, Maharashtra, Tamil Nadu and Uttar Pradesh. Elsewhere : Bangladesh, Bhutan, Nepal, Sri Lanka and Vietnam.

Genus *Nisotra* Baly

1864. *Nisotra* : Baly, *Ann. Mag. nat. Hist.*, (3) 14 : 437.
1969. *Nisotra* : Scherer, *Pac. Ins. Monogr.*, 22 : 143.

Eleven species of this genus were recorded so far from India but there was no record from Tripura.

56. *Nisotra gemella* (Erichson)

1834. *Halitica gemella* Erichson, *Nov. Acta. Leop. Carol.*, 16 (Suppl.) : 275.
1885. *Nisotra gemella* : Jacoby, *Ann. Mus. Civ. Genova*, (2) 2 (22) : 34.
1969. *Nisotra gemella* : Scherer, *Pac. Ins. Monogr.*, 22 : 149.

Material examined : *N. Tripura* : Chailengra, 17-18. xii. 1972 (7 exs.), Ganganagar, 14. xii. 1972 (2 exs.), Ambassa, 4. i. 1973 (3 exs.), Charilam, 17. xi. 1969 (4 exs.), all V. C. Agarwal coll.; *S. Tripura* : Garjee, 24-26, 28-30. xi. 1969 (117 exs.), V. C. Agrawal coll., Belonia, 19. ix. 1992 (2 exs.), B. N. Das & S. K. Saha coll.; *W. Tripura* : Rangamura, 20. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll., Sepahijola, 14. ix. 1992 (1 ex.), B. N. Das & S. K. Saha coll.

Distribution : India : Tripura (North, South, and West Tripura), Andaman Is., Assam, Meghalaya, Nicobar Is., Orissa, Sikkim, Tamil Nadu and West Bengal. Elsewhere : Bhutan, Burma, China, Indonesia (Java), Malaya, Nepal, Phillippines, Sumatra, Taiwan, Thailand and Vietnam.

Remarks : The genus is recorded here for the first time.

Genus *Altica* Fabricius

1762. *Altica* Geoffroy, *Hist. Ins.*, 1 : 244 (nom. nud.)
1775. *Altica* : Fabricius, *Syst. Ent.* : 112.
1969. *Altica* : Scherer, *Pac. Ins. Monogr.*, 22 : 126.

Six species of this genus were recorded from India of which none was from Tripura.

57. *Altica cyanea* (Weber)

1801. *Galleruca cyanea* Weber, *Observ. Ent.*, 1 : 67.
1889. *Halitica cyanea* : Jacoby, *Ann. Mus. Civ. Genova*, 7(27) : 191.
1960. *Altica cyanea* : Ohno, *Toyo Univ. Bull. Dept. Lib. Arts*, 1 : 90.

Diagnostic characters : General colour dark blue; antennae black with the basal segments brownish at apex; scutellum blackish; length 5.0 mm.

Material examined : *N. Tripura* : Kumarghat, 17. V. 1992 (1 ex.), Ambassa, Kulai, 15. V. 1992 (3 exs.), Pacharthal, 20. V. 1992 (1 ex.), all B. Mitra coll.; Anandabazar, 26. V. 1992 (3 exs.), S. K. Chakraborty coll.; Mohanpur, 7. vi. 1990 (1 ex.), G. N. Saha coll.; *S. Tripura* : Kadalchera, 6. i. 1991 (1 ex.), Jalefa, 4. i. 1992 (1 ex.), all M. Datta coll.

Distribution : India : Tripura (North and South Tripura), Himachal Pradesh, Karnataka, Maharashtra and Tamil Nadu. Elsewhere : Afghanistan, Australia, Burma, China, Japan, Laos, Malaya, Nepal, New Guinea, Phillippines, Sri Lanka, Sunda I., Taiwan and Vietnam.

Remarks : The genus is recorded here for the first time.

Subfamily (viii) HISPINAE

Genus *Estigmena* Hope

1840. *Estigmena* Hope, *Col. Man.*, 3 : 174.
1919. *Estigmena* : Maulik, *Fauna Brit. India, Col. Chry.* (*Hisp. & Cass.*) : 26.

Two species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

58. *Estigmena chinensis* Hope

1840. *Estigmena chinensis* Hope, *Col. Man.*, 3 : 175.
 1919. *Estigmena chinensis* : Maulik, *Fauna Brit. India. Col., Chry. (Hisp. & Cass.)* : 27.

Material examined : N. Tripura : Jaithang vill.; Bagbasa, 25. V. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (N. Tripura), Assam, Andhra Pradesh, Madhya Pradesh, Meghalaya, Tamil Nadu and West Bengal. Elsewhere : Bangladesh, Burma, Cambodia, China, Nepal, Pegu, Sumatra and Thailand.

Remarks : First record from Tripura.

Genus *Dicladispa* Gestro

1875. *Hispa* Chapuis (nec Linnaeus), *Gen. Col.*, 11 : 334.
 1897. *Dicladispa* Gestro, *Ann. Mus. Civ. Stor. Nat. Genova*, 38 : 81.
 1963. *Dicladispa* : Gressitt & Kimoto, *Pac. Ins. Monogr.*, 18 : 935.

So far five species of this genus were recorded from India, of these one species was from Tripura.

59. *Dicladispa armigera* (Olivier)

1808. *Hispa armigera* Olivier, *Ent.*, 6 : 763.
 1852. *Dicladispa armigera* : Uhmann, *Treubia*, 21 : 236.

Material examined : N. Tripura : Khowai, 3. XII. 1991 (1 ex.), K. K. Foy coll., Manu, 22. ii. 1992 (1 ex.), R. S. Barman coll. S. Tripura : Amarapur, 15. V. 1992 (2 exs.), Udaipur, Chanban, 17. v. 1992 (5 exs.), Sonamura, 14. v. 1992 (1 ex.), all B. C. Das coll., Garjee, 1. xii. 1969 (1 ex.). Chailengta, 16. xii. 1969 (1 ex.), all V. C. Agarwal coll.; W. Tripura : Singerbill, 10. v. 1992 (4 exs.), Teliamura, 2. v. 1992 (3 exs.), all B. C. Das coll., Agartala, Subhasnagar, 5. ii. 1983 (1 ex.), A. K. Sanyal coll.

Distribution : India : Tripura (North, South and West Tripura), Assam, Orissa, Tamil Nadu and West Bengal. Elsewhere : Bangladesh, Burma, China, Indo-China, Indonesia, Nepal and Sumatra.

Genus *Dactylispa* Weise

1897. *Dactylispa* Weise, *Dtsch. Ent. Zschr.* : 137.
 1919. *Dactylispa* Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cass.)* : 170.

Forty six species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

60. *Dactylispa daipa* Maulik

1919. *Dactylispa daipa* Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cass.)* : 225.

Diagnostic characters : Red-brown with the tubercles or small flattened spines on the elytra black; prothorax with three illdefined patches and the tips of the spines black; body broad shaped with the sides of elytra slightly expanded; length 5.0 mm.

Material examined : S. Tripura : Shalgara, 13. ix. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (S. Tripura) and Andaman Is.

Remarks : First record from Tripura.

Genus *Rhadinosa* Weise

1905. *Rhadinosa* Weise, *Deut. ent. Z.* : 318.
 1919. *Rhadinosa* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cass.)* : 164.

Three species of this genus were recorded from India of which only one species from Tripura.

61. *Rhadinosa laghua* Maulik

1915. *Rhadinosa laghua* Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cass.)* : 166.
 1981. *Rhadinosa laghua* : Basu, et al, *Rec. Zool. Surv. India*, 78 : 58.

Material examined : N. Tripura : Chailengta, 23. xii. 1969 (3 exs.), Chailengta (Manu), 18. xii. 1972 (1 ex.), all V. C. Agrawal coll., Ambassa, 20. xi. 1974 (1 ex.), M. S. Shishodia coll.; W.

Tripura : Teliamura, 11. xi. 1974 (1 ex.), 14. xi. 1974 (1 ex.), all M. S. Shishodia coll.; Abhoya Barpathari, 4. xii. 1969 (1 ex.), V. C. Agrawal coll.

Distribution : India : Tripura (N. Tripura and W. Tripura), Assam and West Bengal. Elsewhere : Burma and Nepal.

Subfamily (ix) CASSIDINAE

Genus *Lacoptera* Boheman

1855. *Lacoptera* Boheman, *Mon. Cassid.*, 3 : 55.

1919. *Lacoptera* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 346.

This genus was so long unknown from Tripura. In the present study one species is recorded here for the first time.

62. *Lacoptera quadrimaculata* (Thunberg)

1789. *Cassida quadrimaculata* Thunberg, *Nov. Ins. Spec.*, 5 : 86.

1910. *Lacoptera quadrimaculata* var. *bohemani* : Weise, *Verh. Naturf. ver. Brunn*, 48 : 42.

1919. *Lacoptera quadrimaculata* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 347.

Material examined : N. Tripura : Ambassa, Dulubari, 13. v. 1992 (3 exs.), S. K. Chakraborty coll.

Distribution : India : Tripura (N. Tripura), Andaman Is., Assam, Arunachal Pradesh, Bihar, Karnataka, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere : Bhutan, Burma, China, Indo-China, Nepal, Sunda Is. and Taiwan.

Remarks : First record from Tripura.

Genus *Chiridopsis* Spaeth

1837. *Deloyala* Chevrolat, In Dejean, *Cat. Col. ed 3* : 371. 395 (Part).

1896. *Chirida* : Weise, *Deut. Ent. Zeits* : 12 (Part).

1919. *Chirida* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 412.

1924. *Chiridopsis* Spaeth, *Voy. Alluaud et Jeannel Afr. Or.*, 18 : 337.

Thirteen species of this genus were recorded from India but there was no record from Tripura. The present paper includes one species from the area.

63. *Chiridopsis scalaris* (Weber)

1801. *Chirida scalaris* Weber, *Observ. Ent.*, 1 : 51.

1919. *Chirida scalaris* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 417.

1994. *Chiridopsis scalaris* : Basu, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya, Part 5* : (In press).

Material examined : S. Tripura : Belonia, 19. ix. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (S. Tripura), Andaman Is., Assam, Meghalaya and Sikkim. Elsewhere : Burma, Indonesia, Malaya and Sumatra.

Remarks : First record from Tripura.

Genus *Cassida* Linnaeus

1758. *Cassida* Linnaeus, *Syst. Nat. ed. 10*, 1 : 362.

1919. *Cassida* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 361.

Forty eight species of this genus were recorded from India of which two were from Tripura.

64. *Cassida circumdata* Herbst

1799. *Cassida circumdata* Herbst, *Natursyst. Kaf.*, 8 : 268.

1919. *Cassida circumdata* : Maulik, *Fauna Brit. India, Col., Chry. (Hisp. & Cassi.)* : 404.

Material examined : W. Tripura : Abhoya (Barpathari), 4. xii. 1969 (1 ex.), V. C. Agrawal coll.

Distribution : India : Tripura (W. Tripura), Kerala, Orissa, Sikkim, Tamil Nadu and West Bengal. Elsewhere : China, Indo-China, Phillipines, Sri Lanka and Taiwan.

65. *Cassida catenata* Boheman

SUMMARY

1855. *Coptocyclus catenata* Boheman, *Mon. Cassid.*, 3 : 262.

1919. *Cassida catenata* : Maulik, *Fauna Brit. India, Col. Chry. (Hisp. & Cass.)* : 406.

Material examined : S. Tripura : Bagma, 17. vi. 1990 (1 ex.), G. N. Saha coll.; Shalgara, 13. ix. 1992 (1 ex.), B. N. Das coll.

Distribution : India : Tripura (S. Tripura), Arunachal Pradesh, Uttar Pradesh and West Bengal. Elsewhere : Borneo, Burma, Celebes, China, Indonesia and Sri Lanka.

Remarks : First record from Tripura.

Sixty five species belonging to fortythree genera distributed in nine subfamilies are reported in this paper. Twenty seven genera and fortyone species are new records from Tripura State. A district wise distributional chart of all the species have been provided.

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The District-Wise Distribution of the Chrysomelid species known from Tripura.

Name of species	N. Tripura	S. Tripura	W. Tripura	Name of species	N. Tripura	S. Tripura	W. Tripura
Subfamily CRIOCERINAE				27. <i>Hoplasoma nilgiriensis</i> Jacoby	+		+
1. <i>Lema coromandelina</i> (F.)		+	+	28. <i>H. unicolor</i> (Illiger)	+	+	+
2. <i>L. lacertosa</i> Lacordaire	+			29. <i>Aulacophora foveicollis</i> (Lucas)	+	+	+
3. <i>L. occipitalis</i> Jacoby		+	+	30. <i>A. forntalis</i> Baly	+		
4. <i>Lilioceris impressa</i> (F.)		+		31. <i>A. lewisii</i> Baly	+		+
Subfamily CLYTRINAE				32. <i>Haplosomoides rasha</i> Maulik		+	+
5. <i>Aspidolopha melanophthalma</i> Lacord.			+	33. <i>Medythia nigrobilineata</i> (Mots.)		+	
6. <i>Smaragdina divisa</i> (Duv.)			+	34. <i>Monolepta madrasensis</i> Wilcox	+		
Subfamily CRYPTOCEPHALINAE				35. <i>M. signata</i> (Oliv.)	+	+	+
7. <i>Cryptocephalus vittipennis</i> Suffrian	+		+	36. <i>Palpoxena ? malayana</i> Jac.	+		
8. <i>C. senarius</i> Suffrian	+	+		37. <i>Dercetina flavocincta</i> (Hope)	+		
Subfamily Eumolpinae				38. <i>D. histrio</i> (Baly)		+	
9. <i>Chrysolampra flavipes</i> Jacoby	+	+		39. <i>D. orientalis</i> (Jacoby)		+	
10. <i>Pagria knaraensis</i> (Jacoby)	+		+	40. <i>Pseudoides flavovittis</i> (Mots.)	+	+	+
11. <i>Nodina indica</i> Jacoby		+		Subfamily ALTICINAE			
12. <i>Basilepta</i> sp.			+	41. <i>Nonarthra variabilis</i> Baly			+
13. <i>Scelodonta indica</i> Duv.		+	+	42. <i>Hyphasis</i> sp.			+
14. <i>Colasposoma semicostatum</i> Jacoby			+	43. <i>Hemipyxis fulvipennis</i> (Illiger)		+	+
15. <i>C. splendidum</i> (F.)	+			44. <i>H. brevicollis</i> (Jacoby)	+		
16. <i>Pachnephorus lewisii</i> Baly			+	45. <i>Longitarsus belgaumensis</i> Jacoby	+		
17. <i>P. impressus</i> Rosenh		+		46. <i>L. indicus</i> Basu, Bhaumik & Sengupta		+	
18. <i>Tricliona</i> sp.			+	47. <i>Luperomorpha vittata</i> (Fabricius)	+	+	+
19. <i>Platycorynus pyrophorus</i> (Parry)	+			48. <i>Phyllotreta striolata</i> (Fabricius)	+	+	
10. <i>P. peregrinus</i> (Herbst)	+	+	+	49. <i>P. chotanica</i> Duvivier	+		
21. <i>P. asphodelus</i> (Marshall)	+	+	+	50. <i>P. tripuraensis</i> Basu et al	+		
Subfamily CHRYSOMELINAE				51. <i>Chaetocnema</i> (C.) <i>concinipennis</i> Baly	+	+	+
22. <i>Chrysolina aurata aurata</i> (Suffrian)			+	52. <i>C. (C.) cognata</i> Baly	+	+	+
23. <i>Plagioderia refescens</i> (Gyllenhal)		+					
24. <i>Lycaria westermanni</i> Stal	+	+					
Subfamily GALERUCINAE							
25. <i>Galerucella grisescens</i> (Joannis)	+	+	+				
26. <i>Oides maculata</i> (Olivier)	+						

Name of species	N. Tripura	S. Tripura	W. Tripura
53. <i>C. (Tlanoma) basalis</i> (Baly)	+	+	+
54. <i>C. (T.) discreta</i> (Baly)	+		
55. <i>C. (T.) indica</i> Weise	+		
56. <i>Nisotra gemella</i> (Erichson)	+	+	+
57. <i>Altica cyanaea</i> (Weber)	+	+	
Subfamily HISPINAE			
58. <i>Estigmena chinensis</i> (Hope)	+		
59. <i>Dicladispa armigera</i> (Oliv.)	+	+	+

Name of species	N. Tripura	S. Tripura	W. Tripura
60. <i>Dactylispa daipa</i> Maulik		+	
61. <i>Rhadinosa laghua</i> Maulik	+	+	
Subfamily CASSIDINAE			
62. <i>Laccoptera</i> <i>quadrimaculata</i> (Thunb.)	+		
63. <i>Chiridopsis scalaris</i> (Weber)		+	
64. <i>Cassida circumdata</i> Herbst			+
65. <i>C. catenata</i> Boheman		+	

INSECTA : DIPTERA

(12 Families)

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INTRODUCTION

Tripura (virtually the state of Hill Tippera off the British regime), the smallest state in the north-east India, lies approximately between 91°10'E and 92°22'E longitudes, and 22°56'N and 24°32'N latitudes, covering an area of 10,486 sq. km. This north-eastern hilly state is encircled on the north, west, south and south-east by the International boundary of Bangladesh, and has a common boundary with the Aizawl district of Mizoram and the Cachar district of Assam, two other north-eastern states on the east (Map 1). The state consists of 3 districts : West, North and South, of which the North Tripura is much more hilly than the other two that are generally transformed into plains. The principal hill ranges in the state, from the east to the west, are the Jampui (highest altitude being 975 m), Sakhsantlang (highest altitude 786 m), Langtarai (highest altitude 482 m) and Atharamura (highest altitude 457 m). These hills are separated from each other by valleys, and pour down in the north the rivers Khowai, Dalai, Manu, Juri and Langi; in the west the Gumti; and in the south-west the Fenny and Muhari. The hills are clothed with forests of the tropical and sub-tropical regions but the valleys are usually utilized for cultivation. The undulating terrain of the state with luxuriant vegetation under the influence of its characteristic climate assures a variegated fauna of insects, especially dipterans in their ever cherished habitats.

The Diptera fauna in this remote state is practically unknown because of lack of systematic exploration. Indeed, the story of the earliest

collecting and describing species from the soil of the jurisdiction of the modern Tripura is very obscure. It is most likely that the collecting and describing species from the state like others in the north-east India came up much before or just after the turn of the nineteenth century but surprisingly Tripura by name as the locality of collection was never registered anywhere in the age-old literature because the state was often deemed confluent with Assam as well as with the Chittagong Hills of Bengal (now in Bangladesh) by the early days' collectors who must have collected from the state while doing so from the Cachar Hills or the Chittagong Hills (recorded then as areas of collecting and describing species of Diptera), lying within the same physiographical territory. To cite examples beyond any argument, Lt. Col. E. A. W. Hall who made collections of certain Diptera from the "Chittagong Hills" (cited as being in Assam) on "July 14, 1908" or Capt. P. J. Barraud who did have collections of mosquitoes from the "Cachar Hills" (implied as being in Tippera alias Tripura) and "Chittagong" (same as above) during "August, 1922" might be regarded as the first collector in this area. Likewise, the discovery of the new species of Diptera with all likelihood was due to Becker (1922) who, while dealing with the material of the whole area from "Sylhet, Assam (Bengal)" to Chittagong (Bengal)" described at least one of 3 dolichopodid species from the soil of the present Tripura state. Incidentally, the first species (that belongs to the family Asilidae) from the reorganized Tripura state in the post-independent India was described by Joseph and Parui (1987),

based on a single male specimen collected by N. Muraleedharan on September 28, 1977.

However, the National Collection held by the Zoological Survey of India contained virtually no representation of specimens from the state. Only during the last seventies, a few were added to it by the following personalities : V. C. Agarwal (in 1971-1972), M. S. Shishodia (in 1974), N. Muraleedharan (in 1977) and J. K. Jonathan (in 1978), all of this institute.

Recently, several collecting trips were organized by this institute in all 3 districts of Tripura in order to reveal the fauna of the state. Those trips that brought the dipterous material for this study are tabulated below with reference to the Collectors, the time of their visit and the districts from which they made their collections.

B. N. Das	October- November, 1991	West & South
M. Datta	December, 1991- January, 1992	West & South
B. Mitra	May, 1992	West & North
S. K. Chakraborty	May, 1992	West & North

This report incorporates the material belonging to the families : Bibionidae, Stratiomyidae, Tabanidae, Bombyliidae, Pipunculidae, Micropezidae, Tephritidae, Sciomyzidae, Sepsidae, Celyphidae, Calliphoridae and Sarcophagidae. The families, such as, Asilidae, Syrphidae, Muscidae and Tachinidae are, however, dealt with separately.

Indeed, the species with their families excepting the Tabanidae and Sarcophagidae are recorded for the first time from the state.

MATERIALS AND METHODS

The reader is referred to Datta (1998), Datta and Parui (1998), and Datta, Parui and Mukherjee (1997) for the purpose of capturing dipterous specimens (adults) from their habitats and of preserving them perfectly for taxonomic

studies. We, however, feel necessary to add certain specific requirements in case of those fly-groups like Pipunculidae, Micropezidae, Tephritidae and Sciomyzidae not detailed elsewhere before.

In fact, collecting becomes much easier and more ambitious if the collector knows the proper habitat as well as the bionomical aspects of the insect. The pipunculids (big-headed flies) have a remarkable hovering habit, and are usually to be taken on flowers, or by sweeping miscellaneous herbage. By the way, they are found hovering over paddy fields during blossoming. Likewise, the tephritids (fruit flies) frequent vegetation in open fields with crop-plants or ornamental plants or any such flowering greenery as their hosts. Both micropezids (stilt-legged flies) and sciomyzids prefer to live in damp situations, and more particularly, the former insects are often seen in the vicinity of moist decayed woods and marshes, while the latter in paddy fields or herbage of any kind in the neighbourhood of water. Specimens of all these flies are readily collected by an insect-net. Furthermore, fruit flies can be collected with beating bags or by using sex attractants, such as, Methyl eugenol, cue-lure, etc. But the best method of getting both sexes in desirable number is to rear adults from immatures out of the infested plant-parts in glass jars in suitable laboratory conditions. The specimens available by any of these means are kept dry and preserved in the manner prescribed by Datta *et al.* (*op. cit.*).

MORPHOLOGY AND TERMINOLOGY

While dealing with the dipterous fauna in West Bengal, Datta *et al.* (*op. cit.*) presented an account of morphology and terminology of Diptera in general. Thereafter, Datta (*op. cit.*), and Datta and Parui (*op. cit.*) reviewed the morphological features of value with the terminological usage for certain families incorporated in the 'Fauna of Meghalaya'. Therefore, only the significant features used in the description and key to the various taxa of the Pipunculidae, Micropezidae, Tephritidae and

Sciomyzidae (added hereto) will suffice the requirement of the paper.

The Pipunculidae are distinctive in having a very large head formed almost entirely of the eyes, wings with the open cell R_5 longer than the abdomen and tibiae devoid of spurs. The head is usually spherical with the prominent occiput and does not have any ocellar bristles (e.g. Pipunculinae). The most important characters upon which the generic and subgeneric division rests, lie with the antennae, propleura of the thorax, wings, legs and abdomen, especially its genitalia, and everywhere these are structural rather than tinctorial in nature. The antennal segment 3 may be more than twice as long as the segment 2 and is short or long acuminate or rounded apically, occasionally extended to a long bristle. The colouration of the antennal segments may also be accountable. The propleura of the thorax may bear a fan of hairs of high taxonomic value. The mesonotum or any other parts of the thorax partially may be setose and the colouration of these parts may sometimes be diagnostic. The wing may not have an axillary lobe and a normally developed alula. The third section of the costa between the apices of the veins Sc and R_1 may either be shorter or equal or longer than the fourth section of the costa. The stigma as well as a cross-vein in the subcostal cell may be occasionally lacking. The location of the radio-medial cross-vein (r-m) above the discal cell ($1 M_2$) is diagnostic in certain instances. The vein M_{1+2} may either be straight or curved, and may have an appendix beyond the cross-vein m (medial). The legs are sometimes useful in respect of the colouration and presence of distinct bristles, especially on femora and tibiae. Apart from the colouration of the abdominal terga, the relative size of the terga 5, 6 or 7 in females may be valuable in species diagnosis. The ovipositor may be short or long and curved, and may bear a strong tubercle ventrally. The male genitalia may have a membranous area of special mention. The surstylus is broad or slender, and tapered abruptly or gradually to the apex that may be truncate, and may bear small secondary lobes inside or outside, besides being setose partially.

The Micropezidae are readily recognized by the short antennae, each with a subbasal arista, elongate thorax with long and slender wings and stilt-like legs, that re-occur in no other acalyptrate Diptera. The antennal bases may be widely spaced (e.g. Taeniapterinae) or approximate as in other subfamilies. Posterior to antennae, a median sclerite called mesofrons bearing the ocelli, is the largest sclerite extending nearly the entire length of the frons. The dimension of this sclerite is often considered valuable. Besides this sclerite, there are others that may occasionally be characteristic. The mesofrons is bounded antero-laterally by the parafrons. The mesofrons and the parafrons are often separated by narrow sclerites called frontalia bearing the anterior frontal bristles. The part of the head on either side of the mesofrons above the parafrons and the frontalia is called the epicephalon that bears the inner vertical bristles and posterior frontal bristles. The epicephalon on either side is bounded by the paracephalon bordering the posterior orbits and bearing the outer vertical bristles. The entire region of the epicephalon and the paracephalon on either side above the eyes up to the vertex is the occiput that is taxonomically important.

The thorax offers excellent taxonomic characteristics in its wings and legs, apart from colouration and pruinosity of its mesonotum. The veins, especially the subcosta and the first radial branch; the cross-veins, especially the second basal and the cells, especially the costal, anal and posterior, are valuable. The hind tibiae are sometimes accountable. Besides, a sub-conical structure called fulcrum, if any, on the metasternum at the base of the hind coxa or in the vicinity of claspers is useful in species diagnosis.

The micropezid abdomen is long and narrow, and is provided with variously shaped claspers, surstyli and sternite 6 in males, and the large and pendulous ovipositor in females, all of which are extremely characteristic.

The Tephritidae form an easily recognizable family with the ornate body, conspicuously

mottled or banded wings and a horny, flattened ovipositor. The head as a rule has distinct inferior fronto-orbital bristles, and the wings have two breaks at the costa and the subcosta with a sharp bend upward nearly at a right angle before reaching the costa at the distal break.

Indeed, the chaetotaxy plays a major role in the classification, and the cephalic bristles partly contribute to it. The inferior fronto-orbitals, superior fronto-orbitals and ocellars are the most important bristles on the head, and, if present, their number, inclination and strength are accountable. The occiput is occasionally useful for diagnosis. The antenna may be short or long but its segment 2 is provided with a cleft dorsally. The shape and size of the segment 3 may be diagnostic. The antennal arista is valuable in respect of its hairiness in that it may either be bare or pubescent, or pectinate or plumose, if it is considerably pilose.

The thorax carries tremendous importance for the purpose of both supra-specific classification and specific identification. Apart from its colouration, the structure of the scutellum may be useful. It bears certain bristles, of which the dorsocentral, humeral, presutural, prescutellar, scutellar, supra-alar, mesopleural, pteropleural and sternopleural bristles are diagnostic in respect of their presence or absence, and their number and strength may be greatly useful. The wings may be broad or narrow, and exhibit a great array of patterns, usually of specific value. The wing venation and its cells offer excellent characters in classifying the genera. The costa may have a deep cleft and the subcosta at its end a lobe occasionally beset with bristles. The relative size of the costal and subcostal cells is important. Likewise, the dimensions of the medial and the cubital cells carry much importance. The latter may be as long as or longer than the cubito-anal vein ($Cu_1 + 1A$). The veins R_1 and R_{4+5} may be setose or bare and the vein R_{2+3} may have an undulation or a short spur. Sometimes, the veins M_{3+4} and Cu are either bare or setose, at least partially. The veins R_{4+5} and M_{1+2} may show divergent apices. The position of the radio-medial

cross-vein (r-m) above the discal cell ($1M_2$) is diagnostic in certain instances. Besides, the legs are mainly useful in taxonomy in respect of presence or absence of ventral or antero-ventral spines on femora and of apical spurs on tibiae.

Alongside the colouration, the abdomen provides certain valuable characters for the determination of various taxa. The tergum 3 in males is accountable when it bears on either side a row of setae called the pecten. The aedeagus is a tube-like coiled organ that occasionally holds some ductules with the phallosome and a dense patch of setae dorsally before its apex. The structure of the surstyli is equally significant. In females, the relative size of the terga 5 and 6, the structure of the ovipositor, especially its base, and the number of the spermatheca, are highly characteristic.

The Sciomyzidae are flies with bare dichoptic eyes in both sexes but without peristomal bristles or vibrissae and grooves for the reception of antennae. The most important characters by which the family is divided into subfamilies and tribes lie in the thorax. The Sciomyzinae are distinguished from others in having the veins R_{4+5} and M_{1+2} parallel to each other or only slightly converging but no triangular extension at the anal cell (Cu_2) and median setae on mid and hind tibiae. The propleuron in the Sciomyzini is beset with a strong seta above the base of the coxa, whereas it is absent from the Tetanocerini that may have fine hairs in its place. In addition, they have the anal vein (1A) reaching the posterior margin of the wing. The generic as well as the specific classification depends upon the structures from the head to the genitalia of the body apart from their tinctorial characteristics. The vertex of the head may hold 1 or 2 strong upper fronto-orbital setae. The ocellar setae may be absent as in *Sepedon*. The frons is occasionally with a mid-frontal stripe that is useful in respect of its length. The dimensions of the antennal segments 2 and 3, their relative size and pilosity, and the location of the arista with its length or pubescence, if any, are often diagnostic. The mesonotum of the thorax is provided with 1 pair

of prescutellar setae and at most with 2 pairs of dorsocentral setae behind the suture. The scutellum may equally bear some setae of taxonomic significance. The mesopleuron, pteropleuron and sternopleuron also occasionally bear setae and hairs of special mention. The mesonotum may be ornamented with a longitudinal stripe and the mesopleuron with a spot of distinction. Besides, the presence or absence of setae on the subalar ridge below the wing base is an important character. The wings may be variously patterned. The venation is also accountable at times. The legs are more useful in respect of presence or absence of setae or hairs on different parts than their colouration. The abdominal sternum 4 is occasionally modified to give diagnostic value. The structures of the cerci and surstyli in males and of the ovipositor in females offer excellent characters for diagnosis.

LIST OF TAXA

- Family BIBIONIDAE
Subfamily PLECIINAE
- Penthetria japonica* Wiedemann
 - Plecia (Plecia) paradispersa* sp. n.
- Family STRATIOMYIDAE
Subfamily PACHYGASTERINAE
- Ptilocera fastuosa* Gerstaecker
 - P. quadridentata* (Fabricius)
- Family TABANIDAE
Subfamily CHRYSOPSINAE
Tribe CHRYSOPSINI
- Chrysops dispar* (Fabricius)
- Subfamily TABANINAE
Tribe TABANINI
- Tabanus (Tabanus) striatus* Fabricius
 - T. (T.) tripurensis* Datta

- Family BOMBYLIIDAE
Subfamily LOMATIINAE
- Petrorossia ceylonica* (Brunetti)
- Subfamily ANTHRACINAE
Tribe EXOPROSOPINI
- Exoprosopa (Exoprosopa) insulata* (Walker)
- Family PIPUNCULIDAE
Subfamily PIPUNCULINAE
- Pipunculus (Eudorylas) biro* Kertész
- Family MICROPEZIDAE
Subfamily TAENIAPTERINAE
- Mimegralla albimana* (Doleschall)
- Family TEPHRITIDAE
Subfamily DACINAE
- Dacus (Zeugodacus) tau* (Walker)
- Family SCIOMYZIDAE
Subfamily SCIOMYZINAE
Tribe TETANOCERINI
- Sepedon plumbella* Wiedemann
- Family SEPSIDAE
Subfamily SEPSINAE
- Decachaetophora aeneipes* (de Meijere)
 - Dicranosepsis bicolor* (Wiedemann)
 - Sepsis albopunctata* Lamb
 - S. rufa* Macquart
- Family CELYPHIDAE
- Spaniocelyphus cognatus* (Karsch)
- Family CALLIPHORIDAE
Subfamily CHRYSOMYINAE
- Chrysomya megacephala* (Fabricius)
- Subfamily RHINIINAE
- Idiella mandarina* (Wiedemann)
 - Stomorhina discolor* (Fabricius)

- Family SARCOPHAGIDAE
 Subfamily SARCOPHAGINAE
22. *Boettcherisca peregrina* (Robineau-Desvoidy)
 23. *Lioproctia pattoni* (Senior-White)
 24. *Parasarcophaga (Curranella) scopariiformis* Senior-White
 25. *P. (Liosarcophaga) brevicornis* (Ho)
 26. *P. (L.) dux* (Thomson)
 27. *P. (Pandelleisca) bainbriggei* (Senior-White)
 28. *P. (Parasarcophaga) albiceps* (Meigen)
 29. *P. (P.) misera* (Walker)
 30. *P. (P.) sericea* (Walker)
 31. *Sarcophaga mysorensis* Nandi
 32. *Sinonipponia smarti* Nandi
 33. *Thyrsochasma (Pseudothyrsochasma) nicobarensis* Nandi
 34. *Harpagophalla kempfi* (Senior-White)
 35. *Iranihindia futilis* (Senior-White)
 36. *I. martellata* (Senior-White)
 37. *I. martellatoides* (Baranov)
 38. *Seniorwhitea reciproca* (Walker)

Key to the families

1. Adult antennae with more than 5 segments (8-16), closely apposed but never fused into a solid structure BIBIONIDAE
- 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 arista 2
2. Adult head without a frontal lunule or a ptilinum 3
- Adult head with a distinct frontal lunule and ptilinum 6
3. Eyes normal in size; antennal arista, if present, invariably terminal 4

- Eyes exceedingly large, occupying almost entire head; antennae with a usually long dorsal arista PIPUNCULIDAE
4. Flies devoid of bristles; antennal segment 3 with annulations; legs with pad-like arolium and pulvilli 5
- Flies with dense bristles; antennal segment 3 simple; legs with or without normal pulvilli but arolium always replaced by a rudimentary empodium BOMBYLIIDAE
5. 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
6. Antennal segment 2 above without a distinct external groove; theca not developed at the base of proboscis; squamae small or vestigial 7
- Antennal segment 2 above with a distinct external groove; theca developed at the base of proboscis; squamae well-developed 12
7. Wings with complete costal vein 8
- Wings with costal vein interrupted after humeral cross-vein as well as at subcostal end TEPHRITIDAE
8. Vibrissae present SEPSIDAE (part)
- Vibrissae absent 9
9. Tibiae with pre-apical bristles 10
- Tibiae without pre-apical bristles 11
10. Antennal socket present; scutellum enlarged, covering abdomen CELYPHIDAE
- Antennal socket absent; scutellum normal .. SCIOMYZIDAE
11. Maxillary palpi short or long; wings with veins R_{4+5} and M_{1+2} nearly closed at margin; legs long and stilt-like MICROPEZIDAE
- Maxillary palpi rudimentary; wings with veins R_{4+5} and M_{1+2} nearly parallel and wide open at margin; legs not specially long SEPSIDAE (part)

12. Body metallic blue or green; antennal arista usually feathered to tip; thorax nearly always with 2 notopleural bristles
CALLIPHORIDAE
- Body dull black or striped grey and black; antennal arista pubescent or feathered usually not much beyond middle; thorax almost invariably with 3 or 4 notopleural bristles..
SARCOPHAGIDAE

SYSTEMATIC ACCOUNT

Family BIBIONIDAE

Subfamily PLECIINAE

Diagnosis : Male eyes contiguous frontally; antenna robust, segment 3 short and never elongated; wing with vein R_{2+3} ; fore tibia without spurs or spines.

Key to the genera

1. Wing with vein R_{2+3} elongate, almost horizontal in position; clasper of male genitalia large and lateral in position
*Penthetria* Meigen (1 species only)
- Wing with vein R_{2+3} short, almost vertical in position; clasper of male genitalia small and vertical in position
*Plecia* Wiedemann (1 species only)

Genus *Penthetria* Meigen

Penthetria Meigen, 1803, *Magazin Insektdkde*, 2 : 264.

Type-species : *Penthetria holosericea* Meigen.

1. *Penthetria japonica* Wiedemann

1830. *Penthetria japonica* Wiedemann, *Aussereurop. zweifl. Insekt.*, 2 : 618.

1912. *Pleciomyia melanaspis* Wiedemann : Brunetti, *Fauna Br. India, Dipt. Nematocera* : 161.

Material examined : 1 M, 1 F, West Tripura, Sonamura, 6.xi.1991, Coll. B. N. Das.

Diagnosis : Antenna 12-segmented, last segment (probably made up of 2 segments fused) nearly twice as long as wide; face below antennae

with a distinct pit in middle; mesonotum velvety black anteriorly and rufous posteriorly; wing with broadly sessile cell M_1 and vein R_{2+3} originating just beyond r-m cross-vein; hind tibia moderately swollen apically, slightly larger than femur; male abdominal sternite 9 with a deep U-shaped cleft posteriorly; claspers short and broad, twice as long as wide, curved inward and ending in a short point.

Distribution : Tripura (West), and Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and West Bengal; China, Myanmar, Nepal and Taiwan; Japan and Siberia (Diags. 1, 2 & 5).

Genus *Plecia* Wiedemann

Plecia Wiedemann, 1828, *Aussereurop. zweifl. Insekt.*, 1 : 72.

Type-species : *Hirtea fulvicollis* Fabricius.

Subgenus *Plecia* Wiedemann

Diagnosis : Head with distinct ocelli, situated on a raised triangle.

2. *Plecia (Plecia) paradispersa* sp. n.

(Figs. 1-3)

A rather small predominantly dark-bodied species with distinct ocellar tubercle, 9-segmented antennae in males, long and slender palpi, and sternum 9 with long postero-lateral ploughshare-shaped lobes and with a small ventral lobe on inner margin of claspers in males.

Male : Body-length 6.0 mm. Wing-length 5.0 mm.

Head about $1.5 \times$ wider than long; ocellar tubercle large and conspicuous; antenna 9-segmented in males, flagellomere 1 twice as long as wide and nearly equal in length to next 2 flagellomeres, apical flagellomere quite small, much smaller than penultimate flagellomere, entirely brown to black but slightly pale at base of flagellomere 1; palpus long and slender, about equal in length to antenna, black.

Thorax with rufous mesonotum, laterally brown to black, extended to pleura, varying a little in colouration, mesonotum with a brown to black spot on front margin and occasionally with 3 indistinct brownish stripes anteriorly; *wing* light brown, stigma darkened; origin of vein R_{2+3} slightly after middle of distance from cross-vein r-m to wing margin, R_{2+3} nearly vertical in position and equal in length to cross-vein r-m; *halteres* black; *leg* dark brown, hind femur clavate, thicker than tibia.

Abdomen dark brown to black, with sparse concolourous pilosity, as wide as thorax and longer than head and thorax together; tergum 9 in males (Fig. 1) nearly twice as wide as long and deeply cleft nearly to base of tergum, nearly with straight margin, neither noticeably produced apically nor laterally, not extending beyond sternum 9 or tips of claspers, apical lobes heavily sclerotized and densely haired, especially on inner margin; sternum 9 (Fig. 2) very broad and somewhat narrowed medially, more than twice broader than long, lateral lobes on posterior margin very large and gradually narrowed to tips, ploughshare-shaped as seen laterally (Fig. 3), more than twice as long as claspers; claspers and other structures exposed; claspers joined at base, longer than sternum 9, blunt and broadly rounded at apices, with a small ventral lobe on inner margin; aedeagus with a pair of slender, rod-like accessory structures.

Female : Unknown.

Material examined : Holotype M, West Tripura, Sonamura, 6. xi. 1991, Coll. B. N. Das; Paratypes 3 M, same data as holotype (deposited in ZSI, Calcutta).

Remarks : The species runs to *Plecia dispersa* Hardy, 1958, but can be readily differentiated by its 9-segmented antennae and characteristic sternum 9 and claspers in males.

Family STRATIOMYIDAE

Subfamily PACHYGASTERINAE

Diagnosis : Small dark soldier flies with spherical or transversely broadened head; eye

bare; antenna branched (in *Ptilocera*), elongate, filiform, globular or of irregular shape, often with very slender arista; wing without vein M_3 ; abdomen with 5 or 6 segments; aedeagal complex long and slender; female cerci always 1-segmented; genital furca comprising a narrow frame and a long, rod-like proximal process.

Genus *Ptilocera* Wiedemann

Ptilocera Wiedemann, 1820, *Nova Dipt. Gen.* : 7.

Type-species : *Stratiomys quadridentata* F.

Diagnosis : Antennal flagellum with 7 annulations, terminated by a style nearly half as long as antenna; in males, annulations 3, 4 and 5 each shaped like a two-pronged fork; in females, annulations 2, 3, 4 and 5 each with a double row of plumes like a feather; scutellum with 4 distinct sub-equal spines; wing with veins M_1 , M_2 and Cu_1 equidistant from discal cell posteriorly; anal cell closed at certain distance from margin; abdomen with 5 segments.

Key to the species

1. Mesonotum with a large golden-haired spot with angular inner corner on each side anteriorly extending to humerus
.....*quadridentata* (F.)
- Mesonotum without such spots, but with 4 distinct equidistant longitudinal stripes from anterior to posterior margins
.....*fastuosa* Gerst.

3. *Ptilocera fastuosa* Gerstaecker

1857. *Ptilocera fastuosa* Gerstaecker, *Linnaea ent.*, 11 : 332.

Material examined : 1 F, North Tripura, Ambasa, Kulai, 15.v.1992, Coll. B. Mitra.

Distribution : Tripura (North), and Arunachal Pradesh, Karnataka, Kerala, Meghalaya and West Bengal; Java, Malaya, Myanmar, Philippines, Sri Lanka, Sulawesi and Thailand (Diags. 1, 2 & 5).

4. *Ptilocera quadridentata* (F.)

1805. *Stratiomys quadridentata* Fabricius, *Syst. Antliat.* : 86.

Material examined : 2 F, North Tripura, Ambasa, Kulai, 15. v. 1992, Coll. B. Mitra.

Distribution : Tripura (North), and Andaman Islands; Andalus, Java, Kalimantan, Malaya, Philippines, Sulawesi and Thailand; Moluccas (Diags. 1, 2 & 5).

Remarks : The species is recorded for the first time from the peninsular India.

Family TABANIDAE

Contribution on the fauna of Tripura : Datta, 1986.

A total of 3 species under 2 genera of 2 subfamilies are hitherto known in Tripura *vis-à-vis* 197 species and 4 subspecies under 12 genera belonging to 3 subfamilies in India (till 1992).

Key to the subfamilies

1. Vertex with well-developed ocelli; hind tibia with 2 apical spurs
.....CHRYSOPSINAE (1 species only)
- Vertex with rudimentary or no ocelli; hind tibia without apical spurs
.....TABANINAE (2 species only)

Subfamily CHRYSOPSINAE

Tribe CHRYSOPSINI

Diagnosis : Slender flies with complex pattern of spots or irregular speckles on eyes; antennae much longer than antero-posterior thickness of head, scape more than twice as long as wide; wings with colour bands.

Genus *Chrysops* Meigen

Chrysops Meigen, 1803, *Magazin Insektdkde*, 2 : 267.

Type-species : *Tabanus caecutiens* Linnaeus.

Diagnosis : Small, slender and greatly patterned flies with colourfully maculate eyes in

life; slender antenna much longer than width of head; face highly developed; wing with cross-bands.

5. *Chrysops dispar* (Fabricius)

1798. *Tabanus dispar* Fabricius, *Ent. Syst. Suppl.* : 567.

Material examined : 1 M, 2 F, South Tripura, Sonaichhari, 4. ix. 1977, Coll. N. Muraleedharan; 2 F, North Tripura, Bagbasa, 2. v. 1978, Coll. J. K. Jonathan; 3 F, South Tripura, Garjee, 13. v. 1978, Coll. J. K. Jonathan; 1 M, 1 F, South Tripura, Belonia, 16-17. v. 1978, Coll. J. K. Jonathan; 1 F, North Tripura, Kumarghat, 19. v. 1992, Coll. B. Mitra.

Diagnosis : Wing with posterior cell 5 having a large hyaline area up to hind margin; tibia never swollen; abdomen extensively yellowish, with a distinct inverted black V-marking on tergum 2 or often extending to 3 or even to 4.

Distribution : Tripura (North and South), and Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Meghalaya, Orissa, Sikkim and West Bengal; Andalus, Bangladesh, China, Java, Kalimantan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam (Diags. 1, 2 & 5).

Subfamily TABANINAE

Tribe TABANINI

Diagnosis : Frons in females much longer than broad, frontal callus usually longitudinal, when present; antenna short, flagellum with broad basal plate and 4 annuli; wing hyaline or smoky; basicosta with strong setae.

Genus *Tabanus* Linnaeus

Tabanus Linnaeus, 1758, *Syst. Nat. Ed.*, 10 : 601.

Type-species : *Tabanus bovinus* Linnaeus.

Diagnosis : Generally robust flies with colourful eyes in life; vertex without a distinct ocellar tubercle; in males, if present, entirely pollinose; eye bare.

Subgenus *Tabanus* Linnaeus

Diagnosis : Head hemispherical, vertex smoothly flat or slightly concave; postocular rim present; banding on eyes often present; frons usually much narrower; antennal scape nearly as long as wide, hairy.

Key to the species

1. Antenna with rather short and broad, orange flagellar plate, dorsal tooth obtuse, annuli orange to blackened; abdomen generally black, with a strong median stripe on terga 3-6 and 2 sublateral stripes on terga 1-4, both of whitish tomentum and hairs *striatus* Fabricius
- Antenna much more than twice as long as wide, reddish brown gradually darkening from distal half of flagellar plate to black annuli, dorsal tooth right angular; abdomen brownish on terga 2-4 and black on terga 5-7, with a broad median stripe of whitish tomentum on terga 1-6 *tripurensis* Datta

6. *Tabanus (Tabanus) striatus* Fabricius

1787. *Tabanus striatus* Fabricius, *Mantissa Insect.*, 2 : 356.

1981. *Tabanus striatus* Fabricius : Burger and Thompson, *Proc. ent. Soc. Wash.*, 83 : 340.

Material examined : 1 M, South Tripura, Peratia, 8. ix. 1977, Coll. N. Muraleedharan.

Distribution : Tripura (South), and Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Bangladesh, Bhutan, Cambodia, China, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam (Diags. 1, 2 & 5).

7. *Tabanus (Tabanus) tripurensis* Datta

1986. *Tabanus (Tabanus) tripurensis* Datta, *Opusc. zool. flumin.*, 7 : 2.

Material examined : 1 F, South Tripura, Garjee, 17. v. 1978, Coll. J. K. Jonathan.

Distribution : Tripura (South) (Diag. 1).

Family BOMBYLIIDAE

Key to the subfamilies

1. Wing with vein R_{2+3} arising before cross-vein r-m, at an acute angle LOMATIINAE (1 species only)
- Wing with vein R_{2+3} arising opposite to cross-vein r-m or nearly so, and always at a right angle ANTHRACINAE (1 species only)

Subfamily LOMATIINAE

Genus *Petrorossia* Bezzi

Petrorossia Bezzi, 1909, *Z. syst. Hymenopt. Dipterol.*, 8 : 32.

Type-species : *Bibio hesperus* Rossi.

Diagnosis : Face rounded, not prominent; antennal segment 3 broad at base, gradually styliform onwards and usually hairy at end; males holoptic; metapleuron bare; wing membrane wrinkled; origin of vein R_{2+3} distant from middle cross-vein, about halfway between it and base of prefurca; discal cell long; ambient vein complete; pulvilli developed.

8. *Petrorossia ceylonica* (Brunetti)

1909. *Argyramoeba ceylonica* Brunetti, *Rec. Indian Mus.*, 2 : 471.

1920. *Aphobantus ceylonicus* Brunetti : Brunetti, *Fauna Br. India, Dipt.*, 1 : 257.

Material examined : 1 F, West Tripura, Jampujhola, 7. xi. 1991, Coll. B. N. Das.

Diagnosis : Antennal segment 3 onion-shaped, with a moderately long style; wing with vein R_{2+3} deeply looped towards tip; hind femur yellow, with a number of black bristles on upper side apically and a row of black bristles behind.

Distribution : Tripura (West), and Assam, Bihar, Uttar Pradesh and West Bengal; Sri Lanka (Diags. 1, 2 & 5).

Subfamily ANTHRACINAE

Tribe EXOPROSOPINI.

Diagnosis : Antennal style devoid of hairs apically; metapleuron hairy; squama with a scaly fringe.

Genus *Exoprosopa* Macquart

Exoprosopa Macquart, 1840, *Dipt. exot.*, 2(1) : 35.

Type-species : *Anthrax pandora* F.

Diagnosis : Ocellar tubercle a long way from vertex; antennal segment 3 like an elongated cone, usually with style divided from it by a distinct suture; wing with 3 submarginal cells; claw with a long and sharp basal tooth.

Subgenus *Exoprosopa* Macquart

Diagnosis : Wing with discal cell typically short and obtuse or even truncate at end; upper branch of cubital fork widely divergent; hind leg never feathered.

9. *Exoprosopa (Exoprosopa) insulata* (Walker)

1852. *Anthrax insulata* Walker, *Insecta Saundersiana*, 1 : 172.

Material examined : 1 M, South Tripura, Sabrum, Kanthalchhari, 6.i.1992, Coll. B. Mitra.

Diagnosis : Pleuron with dense black bristles confined either to lower edge or all over except upper edge; wing mostly clear but spotted, and with a broad oblique dark brown band extending from costa to tip of vein R_1 , distinctly beyond bifurcation of veins R_{2+3} and R_{4+5} , and cross-vein r-m, embracing basal third of discal cell and crossing anal and axillary cells about their middle; hind femur and tibia with dense black bristles.

Distribution : Tripura (South), and Bihar, Himachal Pradesh, Karnataka, Madhya Pradesh, Meghalaya, Tamil Nadu, Uttar Pradesh and West Bengal; ? Myanmar, Nepal and Sri Lanka (Diags. 1, 2 & 5).

Family PIPUNCULIDAE

Subfamily PIPUNCULINAE

Diagnosis : Body usually with sparse hairs; head nearly spherical, with prominent occiput but without ocellar bristles.

Genus *Pipunculus* Latreille

Pipunculus Latreille, 1802, *Hist. Nat. Crust. Ins.*, 3 : 463.

Type-species : *Pipunculus campestris* Latreille.

Diagnosis : Wing with costal third section, between apices of veins Sc and R_1 (stigma) brown-coloured and usually equal or longer than fourth section; leg all yellow or slightly brownish before apices of mid and hind femora only.

Subgenus *Eudorylas* Aczél

Eudorylas Aczél, 1940, *Zool. Anz.*, 132 : 151.

Type-species : *Pipunculus opacus* Fallén.

Diagnosis : Antennal segment 3 acute to acuminate, with or without a long bristle-like apex; propleuron without a fan of hairs; wing with vein M_{1+2} lacking an appendix.

10. *Pipunculus (Eudorylas) biroi* Kertész

1903. *Pipunculus biroi* Kertész, *Annl. hist.-nat. Mus. hung.*, 1 : 466.

Material examined : 1 M, South Tripura, Sabrum, Manughat, 5. i. 1992, Coll. M. Datta.

Diagnosis : Frons in males brownish, with an elongate black streak just below middle; face brilliantly shining white; antennal arista black; wing with cross-vein r-m barely before middle of discal cell; tibia entirely yellow; abdomen dark ash-grey with a dark olive-brown basal band.

Distribution : Tripura (South), and Arunachal Pradesh, Assam, Bihar, Orissa, Uttar Pradesh and West Bengal; Malaya, Myanmar and Sri Lanka (Diags. 1, 2 & 5).

Family MICROPEZIDAE

Subfamily TAENIAPTERINAE

Diagnosis : Frons well-marked, parafrons well-defined anteriorly and well-differentiated from mesofrons; ocelli situated anteriorly near middle of mesofrons; antennae widely spaced; katepisternum with dense vertical fan of many long and fine bristles; epandrium distinctly compressed, U-shaped in cross section; no surstyli.

Genus *Mimegralla* Rondani

Mimegralla Rondani, 1850, *Nuovi Annali Sci. nat. Ist Bologna*, (3) 2 : 180.

Type-species : *Calobata coeruleifrons* Macquart.

Diagnosis : Mesofrons more than one-half as wide as total frons; posterior ocelli posterior to posterior parafrontal bristles; frontal bristles just at border of tomentum or surrounded by it; wing with posterior cell sometimes closed.

11. *Mimegralla albimana* (Doleschall)

1856. *Taenioptera albimana* Doleschall, *Natuurk. Tijdschr. Ned.-Indië*, 10 (n. s. 7) : 413.

Material examined : 1 M, West Tripura, Agartala, Badarghat Agricultural Farm, 24. xii. 1991, Coll. M. Datta.

Diagnosis : Antenna bright reddish yellow; maxillary palpus entirely yellow; anepisternum (mesopleuron) posteriorly sericeous with silvery to pale, brass-yellow shine.

Distribution : Tripura (West), and Assam and West Bengal; Bangladesh, Myanmar and other parts of the Oriental region; Australian region and Japan (Diags. 1, 2 & 5).

Family TEPHRITIDAE

Subfamily DACINAE

Diagnosis : Head and thoracic chaetotaxy greatly reduced, lacking ocellars, postocellars, dorsocentrals, presuturals, sternopleurals and usually humerals; antennal segment 3 thrice or

more as long as wide; wing hyaline except for a brown band along costal margin and a brown streak through cubital area; wing with broad cell M, twice broader than cell Cu and usually about twice longer than wide; cell Cu with an elongate apical lobe, equal or longer than vein $Cu_1 + 1A$ and with an area of dense microtrichia on it and lower margin of cell M_4 ; abdomen short and broad, with well-developed stridulatory apparatus and lateral tergal glands on tergum 5 in males, and with 2 spermathecae comprising tight set coils in females.

Genus *Dacus* Fabricius

Dacus Fabricius, 1805, *Syst. Antliat.* : 272.

Type-species : *Dacus armatus* Fabricius.

Diagnosis : Antenna short, nearly equal or less than front; segment 1 about half as long as 2 and less than half as long as face; abdomen not strongly petiolate or arched and without well-developed tubercles on tergum 1 laterally; suture between terga 3 and 4 straight or so; ovipositor usually flattened dorso-ventrally.

Subgenus *Zeugodacus* Hendel

Zeugodacus Hendel, 1927, *In Lindner, Fliegen palaeärkt. Reg.*, 49 : 26.

Type-species : *Dacus caudatus* Fabricius.

Diagnosis : Male scutellum with 2 pairs of strong bristles; wing with an indentation marginally at apex of vein $Cu_1 + 1A$; abdominal tergum 3 with a pecten on each side; tergum 5 with a slight concavity posteriorly; genitalial surstylus with elongate posterior lobe, about 6 times longer than anterior lobe.

12. *Dacus (Zeugodacus) tau* (Walker)

1849. *Dasyneura tau* Walker, *List Dipt. Colln Br. Mus.*, 4 : 1074.

Material examined : 1 M, 1 F, South Tripura, Sabrum, Dolbari, 3. i. 1992, Coll. B. Mitra.

Diagnosis : Face with 2 round spots; mesonotum with 3 postsutural yellow vittae;

scutellum yellow except for a narrow black band basally; wing with costal band expanded distally forming a large brown spot broadly occupying upper apical portion of cell R_5 ; piercer in female genitalia pointed apically.

Distribution : Tripura (South), and Arunachal Pradesh, Bihar, Karnataka, Maharashtra, Meghalaya, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; China, Java, Kalimantan, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Sulawesi, Taiwan and other parts of the Oriental region (Diags. 1, 2 & 5).

Family SCIOMYZIDAE

Subfamily SCIOMYZINAE

Diagnosis : Wing with bare vein R_1 ; veins R_{4+5} and M_{1+2} parallel or only slightly converging apically; anal cell without triangular extension ventro-apically; mid and hind tibiae without median setae.

Tribe TETANOCERINI

Diagnosis : Propleuron without strong seta above base of coxa but often with fine hairs.

Genus *Sepedon* Latreille

Sepedon Latreille, 1804, *Nouv. Dict. Hist. nat.*, 24 : 196.

Type-species : *Syrphus sphegeus* Fabricius.

Diagnosis : Slender flies with a median longitudinal depression in lieu of mid-frontal stripe; anterior orbital and ocellar setae absent; antennal segment 2 nearly rod-shaped; thorax without humeral, presutural, 1 postalar, 1 or both dorsocentrals, prescutellar acrostichal and 1 pair of scutellar setae; prosternum haired and all parts of pleura with short hairs; subalar setae absent; hind coxa short-haired at inner posterior margin; cerci in male genitalia usually long and exposed.

13. *Sepedon plumbella* Wiedemann

1830. *Sepedon plumbellus* Wiedemann, *Aussereurop. zweifl. Insekt.*, 2 : 577.

Material examined : 1 M, South Tripura, Jalefa, 1.i.1992, Coll. M. Datta.

Diagnosis : Antennal scape reddish yellow, remainder nearly or quite black; wing with clear basal half and dark apical half or so; hind femur usually reddish on apical half.

Distribution : Tripura (South), and Bihar, Himachal Pradesh and West Bengal; China, Java and other parts of the Oriental region; Australia, New Caledonia, New Guinea and Solomon Islands (Diags. 1, 3 & 5).

Family SEPSIDAE

Subfamily SEPSINAE

Diagnosis : Medium or small in size, with reddish to black body and at least mesopleuron glossy; inner vertical bristles present; mid-femur normal and not bent at middle.

Key to the genera

1. Humeral bristles absent*Decachaetophora*
.....Duda (1 species only)
- Humeral bristles present 2
2. Abdomen of both sexes without distinct macrochaetae; wing without a dark spot on vein R_{2+3} apically; hypopygial process bifurcate apically
.....*Dicranosepsis* Duda (1 species only)
- Abdomen in males and often in females also, with distinct macrochaetae; wing with or without a dark spot on vein R_{2+3} apically; hypopygeal process never bifurcate apically ...
.....*Sepsis* Fallén (2 species only)

Genus *Decachaetophora* Duda

Decachaetophora Duda, 1926, *Annln naturh. Mus. Wien*, 39 (1925) : 27.

Type-species : *Sepsis aeneipes* de Meijere.

14. *Decachaetophora aeneipes* (de Meijere)

1913. *Sepsis aeneipes* de Meijere, *Annls hist.-nat. Mus. natn. hung.*, 11 : 119.

Material examined : 3 M, 14 F, South Tripura, Udaipur, 12. xi. 1991, Coll. B. N. Das.

Diagnosis : Blackish fly with duplicate vibrissae; supra-alar and outer vertical bristles present; fore femur in males with complicated setae and fore tibia with ventral emargination beset with a scraper-like tooth in mid-line; abdomen normal and not constricted between segments 2 and 3.

Distribution : Tripura (South), and Assam, Himachal Pradesh, Meghalaya, Punjab, Sikkim, Uttar Pradesh and West Bengal; China (Kansu, Szechuen), Nepal, Pakistan, Sri Lanka and Taiwan; Japan and Nearctic region (Diags. 1, 3 & 6).

Genus *Dicranosepsis* Duda

Dicranosepsis Duda, 1926, *Annln naturh. Mus. Wien*, 39 : 43 (As subgenus of *Sepsis* Fallén).

Type-species : *Sepsis bicolor* Wied.

15. *Dicranosepsis bicolor* (Wiedemann)

1830. *Sepsis bicolor* Wiedemann, *Aussereurop. zweifl. Insekt.*, 2 : 468.

Material examined : 4 M, 1 F, South Tripura, Udaipur, 11. xi. 1991, Coll. B. N. Das.

Diagnosis : Sternopleuron shining antero-ventrally; fore femur without a postero-ventral seta sub-basally, hind tibia without a distinct osmeterium and metatarsus without antero-ventral setae in males.

Distribution : Tripura (South), and Andhra Pradesh, Arunachal Pradesh, Assam, Maharashtra, Meghalaya, Punjab, Sikkim, Uttar Pradesh and West Bengal; other parts of the Oriental region; Japan and Australian region (Diags. 1, 3 & 6).

Genus *Sepsis* Fallén

Sepsis Fallén, 1810, *Sp. Ent. nov. Dipt.* : 17.

Type-species : *Musca cynipsea* L.

Key to the species

1. Wing with a dark spot on vein R_{2+3} apically; male fore femur with 2 emarginations, one with 3 spines and other with 2 spines
.....*albopunctata* Lamb
- Wing entirely clear; male fore femur with a single emargination beset with 3 spines
.....*rufa* Macquart

16. *Sepsis albopunctata* Lamb

1914. *Sepsis albopunctata* Lamb, *Trans. Linn. Soc. Lond.* (2), Zool., 16 : 323.

Material examined : 2 M, South Tripura, Udaipur, 11. xi. 1991, Coll. B. N. Das.

Distribution : Tripura (South), and Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Kerala, Meghalaya, Uttar Pradesh and West Bengal; Bangladesh, East Malaysia, Java, Kalimantan, Lesser Sunda Island, Nepal, Pakistan, Philippines and Taiwan; Australian and Ethiopian regions; Japan (Diags. 1, 3 & 6).

17. *Sepsis rufa* Macquart

1850. *Sepsis rufa* Macquart, *Dipt. exot. Suppl.*, 4 : 269.

1909. *Sepsis rufa* Macquart : Brunetti, *Rec. Indian Mus.*, 3 : 359.

Material examined : 2 M, 5 F, West Tripura, Sonamura, 6. xi. 1991, Coll. B. N. Das.

Distribution : Tripura (West), and Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Meghalaya, Orissa, Sikkim, Uttar Pradesh and West Bengal; Myanmar and Nepal (Diags. 1, 3 & 6).

Remarks : Neither Zuska (1977) nor Iwasa (1982; 1984) mentioned this species as valid.

Family CELYPHIDAE

Genus *Spaniocelyphus* Hendel

Spaniocelyphus Hendel, 1914, *Supplta. ent.*, 1 : 92.

Type-species : *Celyphus scutatus* Wiedemann.

Diagnosis : Head with carinate vertex margin; postvertical bristles minute or absent; palpus slender and slightly expanded apically; antennal arista flattened and widened at least on basal half; scutellum longer than broad; wing with discal and basal cells separated by a cross-vein that may be incomplete or very faint; abdomen with segments 1-6 with terga divided into 3 parts, a dorsal plate and 2 very large lateral plates; terga 1-2 dorsally fused but separated laterally.

18. *Spaniocelyphus cognatus* (Karsch)

1884. *Celyphus cognatus* Karsch, *Berl. ent. Z.*, 28 : 173.

Material examined : 1 F, South Tripura, Kanthalchhari, 1. i. 1992, Coll. M. Datta.

Diagnosis : Mesonotum rugose at least medio-apically; scutellum entirely rugose; mesonotum or scutellum without pilosity; genital sternite in females V-shaped, depressed laterally at base and deep concavity at apex.

Distribution : Tripura (South), and Kerala and Tamil Nadu; Sri Lanka (Diags. 1, 3 & 6).

Family CALLIPHORIDAE

Key to the subfamilies

1. Thoracic squama haired dorsally; subcostal sclerite setulose
.....CHRY SOMYINAE (1 species only)
- Thoracic squama bare dorsally; subcostal sclerite with fine pubescence
.....RHINIINAE (2 species only)

Subfamily CHRY SOMYINAE

Genus *Chrysomya* Rob.-Desv.

Chrysomya Robineau-Desvoidy, 1830, *Mém. prés. div. Sav. Acad. Sci. Inst. Fr.* : 444.

Type-species : *Chrysomya regalis* Rob.-Desv.

Diagnosis : Generally medium-sized flies of metallic green, blue or purple colour; eyes large and bare, usually holoptic and upper facets enlarged in males but dichoptic and with small

uniform facets in females; presutural acrostichal bristle absent; propleuron and prosternum hairy; supra-squamosal ridge usually with anterior parasquamosal tuft; subcostal sclerite hairy; tergum 5 with fine erect bristles on disc.

19. *Chrysomya megacephala* (Fabricius)

1794. *Musca megacephala* Fabricius, *Syst. Ent.*, 4 : 317.

Material examined : 5 M, 10 F, West Tripura, Sonamura, 6. xi. 1991, Coll. B. N. Das; 2 M, South Tripura, Birchandra Nagar, 30. xii. 1991, Coll. B. Mitra; 1 F, South Tripura, Kanthalchhari, 1. i. 1992, Coll. M. Datta; 2 M, South Tripura, Sabrum, Jalefa, 4. i. 1992, Coll. B. Mitra.

Diagnosis : Eyes in males with markedly enlarged facets on upper 2/3, lower 1/3 with small facets; parafacialia and genae yellowish orange, both covered with yellowish-white hairs; antennal segment 3 entirely orange; mesonotum with 2 short, narrow longitudinal black stripes anteriorly and a small black triangle on humeral callus; abdomen greenish-blue with purple reflection; male hypopygium slightly projecting; superior clasper much reduced and lightly chitinized.

Distribution : Tripura (West and South), and also in other states in India and other parts of the Oriental region; North China and Japan of the Palaearctic region; Australasian region; Malagasy sub-region of the Ethiopian region (Diags. 1, 3 & 6).

Subfamily RHINIINAE

Key to the genera

1. Body slender and equilateral; hind tibia without a conspicuous row of antero-dorsal setae but with 2-3 setae as long as or longer than tibial diameter; abdomen mostly testaceous
.....*Idiella* Brauer & Bergenstamm (1 species only)
- Body rather stout, with ovate abdomen; hind tibia with a conspicuous row of subequal antero-dorsal setae longer than normal hairs, sometimes 2-3 rather strong antero-dorsal setae

developed among them; abdomen usually of dark colour*Stomorphina* Rondani
(1 species only)

Genus *Idiella* Brauer and Bergenstamm

Idiella Brauer and Bergenstamm, 1889, *Denkschr. Akad. Wiss., Wien*, 56 : 154.

Type-species : *Idia mandarina* Wiedemann.

20. *Idiella mandarina* (Wiedemann)

1830. *Idia mandarina* Wiedemann, *Aussereurop. zweifl. Insekt.*, 2 : 350.

Material examined : 1 M, 1 F, South Tripura, Sabrum, Jalefa, 4. i. 1992, Coll. B. Mitra.

Diagnosis : Male frons usually broader than width of ocellar triangle; female frons one-fifth of head-width; antennal segment 2 at least reddish; occipital dilatation, mesopleura and sternopleura without distinct piliferous spots; pleura with golden hairs; mid-tibia in males with 2 posterior setae and a tuft of hairs distally; wing with basicosta brown.

Distribution : Tripura (South), and Assam, Bihar, Gujarat, Haryana, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Uttar Pradesh and West Bengal; Bangladesh, China, Indonesia (Andalas, Kalimantan, Timor), Malaysia, Myanmar, Sri Lanka, Taiwan and Thailand; Key Island (Diags. 1, 3 & 6).

Genus *Stomorphina* Rondani

Stomorphina Rondani, 1861, *Dipt. Ital. Prodr.*, 4 : 9.

Type-species : *Musca lunata* F.

21. *Stomorphina discolor* (Fabricius)

1794. *Musca discolor* Fabricius, *Ent. Syst.*, 4 : 320.

Material examined : 3 F, South Tripura, Birchandra Nagar, 30. xii.1991, Coll. M. Datta; 11 M, South Tripura, Sabrum, Dolbari, 1. i. 1992, Coll. M. Datta; 1 M, South Tripura, Kanthalchhari, 2. i. 1992, Coll. M. Datta; 2 M,

South Tripura, Sabrum, Manughat, 5. i. 1992, Coll. B. Mitra.

Diagnosis : Antenna and palpus brown; wing with cell R_5 narrowly open; abdomen yellowish, with black bands posteriorly on terga 1 and 2 and with a median longitudinal black stripe.

Distribution : Tripura (South), and Arunachal Pradesh, Assam, Bihar, Kerala, Manipur, Meghalaya, Uttar Pradesh and West Bengal; other parts of the Oriental region; Moluccas (Diags. 1, 3 & 6).

Family SARCOPHAGIDAE

Contribution on the fauna of Tripura : Nandi, 1989.

A total of 17 species under 9 genera of the subfamily Sarcophaginae are hitherto known in Tripura *vis-à-vis* 101 species under 32 genera of 3 subfamilies in India (till 1992).

Subfamily SARCOPHAGINAE

Diagnosis : Arista pubescent to plumose on basal two-thirds; notopleurals invariably 3 or 4; stem-vein of wing setulose on posterior upper side of its basal section.

Key to the genera

1. Propleuron haired 2
- Propleuron bare 4
2. Thorax without presutural acrostichal bristles; ventralia in male genitalia globose
.....*Boettcherisca* Rohdendorf
- Thorax with distinct presutural acrostichal bristles; ventralia in male genitalia never globose 3
3. Genae at anterior half covered with black hairs; sternite 4 in males with a tuft of short hairs on posterior margin
.....*Sarcorohdendorfia* Baranov
- Genal hairs mostly yellowish white; sternite 4 in males without such tuft of hairs
.....*Lioproctia* Enderlein

4. Abdominal sternite 5 in males with protuberance on inner arm; inner forceps with setae or tuft of short subapical pile 5
- Abdominal sternite 5 in males without protuberance on inner arm; inner forceps without setae or tuft of hairs 7
5. Inner forceps with tuft of pile; apical plate of paraphallus curved anteriorly 6
- Inner forceps with setae; apical plate of paraphallus curved posteriorly
.....*Iranihindia* Rohdendorf
6. Apical plate of paraphallus with 2 long slender pointed cruciate processes.
.....*Harpagophalla* Rohdendorf
- Apical plate of paraphallus with short processes
.....*Seniorwhitea* Rohdendorf
7. Apical part of paraphallus invariably large and broad; ventralia elongate 8
- Apical part of paraphallus small and narrow; ventralia nearly round
.....*Thyrsocnema* Enderlein
8. Abdominal sternites 3 and 4 invariably with short sparse hairs; ventralia pedunculate; apical plate of paraphallus with or without lateral processes
.....*Parasarcophaga* Johnston & Tiegs
- Abdominal sternites with numerous long hairs; ventralia never pedunculate; apical plate of paraphallus with median apophysis and lateral processes*Sinonipponia* Rohdendorf

Genus *Boettcherisca* Rohdendorf

Boettcherisca Rohdendorf, 1937, *Fauna USSR, Dipt.*, 19(1) : 270.

Type-species : *Myophora peregrina* Robineau-Desvoidy.

22. *Boettcherisca peregrina* (Robineau-Desvoidy)

1830. *Myophora peregrina* Robineau-Desvoidy, *Mém. prés. Acad. Sci. Inst. Fr.*, (2) 2 : 356.

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Diagnosis : Frons in males half width of an eye; lateral vertical absent; costal segment iii longer than v; hind femur with postero-ventral macrochaetal row, mid tibia bare, hind tibia with apical fringe; spines on apical part of inner forceps not extending to dorsal side.

Distribution : Tripura (West and South), and Andaman Islands, Assam, Bihar, Himachal Pradesh, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Hainan Is., Indonesia, Malaysia, Myanmar, Nepal, South China, Sri Lanka, Taiwan and Thailand; Australia, Fiji, Gilbert Islands, Hawaii, Japan, Korea, Mariana Islands, New Britain, New Guinea, Ogasawara, Samoa, Seychelles and Society Islands (Diags. 1, 3 & 6).

Genus *Lioproctia* Enderlein

Lioproctia Enderlein, 1928, *Arch. klass. phyl. Ent.*, 1 : 26.

Type-species : *Lioproctia aurifrons* Enderlein.

23. *Lioproctia pattoni* (Senior-White)

1924. *Sarcophaga pattoni* Senior-White, *Rec. Indian Mus.*, 26 : 242.

Diagnosis : Frons in males as wide as half an eye; parafacialia with many irregular rows of fine black hairs; mesonotum greyish, with 3 black longitudinal stripes; wing with costal segment iii greater than v; R_{4+5} with a row of dorsal setae; abdominal sternite 3 with short hairs but 4 with sparse hairs; genital tergite brownish orange; inner forceps broad and beak-like apically, anterior margin with some strong spines medially.

Distribution : Tripura (North), and Mizoram, Sikkim and Tamil Nadu; Malaysia, South China, Thailand; Taiwan and Vietnam (Diags. 1, 3 & 6).

Genus *Parasarcophaga* Johnston and Tiegs

Parasarcophaga Johnston and Tiegs, 1921, *Proc. R. Soc. Qd*, 33 : 86.

Type-species : *Sarcophaga omega* Johnston and Tiegs.

Key to the subgenera

1. Lateral plate of paraphallus in form of an unpaired pedunculate process
.....*Parasarcophaga* Johnston & Tiegs
- Lateral plate of paraphallus either short or tuberculate or in form of broad lamellate hook or narrow and slender paired process.....2
2. 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 3
3. 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

Curranea Rohdendorf, 1937, *Fauna USSR, Dipt.*, 19(1) : 255, 452.

Type-species : *Sarcophaga tibialis* Macquart.

24. *Parasarcophaga (Curranea) scopariiformis*
Senior-White

Diagnosis : Frons in males as wide as two-fifths of an eye; thorax with 6 dorsocentral weak bristles posteriorly; hind tibia without fringe of hairs; genital segment 1 very dark grey and 2 shining black; apical plate of paraphallus curved and bifurcate, with a short basal apophysis; lateral plate of paraphallus with a curved and pointed apex; styli of glans short, serrate anteriorly; ventralia somewhat membranous, with 2 curved, elongate processes.

Distribution : Tripura (North and South), and Assam, Manipur, Mizoram, Nagaland and West Bengal; China, Hainan Island, Laos, Sri Lanka, Taiwan and Thailand (Diags. 1, 4 & 6).

Subgenus *Liosarcophaga* Enderlein

Liosarcophaga Enderlein, 1928, *Arch. klass. phyl. Ent.*, 1(1) : 18.

Type-species : *Cynomyia madeirensis* Schiner.

Key to the species

1. Hind tibia with a single fringe; apical process of paraphallus finger-like with bifurcated tip*brevicornis* Ho
- Hind tibia double-fringed; apex of paraphallus pointed with a subapical process having bifurcated tip*dux* (Thomson)

25. *Parasarcophaga (Liosarcophaga)*

brevicornis (Ho)

1934. *Sarcophaga brevicornis* Ho, *Bull. Fan Mem. Inst. Biol.*, 5 : 23.

Material examined : 11 M, West Tripura, Hawabari, 11. v. 1992, Coll. B. Mitra.

Distribution : Tripura (West, North and South), and Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Meghalaya, Mizoram, Nagaland, Orissa, Rajasthan, Tamil Nadu and West Bengal; Hainan Island, Kalimantan, Malaysia, Ryukyu Islands, South China, Sri Lanka, Taiwan and Thailand; Korea, Japan and North China (Diags. 1, 4 & 7).

26. *Parasarcophaga (Liosarcophaga) dux*

(Thomson)

1868. *Sarcophaga dux* Thomson, *K. svenska Fregatten Eugenie's Resa*, *Dipt.*, 2 : 534.

Distribution : Tripura (West, North and South), and Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Gujarat, Goa, Haryana, Himachal Pradesh, Jammu and Kashmir, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal; Bangladesh, China, Hainan Island, East Malaysia, Java, Kalimantan, Ryukyu Islands, Sri Lanka and Taiwan; Australia, Hawaii, Japan, Korea and New Guinea (Diags. 1, 4 & 7).

Subgenus *Pandelleisca* Rohdendorf

Pandelleisca Rohdendorf, 1937, *Fauna USSR, Dipt.*, 19(1) : 238.

Type-species : *Sarcophaga similis* Meade.

27. *Parasarcophaga (Pandelleisca) bainbriggei*
(Senior-White)

1925. *Sarcophaga bainbriggei* Senior-White, *Spolia zeylan.*, 13 : 212 (nov. nom. for *S. fletcheri* Senior-White-pre-occupied).

Diagnosis : Lateral vertical bristles absent; frons with a black stripe; antenna black; propleuron bare; presutural acrostichal bristles absent; posterior dorsocentral bristles 5, anterior 3 weak; abdominal segment 2 with strong marginal bristles; mid femur with rows of comb-like bristles; hind femur with weak fringe; sternite 5 with a stout bristle at apex of accessory forceps; apical plate of paraphallus with rod-like appendages.

Distribution : Tripura (South), and Arunachal Pradesh, Assam, Bihar, Orissa, Tamil Nadu and West Bengal (Diags. 1 & 4).

Subgenus *Parasarcophaga* Johnston and Tiegs

Parasarcophaga Johnston and Tiegs, 1921, *Proc. R. Soc. Qd.*, 33 : 86.

Key to the species

- 1. Gena almost entirely with white hairs 2
- Gena black-haired anteriorly but white-haired posteriorly*albiceps* (Meigen)
- 2. Cercus slender; ventral membrane of theca-phallus junction never bulgy*misera* (Walker)
- Cercus rather stout; ventral membrane of theca-phallus junction bulgy*sericea* (Walker)

28. *Parasarcophaga (Parasarcophaga) albiceps* (Meigen)

1826. *Sarcophaga albiceps* Meigen, *Syst. Besch. europ. zweifl. Insekt.*, 5 : 22.

Material examined : 3 M, 2 F, West Tripura, Hawabari, 11. v. 1992, Coll. B. Mitra.

Distribution : Tripura (West, North and South), and Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; China, Kalimantan, Malaysia, Nepal, Philippines, Ryukyu Islands, Taiwan and Thailand; Bismarck Archipelago, Europe, Hawaii, Israel, Japan, Korea, New Britain, New Guinea, Solomon Island and Turkey (Diags. 1, 4 & 7).

29. *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.

Distribution : Tripura (West and North), and Andaman Islands, Andhra Pradesh, Assam, Bihar, Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Andalus, Bangladesh, China, Malaysia, Hainan Island, Java, Kalimantan, Myanmar, Nepal, Philippines, Ryukyu Islands, Sri Lanka, Sulawesi, Taiwan and Thailand; Afganistan, Korea, Japan ; widespread in the Pacific Islands to New Guinea and Australia (Diags. 1, 4 & 7).

30. *Parasarcophaga (Parasarcophaga) sericea*
(Walker)

1852. *Sarcophaga sericea* Walker, *Insecta saundersiana*, 4 : 326.

1917. *Sarcophaga knabi* Parker, *Proc. U. S. natn. Mus.*, 54 : 66.

Distribution : Tripura (West, North and South), and Andaman Islands, Andhra Pradesh, Arunachal

Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Bangladesh, China, Hainan Island, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan and Thailand; Australia, Caroline Island, Korea, Mariana Island, Marshall Island, New Guinea, Society Island and the erstwhile U. S. S. R. (Diags. 1, 4 & 7).

Genus *Sarcorohdendorfia* Baranov

Sarcorohdendorfia Baranov, 1938, *Vet. Arch. Zagreb*, 8 : 173.

Type-species : *Sarcorohdendorfia adiscalis* Baranov = *Notochaeta indusa* Curran.

31. *Sarcorohdendorfia mysorensis* Nandi

1988. *Sarcorohdendorfia mysorensis* Nandi, *J. Beng. nat. Hist. Soc.* (n. s.), 7 : 14.

Diagnosis : Antennal arista plumose on basal three-fifths; scutum with 3 black longitudinal stripes; vein R_{4+5} with a row of short setae dorsally extending up to half distance from its basal node; femur with more than one row of bristles; fore and mid tibia each with 3 bristles antero-dorsally but hind without such bristles; male genitalia with lateral plate of paraphallus broad and curved anteriorly; ventralia long, curved, pointed and membranous apically.

Distribution : Tripura (West), and Karnataka (Diags. 1 & 4).

Genus *Sinonipponia* Rohdendorf

Sinonipponia Rohdendorf, 1965, *Revue Ent. USSR*, 44 : 694.

Type-species : *Sarcophaga hervebazini* Séguy.

32. *Sinonipponia smarti* Nandi

1989. *Sinonipponia smarti* Nandi, *Mems Inst. Oswaldo Cruz*, 84 (Suppl. 4) : 398.

Diagnosis : Antennal arista plumose on basal three-fifths; scutum with 3 black longitudinal

stripes; vein R_{4+5} with a row of 8-9 short setae dorsally extending up to four-fifths distance from basal node to cross-vein r-m; fore femur with 2 rows of bristles postero-dorsally and 1 row postero-ventrally; mid femur with a row of 4-5 bristles antero-laterally and another row antero-ventrally on basal half; hind femur with 2 rows of bristles antero-dorsally, few bristles antero-ventrally and a row postero-ventrally; fore tibia with 4-5 bristles, mid tibia with 6 bristles and hind tibia with also 6 bristles on different angles; abdomen black with silvery checkered pattern; male genitalia with apical plate of paraphallus gradually curved and pointed apically without any backward projection but with a long curved process anteriorly; lateral plate long; ventralia membranous and only slightly pointed posteriorly.

Distribution : Tripura (West and South) (Diag. 1).

Genus *Thyrsochnema* Enderlein

Thyrsochnema Enderlein, 1928, *Arch. klass. phyl. Ent.*, 1 : 42.

Type-species : *Sarcophaga striata* Enderlein = *Sarcophaga incisilobata* Pandellé.

Subgenus *Pseudothyrsochnema* Rohdendorf

Pseudothyrsochnema Rohdendorf, 1937, *Fauna USSR, Dipt.*, 19 : 167.

Type-species : *Sarcophaga spinosa* Villeneuve.

Diagnosis : Male genitalia with well-developed, long and slender paraphallus, apical plate of paraphallus elongate but lateral plate short; styli of glans long, occasionally extended beyond the apex of apical plate of paraphallus; ventralia short, with 1 or 2 pairs of lobes; cerci almost entirely covered with hairs, its apical part not slender.

33. *Thyrsochnema* (*Pseudothyrsochnema*) *nicobarensis* Nandi

1989. *Thyrsochnema* (*Pseudothyrsochnema*) *nicobarensis* Nandi, *J. Andaman Sci. Assoc.*, 5 : 120.

Diagnosis : Antennal arista plumose on basal three-fifths; scutum with 3 black longitudinal stripes; hind tibia without tuft of hairs ventrally; abdomen with silvery checkered pattern; male genitalia with apical plate of paraphallus gradually curved and pointed apically; lateral plate also curved and pointed; styli of glans elongate without serration; ventralia small and strongly pointed apically.

Distribution : Tripura (West), and Nicobar Islands (Diags. 1 & 4).

Genus *Harpagophalla* Rohdendorf

Harpagophalla Rohdendorf, 1937, *Fauna of USSR, Dipt.*, 19 : 276.

Type-species : *Sarcophaga sera* Rohdendorf = *Sarcophaga kempi* Senior-White.

34. *Harpagophalla kempi* Senior-White

1924. *Sarcophaga kempi* Senior-White, *Rec. Indian Mus.*, 26 : 247.

Material examined : 1 M, 3 F, North Tripura, Pacharthol, 20. v. 1992, Coll. S. K. Chakraborty.

Diagnosis : Frons narrow, half an eye-width; antenna black, segment 3 grey pollinose; lateral vertical bristle absent; pre-scutellar acrostichal bristles only; posterior dorsocentral bristles 5; segment iii of costa equal to v; mid femur with comb and basal fringe; hind femur with lower hind macrochaetal row and fringe; mid tibia bare; hind tibia double-fringed; accessory forceps in male genitalia with internal apical serrate lobes.

Distribution : Tripura (North and West), and Arunachal Pradesh, Assam, Bihar, Kerala, Mizoram, Nagaland and West Bengal; China, Hainan Island, Java, Laos, Myanmar, Sri Lanka and Thailand; New Guinea (Diags. 1, 4 & 7).

Genus *Iranihindia* Rohdendorf

Iranihindia Rohdendorf, 1961, *Stutt. Beitr. Naturk.*, 58 : 2.

Type-species : *Sarcophaga futilis* Senior-White.

Key to the species

1. Abdominal tergite 3 with distinct median marginal bristles; styli of glands long and blunt 2
- Abdominal tergite 3 without median marginal bristles; styli of glans short or pointed
..... *martellata* (Senior-White)
2. Lateral plate of paraphallus with equal processes apically; ventralia small
..... *martellatoides* (Baranov)
- Lateral plate of paraphallus with unequal processes apically; ventralia moderately developed *futilis* (Senior-White)

35. *Iranihindia futilis* (Senior-White)

1924. *Sarcophaga futilis* Senior-White, *Rec. Indian Mus.*, 26 : 246.

Distribution : Tripura (West, North and South), and Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal; Myanmar and Sri Lanka (Diags. 1, 4 & 7).

36. *Iranihindia martellata* (Senior-White)

1924. *Sarcophaga martellata* Senior-White, *Rec. Indian Mus.*, 26 : 247.

Distribution : Tripura (West and South), and Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Nagaland, Orissa, Tamil Nadu and West Bengal; Sri Lanka (Diags. 1, 4 & 7).

37. *Iranihindia martellatoides* (Baranov)

1931. *Sarcophaga martellatoides* Baranov, *Konowia*, 10 : 114.

Distribution : Tripura (West and South), and Bihar, Orissa, Uttar Pradesh and West Bengal; Sri Lanka (Diags. 1, 4 & 7).

Genus *Seniorwhitea* Rohdendorf

Seniorwhitea Rohdendorf, 1937, *Fauna of USSR, Dipt.*, 19 : 297.

Type-species : *Sarcophaga orientaloides*
Senior-White = *Sarcophaga krameri* Böettcher =
Sarcophaga reciproca Walker.

38. *Seniorwhitea reciproca* (Walker)

1856. *Sarcophaga reciproca* Walker, J. Proc. Linn. Soc.
Lond., Zool., 1 : 22.

1912. *Sarcophaga krameri* Böettcher, Ent. Mitt., 1 : 165.

Diagnosis : Lateral vertical bristles weak or absent; antenna black, segment 3 more than thrice as long as 1; abdominal tergite 2 only with marginal bristles; mid femur with strong comb and basal fringe; hind femur well-fringed; mid and hind tibiae fringed.

Distribution : Tripura (West and South), and Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; China, Hainan Island, Laos, Malaya, Myanmar, Nepal, Singapore, Sri Lanka, Taiwan and Thailand; Hawaii (Diags. 1, 4 & 7).

ZOOGEOGRAPHICAL REMARKS

Tripura as one of seven sister states is very close to Assam, Mizoram, Manipur, Meghalaya, Nagaland and Arunachal Pradesh in the north-east India and to Bangladesh as well. The entire region essentially exhibits a like physiographical feature and is, therefore, likely to harbour common faunal elements. However, the present account does not conform to what should have been the faunal picture of the state because of inexhaustive collecting within limited opportunity. None-the-less, necessary comments on the fauna are made for further clarity and better understanding in the light of the Meghalayan fauna recently discussed in detail (*vide* Datta, 1998; Datta and Parui, 1998).

The family Bibionidae is represented by 2 species, of which *Plecia* (*Plecia*) *paradisversa* is

described as new to science from the state and the other, *viz.*, *Penthetria japonica* is a well-known Oriental species extending its range northward as far as Japan and Siberia of the Palaearctic region. However, the species shows the Himalayan bias occurring in the north and north-east India.

The Stratiomyidae are known only by 2 species, such as, *Ptilocera fastuosa* and *P. quadridentata* that are certainly the widespread species of the east and the south-east of the Orient. Indeed, the southward distribution of the latter species is more extensive than that of the former in that the species exhibiting a noticeable discontinuity not only in the peninsular India and Sri Lanka but also in Myanmar, has crossed the Weber's Line so as to intrude into the Australian region.

The tabanid fauna in Tripura comprises 3 species, namely, *Chrysops dispar*, *Tabanus striatus* and *T. tripurensis*, of which the last one is hitherto known only from Tripura and the remaining 2 species are extremely widespread, displaying nearly continuous distribution throughout India and certain other parts of the Oriental region (Datta, *op. cit.*). Both the species do occur far and wide in China and Nepal in the north, extending their range westward to Pakistan. However, *dispar* exhibits continuous distribution as far east as Philippines through China and Taiwan, and southward through East Malaysia and Kalimantan up to Java but *striatus* is known neither beyond China in the east nor beyond Cambodia (where *dispar* remains unrecorded), Vietnam and Thailand in the south.

Of the 2 bombyliids, *Petrorossia ceylonica* is known neither from Meghalaya nor from anywhere in the south India where *Exoprosopa insulata* does exist and extend its range of distribution to Sri Lanka but the former species occurs there with disjunct record all along the peninsular part of the country, the most probable course of dispersal.

Knowledge on the families Pipunculidae, Micropezidae, Tephritidae, Sciomyzidae and

Celyphidae in Tripura is practically lacking since each of them is represented by a single species only, especially when the size of the family-groups is neither too small nor their occurrence is too uncommon nor their distribution is too limited to come across in the state. Moreover, the entire plain land in Tripura is devoted to agriculture where fruit flies and big-headed flies are likely to abound by habit.

Pipunculus biroii is known to occur in the north and north-east of India, from Uttar Pradesh to Arunachal Pradesh (excepting Sikkim), coming down to Orissa, Assam and Tripura. The species, however, extends its range to Sri Lanka with discontinuous distribution throughout the south India and to the peninsular Malaya across Myanmar with disjunct record in Thailand. *Mimegralla albimana*, though known only from Assam, Tripura and West Bengal in India, is extremely widespread in other parts of the Orient as well as in Japan (Palearctic region), extending its range of distribution as far as the Australian region. Both *Dacus tau* and *Sepedon plumbella* follow *albimana* in the pattern of dispersal in the Oriental region excepting India wherein our knowledge stoops to a dead silence. Whereas *tau* remains confined to the Orient, *plumbella* colonizes quite well in the Australian region. Whereas the former represents from most parts of India, the latter is known only from Himachal Pradesh, Bihar, West Bengal and Tripura. A species like *Spaniocelyphus cognatus* that occurs in some parts of the south India and Sri Lanka, is recorded from Tripura, implying its existence throughout the Indian plains and hills.

The Sepsidae are known by 4 species, of which *Dicranosepsis bicolor* is the most widespread Oriental species, extending its range of distribution not only in Japan (Palearctic region) but also in most parts of the Australian region. Although *Sepsis albopunctata* is unknown from certain parts of the Orient, notably China, Myanmar, Thailand and the peninsular Malaya, it is spread far and wide in the west over the Ethiopian region and in the east and south over Japan (Palearctic region) and the Australian

region. *Decachaetophora aeneipes* exhibits its distributional range as far west as Pakistan, as far south as Sri Lanka, and as far east as Taiwan, extending further northward to Japan or even to the Nearctic region across it. *Sepsis rufa*, the only species among Tripuri sepsids, is very much restricted to Nepal in the north and Myanmar in the east besides being distributed with a Himalayan bias mainly along the northern edge of India. Concerning the distribution of the other 3 Tripuri species in India, nearly the same course has been followed up by *aeneipes* but both *bicolor* and *albopunctata* are hitherto known from the south India in addition to certain northern states as above, distending the occurrence of the former in Maharashtra too.

The fact that surprises most is the poor representation of the Calliphoridae by 3 species only despite their abundance almost everywhere by virtue of their spontaneous synanthropy. Of the 18 species reported from Meghalaya (Datta and Parui, *op. cit.*), these 3 species from Tripura are present and, therefore, they need not be discussed again but it may be re-called that all of them cross the Weber's Line and colonize the Australian region as well. And *Chrysomya megacephala* is not only widespread in high population in the Australian region but also in the south-eastern part of the Palearctic region and the Malagasy subregion of the Ethiopian region. We are here to add that *Stomorrhina discolor* is now known to be in Pakistan, where *Idiella mandarina* still remains unknown.

Lastly, the Sarcophagidae comprise 17 species that outnumber the Meghalayan fauna containing 14 species (*cf.* Datta and Parui, *op. cit.*). However, these species belong to 9 genera, such as, *Parasarcophaga* with 7 species, *Iranihindia* with 3 species, and *Boettcherisca*, *Lioproctia*, *Sarcorohdendorfia*, *Sinonipponia*, *Thyrsoctema*, *Harpagophalla* and *Seniorwhitea* each with a lone species. Of them, 4 species, *viz.*, *Parasarcophaga bainbriggei*, *Sarcorohdendorfia mysorensis*, *Sinonipponia smarti* and *Thyrsoctema nicobarensis* are so far confined to India and *S. smarti* is unknown elsewhere in the country.

Whereas *S. mysorensis* is hitherto known from Karnataka and *nicobarensis* from the Nicobar Islands, *P. bainbriggei* spreads over Arunachal Pradesh, Assam and West Bengal in the north-eastern part, coming down to Bihar and Orissa, and to Tamil Nadu in the distant south. The remaining species that are known to occur not only in India but also abroad, require to be thoroughly discussed in view of certain nomenclatural changes, addition of species and supplement of distributional records for some species. However, *brevicornis* among other *Parasarcophaga* is further ahead of *bainbriggei* in extending its range of distribution to the north, north-east and west India. The most widespread species certainly are *dux*, *albiceps*, *misera* and *sericea* occurring nearly throughout India. But *scopariiformis* is unknown beyond the north-east India and is restricted to certain parts of the Orient in that it is distributed as far north as China, as far south as Sri Lanka (with disjunct record entirely in the Indian peninsula) and as far east as Taiwan, turning southward to the Hainan Island, Laos and Thailand across China without any continuity in Myanmar where it may possibly occur. In fact, *brevicornis* is known to occur in some parts of the Orient as well as in the adjoining parts of the Palaearctic region in that the species exhibits its distributional range northward to Korea and Japan continuously through China, Taiwan and Ryukyu Islands, and southward to Sri Lanka in one direction and Kalimantan in the other with discontinuous distribution in Myanmar, but it is presumed to exist not only in Myanmar but also in Laos, Cambodia and Vietnam at least when it is widely dispersed in China and the neighbouring islands. All the other *Parasarcophaga*, namely, *dux*, *albiceps*, *misera* and *sericea* occur not only in some or other parts of the Palaearctic region but extensively also in the Australian region and the former 2 species even far beyond in the Hawaiian Islands. *P. dux* is only known from China and the Ryukyu Islands in the north to Sri Lanka, and East Malaysia, Kalimantan and Java across Bangladesh in either way in the south and from the Hainan Island and Taiwan in the east of the Orient, implying no

clue to its meaningful dispersal, because of deficient records in the intervening territories of the region. *P. albiceps* is represented well in the Orient, extending its distributional range to China across Nepal in the north, to Kalimantan across Thailand and Malaysia in the south, and to Taiwan and Philippines across China in the east up to the Ryukyu Islands, with disjunct records in Bangladesh, Myanmar, Laos and Vietnam where it is most likely to occur. Both *misera* and *sericea* are the most widespread Oriental species exhibiting their existence almost everywhere, most probably including Laos, Cambodia, Vietnam and other areas as per their distributional trend despite apparent discontinuity in them. The *Iranihindia* species are very much confined to India, directing the range only towards Sri Lanka (e.g. *martellata* and *martelletoides*) or towards Sri Lanka and Myanmar (e.g. *futilis*) in either way respectively across the southern and north-eastern parts of the country. Indeed, *futilis* and *martellata* are represented from almost everywhere excepting the extreme north India but *martellatoides* is so far poorly known only from a few northern and eastern states, with an extensive discontinuity all along the west and the south. However, the extremely widespread species, perhaps only comparable with *misera* and *sericea* of the genus *Parasarcophaga*, is certainly *Boettcherisca peregrina* that is known nearly from the entire Oriental region (remarkably excepting territories beyond Thailand eastward up to Philippines) as well as from the Palaearctic, Ethiopian and Australian regions and as far as the Hawaiian Islands, but it is yet to be known from several parts of India. Indeed, *Seniorwhitea reciproca* is represented very well in India but in other parts of the Orient it is known from China in the north to Sri Lanka and Singapore in the south through Myanmar, Thailand and Malaya, extending its range to Laos, the Hainan Island and Taiwan eastward across China with disjunct distribution in Vietnam and the intervening territories to reach the Hawaiian Islands. Whereas *Lioproctia pattoni* is unknown from almost everywhere in India, *Harpagophalla kempfi* is from the north, west and central parts of the country but both of

them are distributed well in other parts of the Orient in that the latter extends its range to China in the north, Sri Lanka and Java in the south and New Guinea in the far east across Myanmar and Thailand with discontinuity in Malaysia and the rest of Indonesia. The intrusion of the species in the Hainan Island might have brought about through China from the north because its occurrence eastward beyond Laos is unknown. However, *pattoni* is hitherto confined to the Orient in that the species exhibits its range of distribution eastward to Taiwan across China and southward to Malaysia or Vietnam across China and Thailand with discontinuous records both in Bangladesh and Myanmar, considered to be the most possible course of migration.

To conclude, Tripura harbours 38 species under the families : Bibionidae, Stratiomyidae, Tabanidae, Bombyliidae, Pipunculidae, Micropezidae, Tephritidae, Sciomyzidae, Sepsidae, Celyphidae, Calliphoridae and Sarcophagidae, of which 6 species, inclusive of 3 from the state, are confined to India and 14 species are spread over the Oriental region but there are 18 species that extend their range of distribution beyond the Orient.

SUMMARY

The paper introduces the early history of collecting and describing Diptera from Tripura

and concludes with the zoogeographical comments on the Tripuri fauna of 38 species including a new bibionid *Plecia (Plecia) paradispersa*, under 27 genera belonging to 12 families of Diptera : Bibionidae, Stratiomyidae, Tabanidae, Bombyliidae, Pipunculidae, Micropezidae, Tephritidae, Sciomyzidae, Sepsidae, Celyphidae, Calliphoridae and Sarcophagidae, of which all but the Tabanidae and Sarcophagidae are new records from the state.

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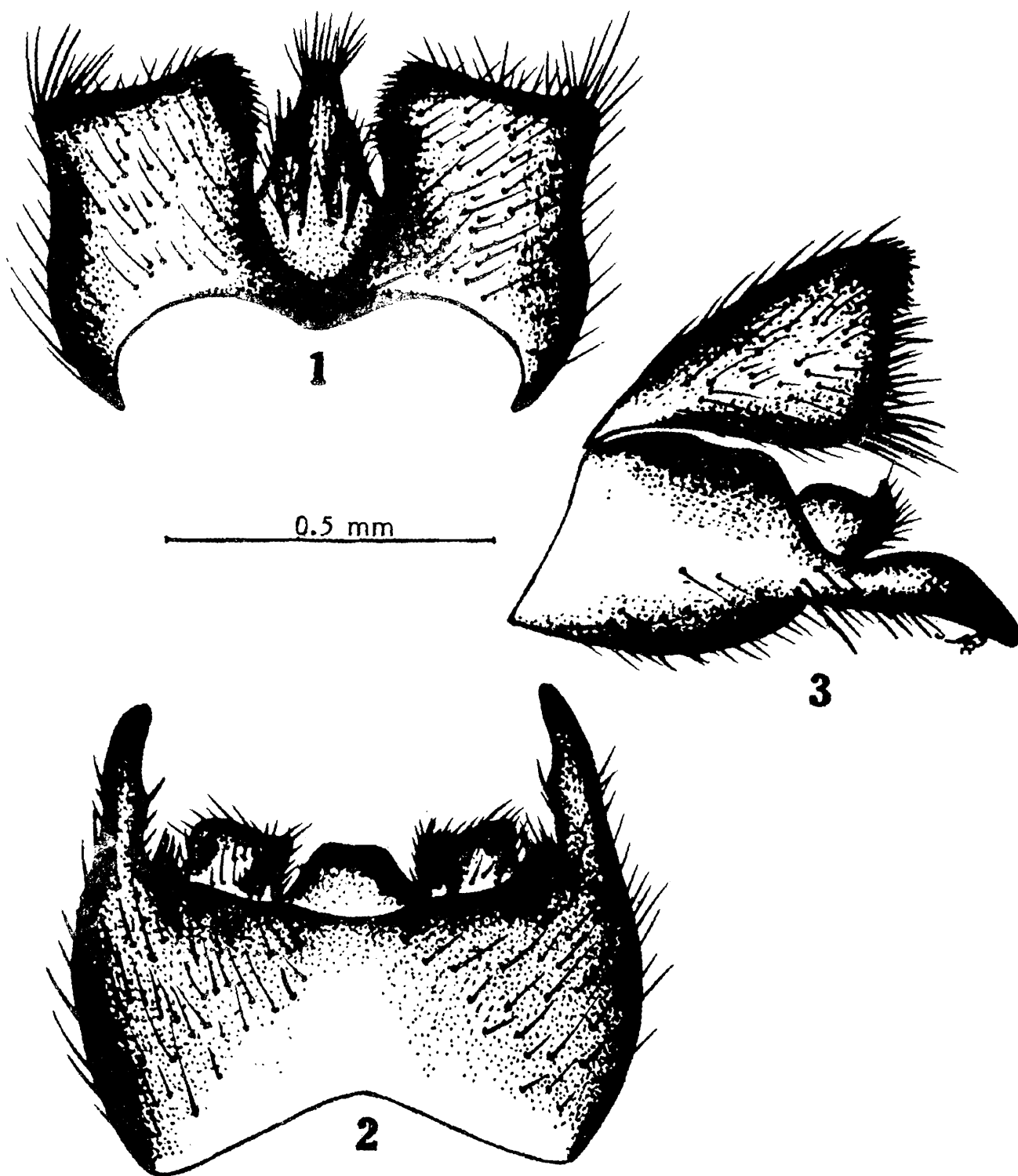
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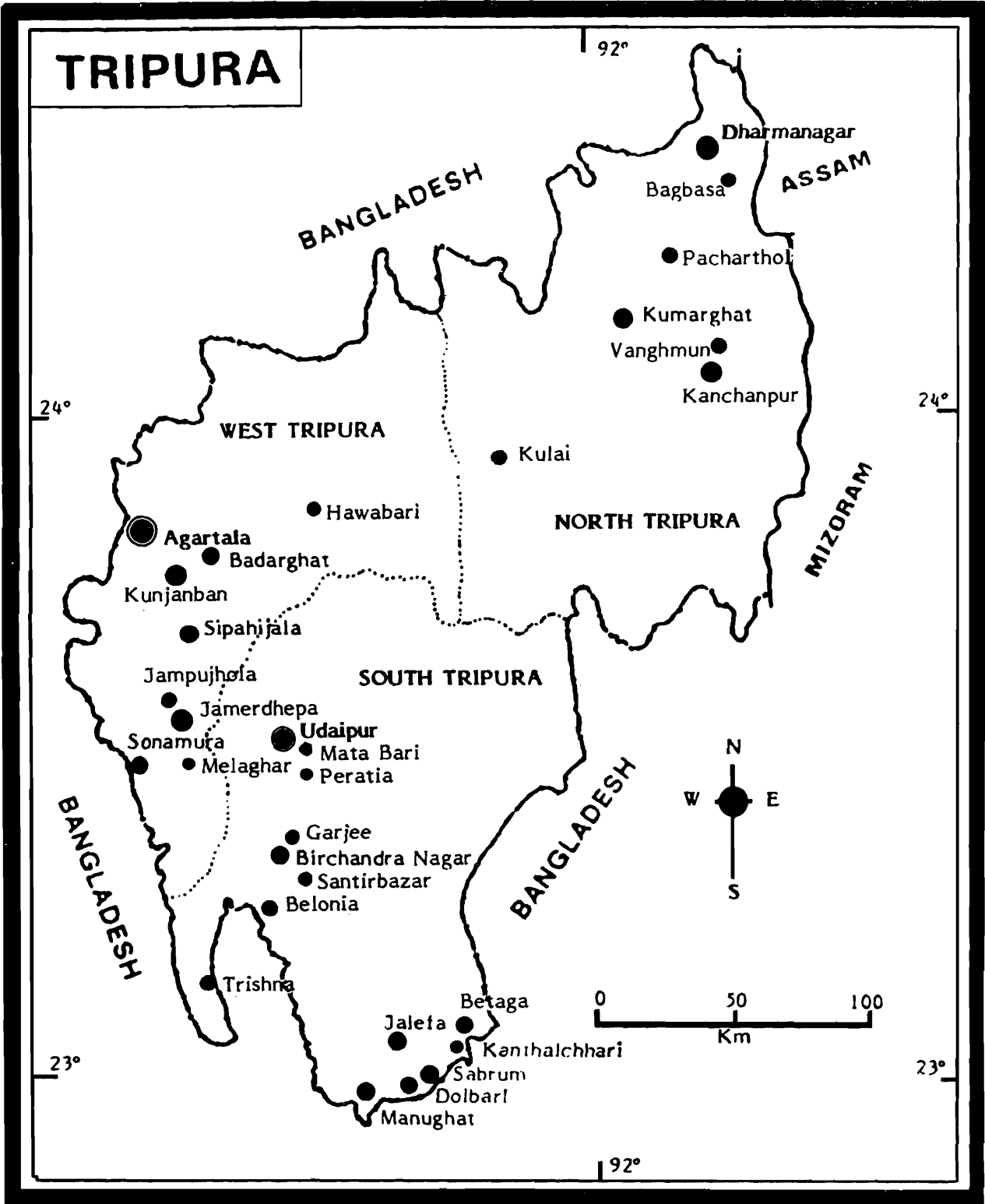
Appendix : Diptera fauna known from Tripura (up to 1992)

Suborder/Family (no./name)	Subfamily (no.)	Genus (no.)	Species (no.)	Suborder/Family (no./name)	Subfamily (no.)	Genus (no.)	Species (no.)
1	2	3	4	1	2	3	4
(3/20 + 4*)	(28 + 6*)	(65 + 11*)	(123 + 14*)	Dolichopodidae*	2*	2*	3*
NEMATOCERA	(5 + 4*)	(9 + 9*)	(38 + 11*)	CYCLORRHAPHA	(16)	(44)	(67)
Tipulidae*	2*	5*	6*	Pipunculidae	1	1	1
Phlebotomidae*	—	2*	3*	Syrphidae	2	13	21
Culicidae	2 + 1*	5 + 1*	32 + 1*	Micropezidae	1	1	1
Ceratopogonidae	1	1	1	Tephritidae	1	1	1
Simuliidae	1	1	3	Sciomyzidae	1	1	1
Bibionidae	1	2	2	Sepsidae	1	3	4
Mycetophilidae*	1*	1*	1*	Celyphidae	—	1	1
BRACHYCERA	(7 + 2*)	(12 + 2*)	(18 + 3*)	Chloropidae	2	3	5
Stratiomyidae	1	1	2	Muscidae	2	3	7
Tabanidae	2	2	3	Calliphoridae	2	3	3
Asilidae	2	7	11	Sarcophagidae	1	9	17
Bombyliidae	2	2	2	Tachinidae	2	5	5

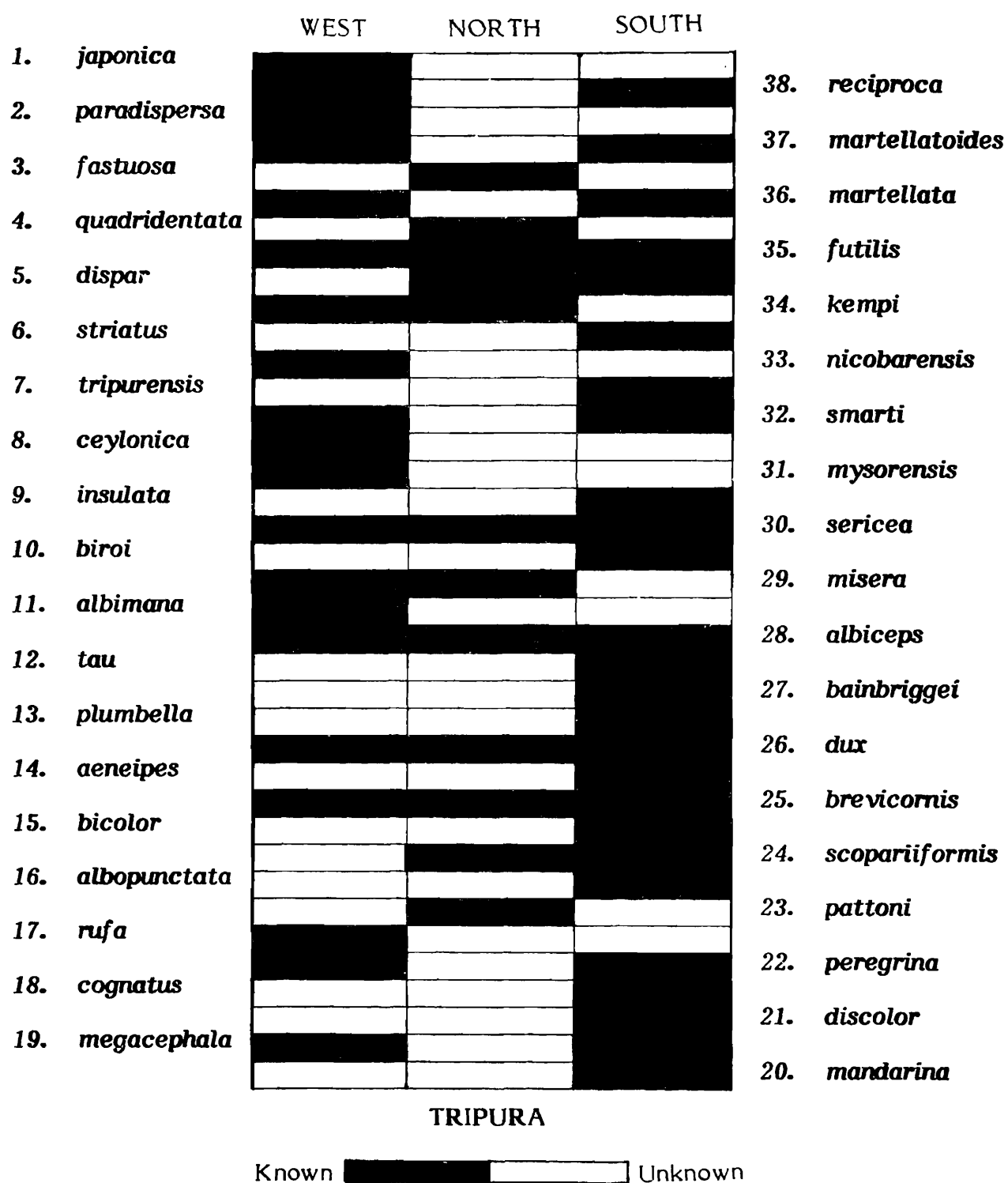
*Based on presumption as per introductory notes



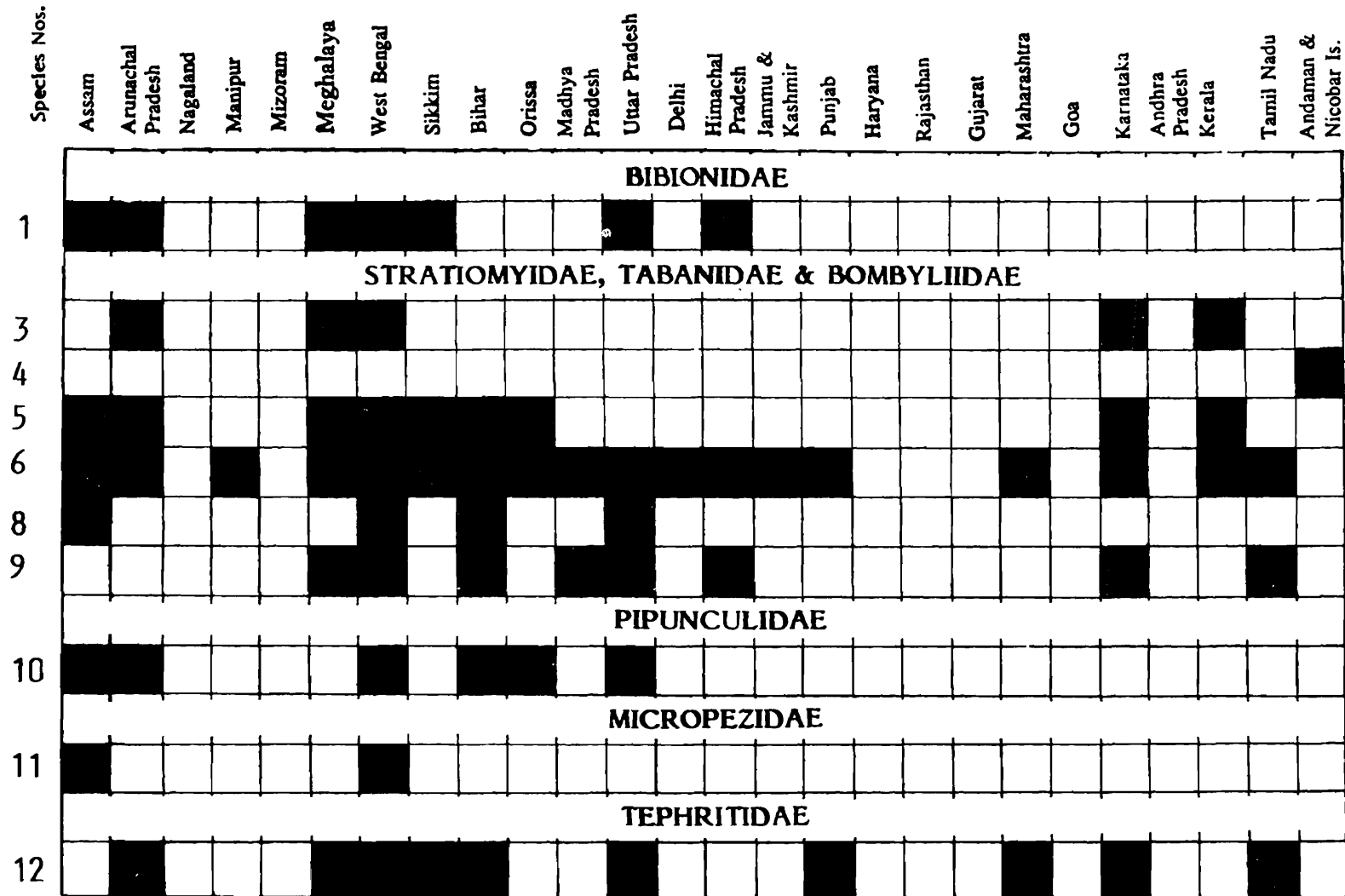
Plecia (Plecia) paradispersa sp. n. Male terminalia :
Fig. 1, dorsal view; Fig. 2, ventral view; Fig. 3, lateral view.



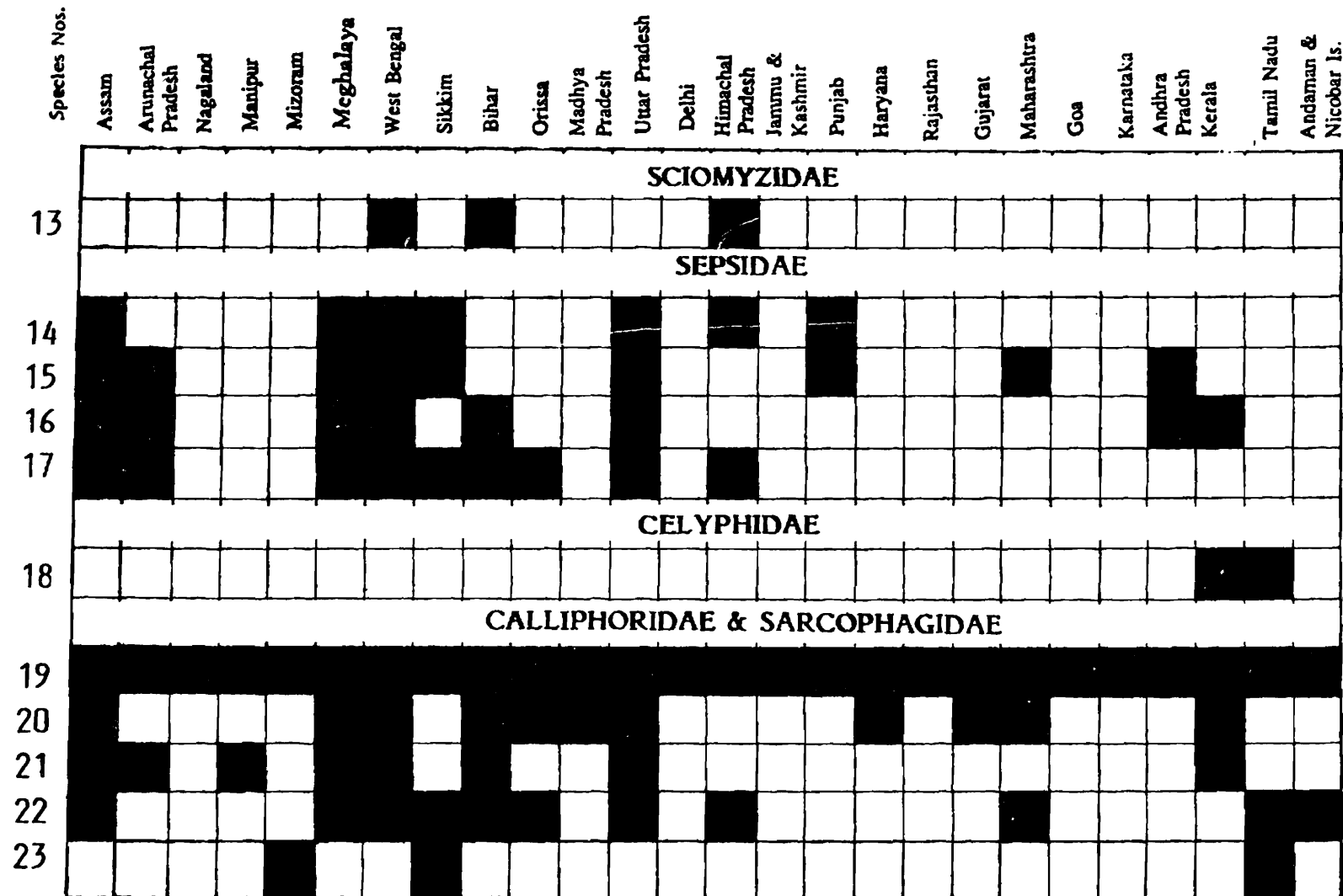
Map 1. Tripura showing its location, districts, district headquarters and recorded places of occurrence of Diptera dealt with.



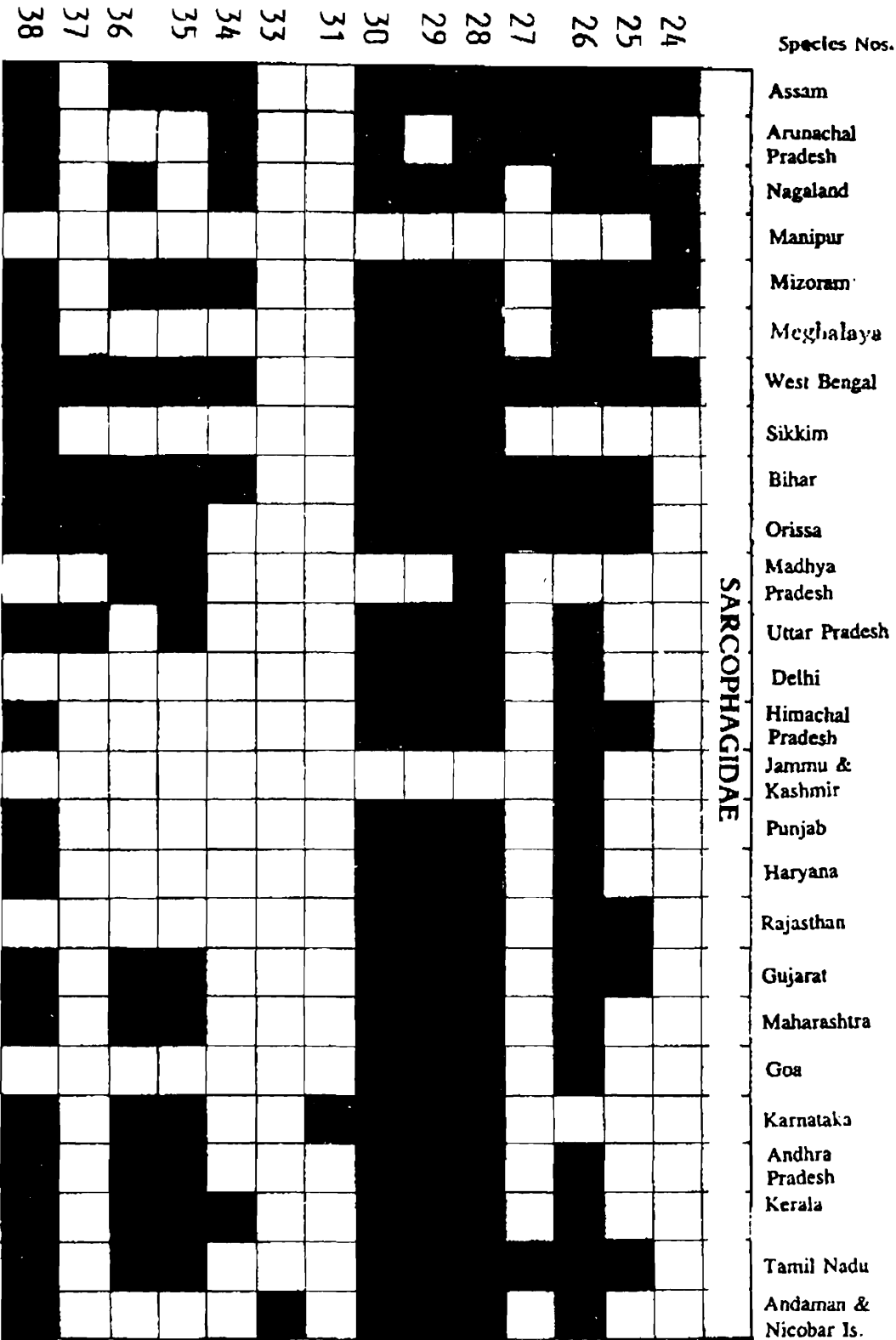
Diag. 1. Species recorded from three districts in Tripura.



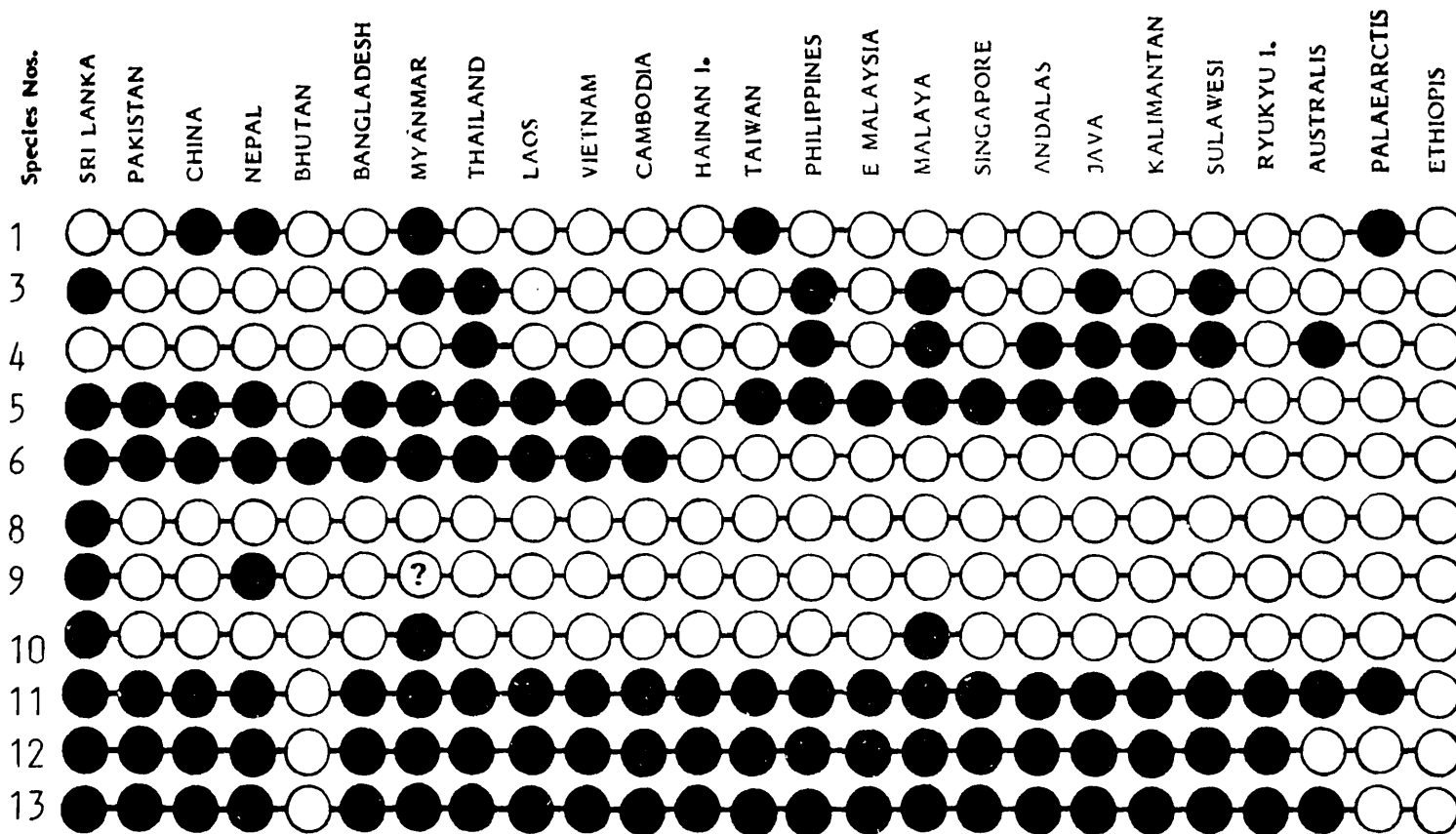
Diag. 2. Distribution of species (as per serial number) of the Bibionidae, Stratiomyidae, Tabanidae, Bombyliidae, Pipunculidae, Micropezidae and Tephritidae in other parts of India (in black shade).



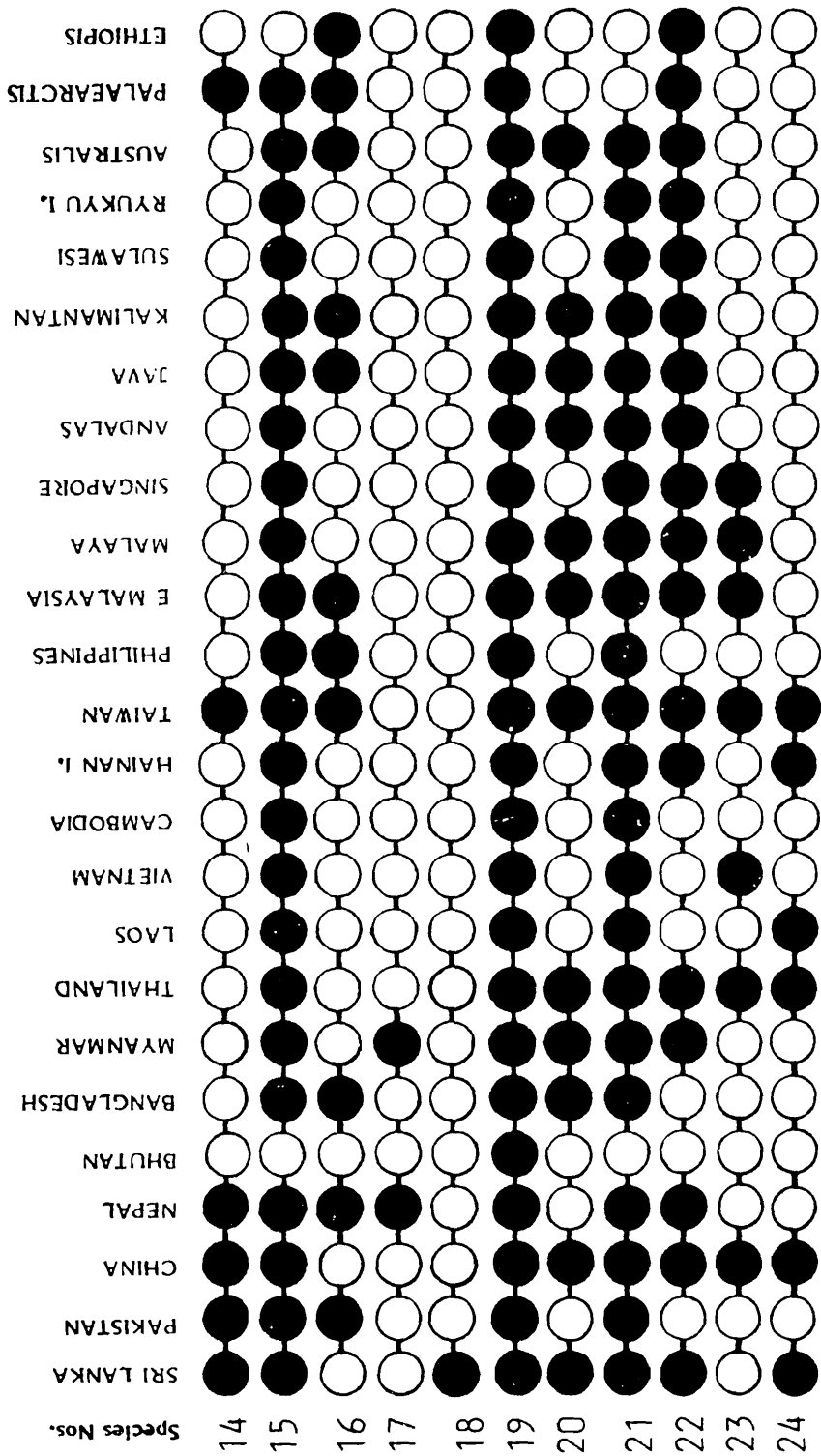
Diag. 3. Distribution of species (as per serial number) of the Sciomyzidae, Sepsidae, Celyphidae, Calliphoridae and Sarcophagidae in other parts of India (in black shade).



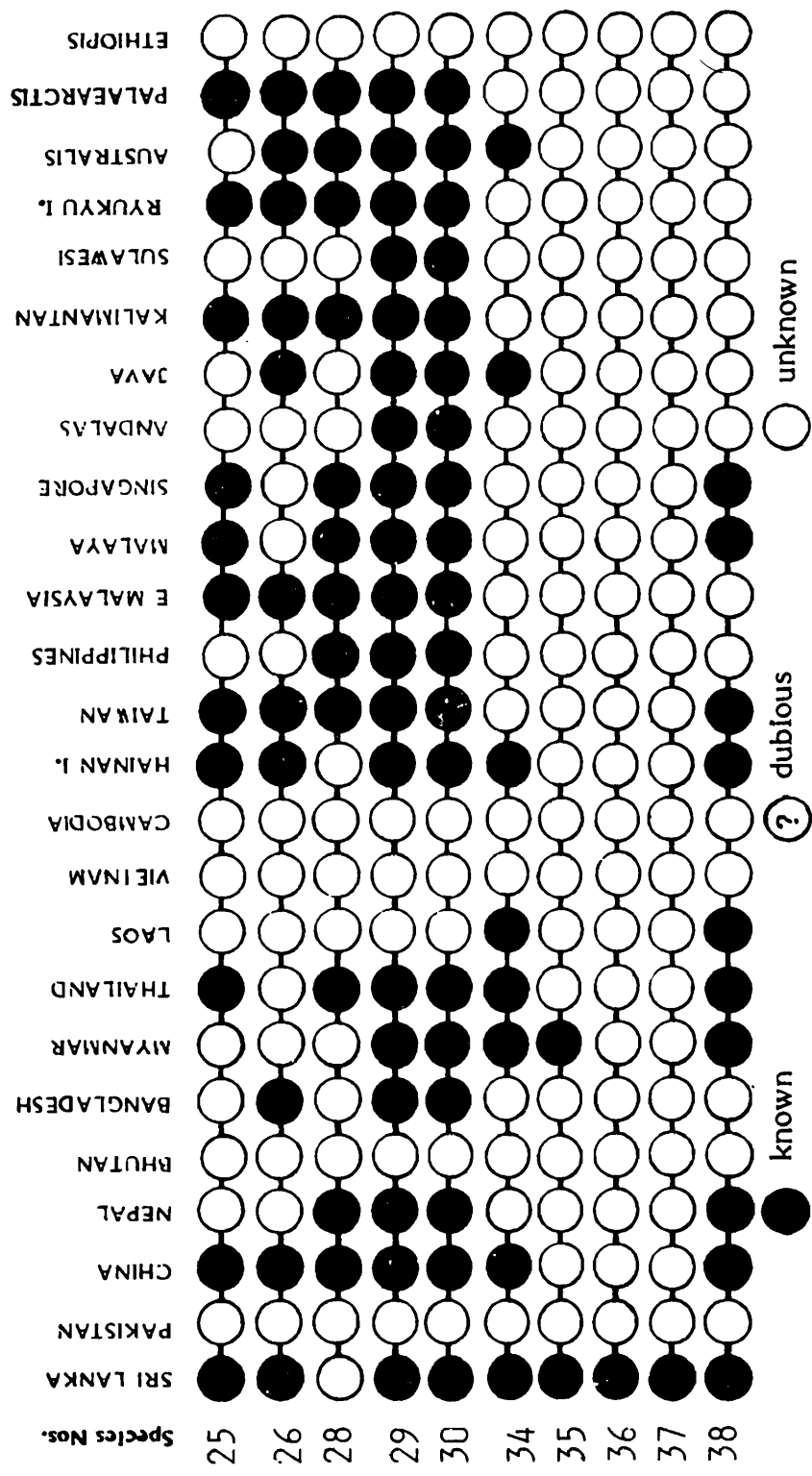
Diag. 4. Distribution of species (as per serial number) of the Sarcophagidae in other parts of India (in black shade).



Diag. 5. Distribution of species (as per serial number) of the Bibionidae, Stratiomyidae, Tabanidae, Bombyliidae, Pipunculidae, Micropezidae, Tephritidae and Sciomyzidae in and around the Oriental region (excepting India).



Diag. 6. Distribution of species (as per serial number) of the Sepsidae, Celyphidae, Calliporidae and Sarcophagidae in and around the Oriental region (excepting India).



Diag. 7. Distribution of species (as per serial number) of the Sarcophagidae in and around the Oriental region (excepting India).

INSECTA : DIPTERA : CULICIDAE

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INTRODUCTION

The first anopheline survey was undertaken in Tripura by Ray and Basu in 1952 and a total of 9 species of *Anopheles* were encountered with preponderance of *An. minimus*. Further, during April-May 1954, a number of hyperendemic villages were surveyed in search for malaria vectors, but the density of anophelines in general and *An. minimus* in particular, was found to be very low (Misra, 1954). Out of 71 *An. minimus* (collected from human dwellings at Hawaibari, a small village about 50 Km northeast of Agartala), 51 fresh specimens were dissected with two mosquitoes found positive for sporozoites (Misra *loc. cit.*).

A detailed study was undertaken during January-May 1954 by Misra and Dhar (1955). Ten species of *Anopheles* were captured with preponderance of *An. vagus*. *An. minimus* formed 13% of the total. *An. fluviatilis* and *An. "hyrcanus"* were recorded for the first time, whereas *An. kochi*, reported by Ray and Basu (1952), was altogether absent. Thus, the anopheline fauna, so far recorded, consisted of eleven species only.

After more than three decades, a detailed mosquito survey was carried out during rainy season at 4 places in Tripura by Das *et al.* (1991). The fauna comprised of 33 species of 6 genera, viz., *Anopheles* (17 species), *Aedes* (2), *Armigeres* (1), *Culex* (8), *Mansonia* (4) and *Coquillettidia* (1). Major species encountered were *Cx. gelidus*, *Cx. tritaeniorhynchus*, *Cx. vishnui*,

Cx. malayi, *An. philippinensis* and *An. karwari*. The collected specimens were deposited in the Entomology Division, Defence Research Laboratory, Tezpur, Assam.

The latest monograph on Indian Anophelines refers 21 species of *Anopheles* from Tripura (Nagpal & Sharma, 1995). However, no comprehensive information regarding faunistic details of mosquitoes of Tripura has been published so far. The present update information is an attempt in this direction.

DESCRIPTION OF THE STUDY AREA

Tripura is situated between 22°56' N and 24°31' N latitude and 91°10' E and 92°21' E longitude. It has an area of 10,486 sq. km., population nearly 27 lakhs. The state is practically landlocked by Bangladesh on all the sides except in north, where it is connected with Assam and Mizoram by a narrow strip of land. The populace consists of Kukis, Chakmas, Gonds, Nagas, Khasias etc. It is a hilly and submountainous state, divided into a number of valleys by a series of high hill ranges. The state is divided into 4 districts namely, Dhalai, Kailash Shahar (formerly North Tripura), Udaipur (South Tripura) and Agartala (West Tripura). Agartala is the state capital.

The housing conditions of tribals are very primitive having no arrangement of sanitation. Houses are built of split bamboo with thatched roof. Paddy-cultivation is the main agricultural crop. Tea, Cotton and Jute are also grown but to

a lesser extent. Hot and humid climate prevails almost throughout the year, with a mild winter during December and January. The rains are spreadout from March to October and mostly received from south-west monsoon. The average rain-fall is around 200 cm.

SYSTEMATIC ACCOUNT

Table-1 : Systematic list of the mosquitoes of Tripura State

Family	CULICIDAE
I Subfamily	ANOPHELINAE
<i>Anopheles</i> Meigen, 1818	
Subgenus <i>Anopheles</i> Meigen, 1818	
<i>barbirostris</i> Vander Wulp, 1884	
<i>crawfordi</i> Reid, 1953	
<i>nigerrimus</i> Giles, 1900	
Subgenus <i>Cellia</i> Theobald, 1902	
<i>aconitus</i> Doenitz, 1902	
<i>annularis</i> Vander Wulp, 1884	
<i>balabacensis</i> Baisas, 1936	
<i>culicifacies</i> Giles, 1901	
<i>dirus</i> Peyton & Harrison, 1979	
<i>fluviatilis</i> James, 1902	
<i>jamesii</i> Theobald, 1901	
<i>jeyporiensis</i> James, 1902	
<i>karwari</i> (James), 1903	
<i>kochi</i> Doenitz, 1901	
<i>maculatus</i> Theobald, 1901	
<i>majidi</i> McCombie Young & Majid, 1928	
<i>minimus</i> Theobald, 1901	
<i>pallidus</i> Theobald, 1901	
<i>philippinensis</i> Ludlow, 1902	
<i>subpictus</i> Grassi, 1899	

tessellatus Theobald, 1901

vagus Doenitz, 1902

II Subfamily CULICINAE

i. Tribe Aediini

Aedes Meigen, 1818

Subgenus *Finlaya* Theobald, 1903

pseudotaeniatus (Giles), 1901

Subgenus *Stegomyia* Theobald, 1901

albopictus (Skuse), 1894

Armigeres Theobald, 1901

Subgenus *Armigeres* Theobald, 1901

subalbatus (Coquillett), 1898

Coquillettidia Dyar, 1905

Subgenus *Coquillettidia* Dyar, 1905

crassipes (Vander Wulp), 1892

ii. Tribe Culicini

Culex Linnaeus, 1758

Subgenus *Culex* Linnaeus, 1758

bitaeniorhynchus Giles, 1901

gelidus Theobald, 1901

quinqüefasciatus Say, 1823

sinensis Theobald, 1903

tritaeniorhynchus Giles, 1901

vishnui Theobald, 1901

Subgenus *Eumelanomyia* Theobald, 1909

malayi (Leicester), 1908

Subgenus *Lutzia* Theobald, 1903

fuscanus Wiedemann, 1820

Mansonia Blanchard, 1901

Subgenus *Mansonioides* Theobald, 1907

annulifera (Theobald), 1901

indiana Edwards, 1930

longipalpis (Vander Wulp), 1892

uniformis (Theobald), 1901

1. *Anopheles barbirostris* Vander Wulp, 1884
State Museum of Natural History, Leyden,
Netherlands, 6 : 248.

Type locality : Mount Ardjoeno, Java, Indonesia.

Taxonomy : Reid (1968) considered it as a species group consisting of 2 subgroups, viz.,

- (a) Barbirostris subgroup having 6 species i.e. *barbirostris*, *campestris*, *donaldi*, *franciscoi*, *hodgkini*, *pollicaris*.
- (b) Vanus subgroup of 5 species i.e. *ahomi*, *vanus*, *barbumbrosus*, *manalangi* and *reidi*.

Of these, *barbirostris*, *ahomi* and *barbumbrosus* are reported from India.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.* 1991), Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : Large mosquito with shaggy appearance, having a tuft of black-scales on 7th. sternite.

Biting habits : Mainly zoophilic. Common in cow-sheds, sties and human-dwellings.

Susceptibility status : Not available. Resistant to DDT/ Dieldrin in adjoining Assam (Das *et al.*, 1987).

Larval ecology : Collected from a stream (with partial shade) in a dense forest (Misra & Dhar, 1955). Breeding habitats include ponds, pools, rice-fields, running streams, shallow wells etc.

Distribution : Oriental species. Occurs in India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Nepal, China, Indonesia, Thailand, Vietnam, Malaysia, Kampuchea, Laos, North Borneo, Moluccas and Timor.

Relation to disease : No role in human malaria transmission in India. Minor role as vector of filariasis. Found infected in nature with Japanese encephalitis virus in adjacent West Bengal (Chakravarty *et al.*, 1975; NIV, Pune, 1979).

Remarks : Taxonomic studies warranted to find out if any other member, besides *barbirostris*, *ahomi*, *barbumbrosus* present in India.

2. *Anopheles crawfordi* Reid, 1953

British Museum of Natural History, London, *Bull ent. Res.*, 44 : 5-76.

Type locality : Kuala Lumpur, Malaysia.

Taxonomy : Species was being identified as *An. sinensis* Wiedmann, 1828, till Reid (1968) classified the *hyrcanus* group, and identified it as a separate species.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Wing without a fringe spot at vein 5.2, apical fringe spot a little shorter, commencing at 2.1, no pale scales on vein 1 (Das *et al.*, 1990 a).

Biting habits : Mainly zoophilic. Also occurs in human habitations.

Susceptibility status : Not available.

Larval ecology : Breeding in paddy-fields, ditches, road side drains (Das *et al.*, 1991), particularly marshes and ground pools (Ramachandra Rao, 1984).

Distribution : Assam, Manipur and Tripura of India, Thailand, Malaysia, Vietnam, Kampuchea and Indonesia.

Relation to disease : No information.

3. *Anopheles nigerrimus* Giles, 1900

Anopheles hyrcanus var. *nigerrimus* Giles, British Museum, London. Handbook of Gnats or Mosquitoes, 1900 : 161.

Type locality : Calcutta (Bengal), India.

Taxonomy : This species was considered as a variety of *Anopheles hyrcanus* (Pallas), 1771, since long.

Synonyms : *Anopheles nero* Doleschall, 1857, *Nat. Tijds. Ned. Indie.*, 14 : 383

Type-loc. : Gombong, Indonesia.

Anopheles indiensis Theobald, 1901a, *Mono. Cul.*, 1 : 145.

Type-loc. : Chennai = Madras (Tamil Nadu), India.

Anopheles pursati Laveran, 1902, *C. R. Soc. Biol.* 54 : 907.

Type-loc. : Pursat, Kampuchea.

Anopheles bentleyi Bentley, 1902, *Ind. Med. Gaz.*, 37 : 15.

Type-loc. : Tezpur (Assam), India.

Anopheles minutus Theobald, 1903a, *Mono. Cul.*, 3 : 91.

Type-loc. : Lahore (Punjab), Pakistan.

Anopheles argyropus Swellengrebel, 1914, *Geneesk. Tijds. Ned. Indie.*, 54 : 334.

Type-loc. : Deli (Sumatra), Indonesia.

Anopheles williamsoni Baisas & Hu, 1936, *Mon. Bull. Bur. Hlth. Philipp.*, 16 : 222.

Type-loc. : Penang, Malaysia.

Anopheles venhuisi Bonne-Wepster, 1951, *Morb. trop.*, 3 : 284.

Type-loc. : Java, Indonesia.

Collection records : Agartala, Maharani (Das *et al.*, 1991). Earlier, specimens of *An. hyrcanus* group were recorded from Tripura by Misra & Dhar (1955).

Distinguishing characters : Inner quarter of costa mainly dark, palpi with distinct pale markings, long dark mark on base of wing vein 5, fringe spot also on vein 5.

Biting habits : Zoophilic.

Susceptibility status : Not known.

Larval ecology : Predominantly a rice-field breeder. Misra & Dhar (1955) collected larvae of "*An. hyrcanus*" from a jungle stream with partial shade.

Distribution : Oriental species, occurs throughout India and Southeast Asia except Philippines.

Relation to disease : Found infected with J. E. virus in West Bengal (Chakravarty *et al.*, 1975; NIV, Pune, 1979). No role in malaria transmission. Natural infections of *Brugia malayi* in this species are reported from Calcutta (Ghosh & Hati, 1966).

Remarks : In northeast, the field workers should be very careful in identification of this species due to occurrence of *An. pedtaeniatus* and *An. sinensis* which are very closely related to *An. nigerrimus*.

4. *Anopheles aconitus* Doenitz, 1902

Zoologisches Museum, Humboldt Univ., Berlin, *Zeit. f. Hyg.*, 41 : 70.

Type locality : Kajoe-Tanam (Sumatra) and Willem Island, Soekaboemi (Java), Indonesia.

Synonyms : *Anopheles vincenti* Laveran, 1901, *C. R. Soc. Biol.*, 53 : 993.

Type-loc. : Van-Linh (Haut Tonkin).

Anopheles albirostris Theobald, 1903a, *Mono. Cul.*, 3 : 24.

Type-loc. : Kuala Lumpur, Malaysia.

Anopheles brahmachari Christophers, 1912, *Paludism.* (5) : 11.

Type-loc. : Calcutta (Bengal), India.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991), Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : A fringe spot at vein 6. Palpi with apical white band equal to sub-apical white band.

Biting habits : Highly zoophilic. Occurrence in human dwellings also noted (Das *et al.*, 1991).

Susceptibility status : Resistant to organochlorines.

Larval ecology : Occur in clean water tanks with grassy edges, in paddy-fields, stillwater having algae/aquatic plants.

Distribution : Eastern and southern zones of India. Throughout the Oriental region. Absent in Taiwan and Philippines.

Relation to disease : Secondary vector of malaria (Anderson & Viswanathan, 1941; Viswanathan *et al.* 1941). Recently incriminated in Bangladesh (Maheswary *et al.* 1992).

Remarks : Studies should be undertaken on this species in northeast, keeping its recent incrimination (in Bangladesh) in view.

5. *Anopheles annularis* Vander Wulp, 1884

State Museum, Leyden, Netherlands, **6** : 249.

Type locality : Mount Ardjoeno, Java, Indonesia.

Synonyms : *Anopheles fuliginosus* Giles, 1900, Handbook of Gnats or Mosquitos : 160.

Type-loc. : Calcutta (Bengal), India.

Anopheles jamesi Liston, 1901, *Ind. Med. Gaz.*, **36** : 441.

Type-loc. : Ellichpur (Maharashtra), India.

Anopheles leucopus Doenitz, 1901, *Insektenborse.*, **18** : 37.

Type-loc. : Doerian, Sumatra, Indonesia.

Anopheles nagpori James & Liston, 1904, *Anop. Mosq. India*, Ed. I : 101.

Type-loc. : Nagpur (Maharashtra), India.

Anopheles lineata Ludlow, 1908, *Canad. Entom.*, **40** : 50.

Type-loc. : Camp Gregg, Luzon, Philippines.

Anopheles adiei James & Liston, 1911, *Anop. Mosq. India*, Ed. II : 89.

Type-loc. : Ferozepur & Amritsar (Punjab), India.

Collection records : Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : Wing vein 5 mainly dark, with a dark spot at the point of bifurcation (Wattal & Kalra, 1961).

Biting habits : Mainly zoophilic, may be collected in human and mixed dwellings.

Susceptibility status : Data not available. Resistant to DDT in nearby states (Sundaram *et al.*, 1980; Das *et al.*, 1987).

Larval ecology : Breeding in ponds, pools, tanks, borrow pits, rice-fields with abundance vegetation, green algae, aquatic weeds, etc.

Distribution : Occurs throughout India. Oriental species-available in Afghanistan, Pakistan, Sri Lanka, Bangladesh, Philippines and China.

Relation to disease : Secondary vector of malaria. Many gut/gland positive mosquitoes were observed in Assam, Shillong and rural West Bengal (Viswanathan *et al.*, 1941, Anderson & Viswanathan, 1941; Ghosh *et al.*, 1985).

Remarks : Studies on *An. annularis* are warranted, as this species is very common in northeast (Malhotra & Mahanta, 1994).

6. *Anopheles balabacensis* Baisas, 1936

Institute of Hygiene, University of Philippines, Manila.

Type locality : Balabac, Balabac Island, Philippines.

Taxonomy : The species was being identified as *An. leucosphyrus* Doenitz, 1901, till Colless (1956) confirmed that the earlier records were either *An. balabacensis* or *An. elegans*, as "true *An. leucosphyrus*" does not occur in India. It has two sub-species, viz., *baisasi* in Philippines and *introlatus* in Malaysia & Thailand, but none occurs in India.

Synonyms : *Anopheles leucosphyrus* Doenitz, 1901, *Insektenborse.*, **18** : 37.

Type-loc. : Kajoe Tanam, Sumatra, Indonesia.

Anopheles elegans James, 1903, *Mono. Cul.*, **3** : 51.

Type-loc. : Karwar (Karnataka), India.

Anopheles hackeri Edwards, 1921, *Bull. ent. Res.*, **12** : 70.

Type-loc. : Borneo, Malaysia, Indonesia.

Anopheles takasagoensis Morishita, 1946, *J. Formosan Med. Assoc.*, **45** : 65-70.

Type-loc. : Dairi, Taiwan.

Collection records : Tripura (Nagpal & Sharma, 1995).

Distinguishing characters : Hind leg with broad white tibiotarsal joint. Commonly called "mosquito with white stockings"

Biting habits : Highly anthropophilic, rarely in cattle-sheds.

Susceptibility status : No data available. Highly susceptible to DDT elsewhere (Sen *et al.*, 1982).

Larval ecology : Breeds deep in the jungles. Larvae occur in pools by side of rocky-streams, disused wells, rain-water pits/nullahs, etc.

Distribution : Eastern and western zones of India, prevalent throughout the northeast. Nepal, Bangladesh, Myanmar, Thailand, Indonesia, Malaysia, Kampuchea, Taiwan, China and Philippines.

Relation to disease : Most efficient vector of human malaria. Not incriminated in Tripura. Role in disease transmission in northeast is well documented (Das *et al.*, 1990b).

Remarks : Extensive studies should be taken up on this vector species, keeping persistent malaria transmission in view. The pinned specimens (if available) may be rechecked to find out whether it includes *An. dirus* also.

7. *Anopheles culicifacies* Giles, 1901

British Museum, London, Giles, 1901a, *Entom. Month. Mag.*, **12** : 197.

Type locality : Hoshangabad (Madhya Pradesh), India.

Taxonomy : Recent studies shown that *An. culicifacies* is a complex having 4 sibling species, viz. A, B, C & D (Vasanthi *et al.*, 1991).

Synonyms : *Anopheles listonii* Giles, 1901a, *Entom. Month. Mag.*, **12** : 197.

Type-loc. : Ellichpur (Maharashtra), India *Anopheles indica* Theobald, 1901a, *Mono. Cul.*, **1** : 183.

Type-loc. : Chennai=Madras (Tamil Nadu), India.

Anopheles punjabensis James, 1911, *Anop. Mosq. India*, Ed. 2 : 72.

Type-loc. : Punjab, India.

Collection records : Agartala; Dharmanagar (Das *et al.*, 1991), Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : During resting, it maintains *Culex*-like posture, hence the name. Wing vein 3 mainly dark.

Biting habits : Highly zoophilic species.

Susceptibility status : Not known. Resistant to chlorinated hydrocarbons and organophosphates in many parts of India.

Larval ecology : Breeding in irrigation channels/wells, swamps, river bed-pools, tanks, ponds, hoof-marks, cart-tracks, etc.

Distribution : A very common mosquito in most parts of India, including high elevations in the Himalayas. Pakistan, Afghanistan, Bangladesh, Sri Lanka, Myanmar, Nepal, China, Thailand, Oman, Behrein, Iraq and Iran.

Relation to disease : Recognised malaria vector. Extensive dissections made earlier by Anderson & Viswanathan (1941) in Assam have shown very low infection rate.

Remarks : Its role in malaria transmission should be investigated. Susceptibility status to DDT/BHC is also warranted.

8. *Anopheles dirus* Peyton & Harrison, 1979

U.S. National Museum, Washington, *Mosq. Syst.*, **11** : 40-50.

Type locality : Ban Bu Phram and Ban Tablan, Thailand.

Taxonomy : In India, the species was known as *An. b. balabacensis* Baisas, till Peyton &

Harrison (1979) described *An. (Cellia) dirus* group in Thailand. They advocated that species which was hitherto being described as *An. b. balabacensis*, was infact *An. dirus*. The specimens of *An. b. balabacensis*, collected from Mizoram (Malhotra *et al.*, 1984) were reexamined by the present author and found to be *An. dirus*.

Synonyms : *Anopheles leucosphyrus* of Ayruakitosol & Griffith, 1963. *Proc. Ninth Pacif Sci. Congr.*, **17** : 122-136.

Anopheles leucosphyrus balabacensis of Thurman, 1959. *Univ. Maryland Agric. Exp. Sta. Bull.*, A-100 : 1-182.

Anopheles balabacensis of Wilkinson *et al.*, 1978. *J. Med. Entomol.*, **14** : 666-671.

Collection records : Maharani, Shantir Bazar (Das *et al.*, 1991), Tripura (Nagpal & Sharma, 1995).

Distinguishing characters : Presector dark mark on vein 1 with one or more pale interruptions, proboscis as long as or slightly shorter than forefemur, apical pale band on hind tibia without a ventral dark stripe (Peyton & Harrison, 1979; Das *et al.*, 1990a).

Biting habits : Highly anthropophilic.

Susceptibility status : Not known.

Larval ecology : Breeding occurs deep in the forests. Larval habitats include pools by side of rocky streams, disused wells, rain water pits/nullahs etc.

Distribution : Northeast India, Myanmar, Bangladesh, Southeast Asian countries, Philippines, Borneo and Thailand.

Relation to disease : Most efficient vector of human malaria. Not incriminated in Tripura. Role in disease transmission in northeast already established (Dutta *et al.*, 1989 a & b; Das *et al.*, 1990b; Nandi *et al.*, 1993).

Remarks : Detailed studies on this species are warranted.

9. *Anopheles fluviatilis* James, 1902

Type unknown. *Sci. Mem. med. sanit. Dep.*, (2) : 31.

Type locality : Duars (Bengal), Nagpur (Maharashtra), Jeypore Hill Tracts (Orissa), India.

Synonyms : *Anopheles listonii* Liston, 1901, *Ind. Med. Gaz.*, **36** : 361.

Type-loc. : Ellichpur (Maharashtra), India.

Anopheles leptomeres Theobald, 1903a, *Mono. Cul.*, **3** : 38.

Type-loc. : Lahore (Punjab), Pakistan.

Anopheles arabica Christophers & Khazan Chand, 1915, *Indian J. Med. Res.*, **3** : 180-200.

Type-loc. : Muscat, Oman.

Collection records : Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : Small to medium size mosquito, wing length 2.4-3.6mm. Inner quarter of costa without white interruption (Wattal & Kalra, 1961).

Biting habits : Predominantly an anthropophilic species.

Susceptibility status : Not known. So far the species has not become resistant to any synthetic insecticide.

Larval ecology : Freshwater streams, field channels, ditches, swamps, rice-fields, etc. with abundant vegetation and good shade.

Distribution : Oriental region, essentially a species of hills and foot hills. India, Afganistan, Pakistan, Nepal, Bangladesh, Myanmar, Thailand, Kazakhstan, Iran, Iraq, Oman, Behrin, Yemen, Saudi Arabia and Taiwan.

Relation to disease : Very efficient vector of malaria in India. Not incriminated in Tripura. Recently positive specimens found in Assam (Nandi *et al.*, 1993).

Remarks : Two biological races, one in hills/foot-hills (highly anthropophilic, small densities

with high infection rate) and another in plains (highly zoophilic, high densities, low infection rate). No morphological differences (Ramachandra Rao, 1984). Recent studies indicated 3 sibling species within *An. fluviatilis* (Subbarao *et al.*, 1994).

10. *Anopheles jamesii* Theobald, 1901

British Museum, London, Theobald, 1901a, *Mono. Cul.* 1 : 134.

Type locality : Quilon (Kerala), India.

Taxonomy : The species was mostly confused with *An. annularis*, *An. splendidus* and *An. ramsayi*.

Collection records: Very common species. Collected from all the four places of survey in Tripura (Das *et al.*, 1991).

Distinguishing characters : Golden yellow scales on the apical portion of dorsum of 7th and 8th abdominal segments.

Biting habits : Adults abundantly found in cow-sheds, rarely in human dwellings.

Susceptibility status : Not known.

Larval ecology : Larvae occur in tanks, rain-pools, ponds with grass, springs, surface-wells, growing rice-fields, etc.

Distribution : India, Nepal, Bangladesh, Myanmar, China, Sri Lanka, Malaysia and Thailand.

Relation to disease : No malaria infection recorded so far.

11. *Anopheles jeyporiensis* James, 1902

British Museum, London, *Sci. Mem. med. sanit. Dep.*, (2) : 32.

Type locality : Patingi (Jeypore Hills Tracts, Orissa), India.

Synonyms : *Anopheles candidiensis* Koidzumi, 1924, *Trans. Far-East. Ass. trop. Med.* 5th Cong. : 98.

Type-loc. : Lake Candidus, Taiwan.

Anopheles tonkinensis Toumanoff, 1931, *Bull. Soc. Path. Exot.*, 24 : 958-967.

Type-loc. : Tonkin, Indonesia.

Collection records : Tripura (Ray & Basu, 1952; Misra & Dhar, 1955; Nagpal & Sharma, 1995).

Distinguishing characters : Basal 3rd of costa with one or more white interruptions. Tarsi with narrow and very distinct pale bands (Das *et al.*, 1990a).

Biting habits : During day time, large numbers are available in cattle-sheds and lesser inside houses. No preference for cattle/man, biting equally, depending upon availability.

Susceptibility status : Not known.

Larval ecology : Breeding in grassy slow moving streams, channels, fallow rice-fields, swampy land, grass grown edges of lakes (Christophers, 1933).

Distribution : India, Nepal, Bangladesh, Myanmar, China, Thailand and Indochina.

Relation to disease : Not a vector of any human disease.

12. *Anopheles karwari* James, 1903

British Museum, London, *Mono. Cul.*, 3 : 102.

Type locality : Karwar (Karnataka), India.

Synonym : *Anopheles nigrans* Station, 1912, *J. London Sch. Trop. Med.*, 2 : 7.

Collection records : Very common species throughout Tripura. Recorded from all the places of survey (Das *et al.*, 1991).

Distinguishing characters : Medium size mosquito, wing length 2.5-4.3 mm. Female palpi with 4 white bands.

Biting habits : In abundance in cow-sheds and human dwellings. Less common in pig sties and goat-cabins (Das *et al.*, 1991).

Susceptibility status : Not known.

Larval ecology : Breeding in ponds, weedy tanks, springs, seepages and slow running streams.

Distribution : Oriental region. India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Nepal, China, Indonesia, Borneo, Malaysia and New Guinea.

Relation to disease : Not regarded as a vector anywhere, though few malaria infected specimens have been found.

13. *Anopheles kochi* Doenitz, 1901

Zoologisches Museum, Humboldt University, Berlin, Germany, *Insektenborse.*, **18** : 36.

Type locality : Padang (Sumatra), Indonesia.

Synonyms : *Anopheles ocellatus* Theobald, 1901a, *Mono.Cul.*, **1** : 174.

Type-loc. : Taipang (= Taiping), Perak, Malaysia.

Anopheles halli James, 1910, *Paludism.*, **1** : 33.

Type-loc. : Sylhet, Bangladesh.

Anopheles flava Ludlow, 1908, *Canad. Entom.*, **40** : 32.

Type-loc. : Quezon, Luzon, Philippines.

Collection records : Recorded from Tripura (Ray & Basu, 1952), found absent in the collections of Misra & Dhar (1955). A common mosquito species in Tripura (Das *et al.*, 1991).

Distinguishing characters : Presence of conspicuous abdominal hair tuft on the ventral side of segments II-VII. Female palpi with 4 pale bands. Vein 6 has maximum of 3 dark spots (Ramachandra Rao, 1984).

Biting habits : Mainly zoophilic.

Susceptibility status : Not known.

Larval ecology : Shallow muddy collections of water, groundpools, buffalo-wallows, fallow rice-fields.

Distribution : India, Nepal, Bangladesh, Myanmar, Thailand, Malaysia, Indonesia, Philippines, Borneo and China.

Relation to disease : Species not regarded as a vector of human malaria, however, infected specimens were found in Assam.

14. *Anopheles maculatus* Theobald, 1901

British Museum, London, Theobald, 1901a, *Mono. Cul.*, **1** : 171.

Type locality : Hong Kong, China.

Synonyms : *Anopheles pseudowillmorei* Theobald, 1910, *Mono. Cul.*, **5** : 65.

Type-loc. : Meenglas, Duars (Bengal), India.

Anopheles dravidicus Christophers, 1924, *Indian J. Med. Res.*, **12** : 297.

Type-loc. : Nilgiri Hills (Tamil Nadu), India.

Anopheles hanabusai Yamada, 1925, *Sci. Repts. Govt. Inst. Inf. Dis.*, **4** : 471.

Type-loc. : Kagi, Taiwan.

Variety : *Anopheles maculatus* var. *willmorei* (James), 1903, *Mono. Cul.*, **3** : 100.

Type-loc. : Kashmir (Jammu & Kashmir), India.

Collection records : Recorded from the state (Das *et al.* 1991).

Distinguishing characters : Speckled legs, hind tarsi 5 and part of 4 white.

Biting habits : Mainly exophilic. The species bites outdoor as well as indoor. Anthropophilic.

Susceptibility status : Unknown. In Arunachal Pradesh, the species resistant to DDT (Sundaram *et al.*, 1980).

Larval ecology : Primarily a stream breeder but also occurs in ponds, water tanks, pools (formed in river-beds), rarely in rice-fields.

Distribution : Oriental species. India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Nepal, Indonesia, Taiwan, Borneo, Malaysia, China and Philippines.

Relation to disease : The earlier dissections confirmed the presence of gut/gland positive *An. maculatus* in Assam (Anderson & Viswanathan,

1941, Viswanthan *et al.*, 1941). However, no recent incrimination is reported.

Remarks : Studies on this suspected vector are warranted.

15. *Anopheles majidi* McCombie Young & Majid, 1928

National Institute of Communicable Diseases, Delhi, *Indian J. Med. Res.*, **16** : 469.

Type locality : Coorg (Karnataka), India.

Taxonomy : Species first described as a variety of *An. karwari*.

Collection records : Agartala (Das *et al.*, 1991).

Distinguishing characters : Female palpi has only 3 bands-two white broad apical bands and one narrow basal band.

Biting habits : Adults collected in houses and in cattle-sheds.

Susceptibility status : Not known.

Larval ecology : Breeding in slow running streams, open drains in tea-gardens and fallow rice-fields.

Distribution : India, Bangladesh, Nepal and Myanmar.

Relation to disease : No relation to malaria.

16. *Anopheles minimus* Theobald, 1901

Type unknown. Theobald, 1901a, *Mono. Cul.*, **1** : 186.

Type locality : Pokfulam, Hong Kong.

Synonyms : *Anopheles christophersi* Theobald, 1902, *Proc. Roy. Soc.*, **69** : 378.

Type-loc. : Duars (Bengal), India.

Anopheles formosaensis Tsuzuki, 1902, *Arch. Schiffs-u. Tropenhyg.*, **6** : 287.

Type-loc. : Taiwan.

Anopheles cohaesa Doenitz, 1903, *Zeit. f. Hyg.*, **43** : 233.

Type-loc.: Not known.

Anopheles alboapicalis Theobald, 1910, *Mono. Cul.*, **5** : 25.

Type-loc. : Meenglas, Duars (Bengal), India.

Anopheles flavirostris Ludlow, 1914, *Bull. No. 4*, Surg-Gen. Off., Washington : 1-97.

Type-loc. : Camp Wilhelm, Tayabas, Luzon, Philippines.

Anopheles merak Mangkoewinoto, 1919, *Meded brugerl. geneesk. Denist. Ned. Indie.*, **8** : 41-82.

Type-loc. : Kali Madaksa, Merak (Java), Indonesia

Collection records : Ray & Basu (1952) collected *An. minimus* for the first time from Tripura. Later, specimens of *An. minimus* were collected from Hawaibari, at the foot-hills of Buramurra range (Misra, 1954), and various other places/villages althrough Tripura State (Misra & Dhar, 1955). Recently, again recorded from Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Inner quarter of costa with a white interruption atleast on one wing. No fringe spot on vein 6.

Biting habits : Highly anthropophilic.

Susceptibility status : No tests in Tripura. In Mizoram, the species was highly susceptible to DDT (Das *et al.*, 1990b).

Larval ecology : Swamps and seepages containing plentiful clear slow moving water.

Distribution : Oriental species, widely occurs in India, Pakistan, Bangladesh, Sri Lanka, Nepal, Myanmar, Thailand, Indonesia, Malaysia, Philippines, Taiwan, China and Hong Kong.

Relation to disease : Recognised vector of human malaria in India. Incriminated in Tripura (Misra, 1954). In a recent study, 63.9% parity was noted in this species which further gives a strong indiction about its vectorial status (Das *et al.*, 1991) It's role in malaria transmission in northeast is also well recognised (Dutta & Baruah 1987; Nandi *et al.*, 1993; Dutta *et al.*, 1994).

Remarks : Vectorial status of *An. minimus* in Tripura is highly warranted. Recent dwindling of *An. minimum* susceptibility to DDT also needs further confirmation.

17. *Anopheles pallidus* Theobald, 1901

British Museum, London, Theobald, 1901a, *Mono. Cul.* 1 : 134.

Type locality : Sambalpur (Orissa), Chennai (Tamil Nadu), India.

Taxonomy : The species was previously considered as a variety of *An. fuliginosus* (= *An. annularis*).

Synonym : *Anopheles fowleri* Christophers, 1911, *Paludism.*, (2) : 64.

Type-loc. : Amritsar (Punjab), India.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Brownish mosquito with lightly coloured wings. Vein 5 is mainly pale except at base and apex, and having no dark spot in its middle portion.

Biting habits : May be collected in cow-sheds as well as in human dwellings.

Susceptibility status : No records. Highly susceptible to DDT in Myanmar (Ramachandra Rao, 1984).

Larval ecology : Breeding in ditches, ponds, shallow pools, tanks, field channels, just planted rice-fields, etc.

Distribution : India, Sri Lanka, Bangladesh, Nepal, Myanmar, Thailand, Malaysia, Indonesia and Indochina.

Relation to disease : Secondary malaria vector in Bengal, Bihar, Orissa and East central India. *An. pallidus* can be experimentally infected with *W. bancrofti*, but no natural infection recorded so far.

18. *Anopheles philippinensis* Ludlow, 1902

U. S. National Museum, Washington, *J. Amer. Med. Assoc.*, 39 : 426.

Type locality : San Jose, Abra, Luzon, Philippines.

Taxonomy : Earlier, this species was confused with *An. annularis*.

Synonyms : *Anopheles nivipes* Theobald, 1903b, *Entom.*, 36 : 258.

Type-loc. : Kuala Lumpur, Malaysia.

Anopheles freerae Banks, 1906, *Philipp. J. Sci.*, 1 : 993.

Type-loc. : Manila, Philippines.

Anopheles pampangensis Brunetti, 1920, *Rec. Ind. Mus.*, 17 : 114.

Anopheles hainanensis Takei, 1941, *Bull. nav. med. Ass.*, 30 : 417.

Type-loc. : Pao-ting, Nan-feng and Tahsing, Hainan Islands, China.

Collection records : Widely distributed in Tripura. Collected from all the places of survey (Das *et al.*, 1991).

Distinguishing characters : Wing vein 5 mainly white with no dark spot at the point of bifurcation. Distal end of hind tarsus 1 is almost white (Wattal & Kalra, 1961).

Biting habits : Mainly zoophilic (Khin-Maung-Kyi, 1972; Rajagopal, 1976) but its anthropophilic index is also very high. Rests in houses and cattle sheds during day time. The species showed a marked preference for biting outdoors than indoors thus indicating exophagy (Das *et al.*, 1991).

Susceptibility status : Susceptible to DDT in Tripura (Nawab Singh & Chakrabarti, 1979) and elsewhere also (Dutta Choudhury Malhotra, 1982). Recent tests revealed 95% mortality (Das *et al.*, *loc. cit.*).

Larval ecology : Breeds in swamps, water tanks, ponds, ditches and rice-fields. Good growth of vegetation with stagnant water are the preferential breeding places (Ramachandra Rao, 1984).

Distribution : India, Bangladesh, Nepal, Myanmar, Philippines, Indonesia, China, Thailand, Indochina, Hainan Islands.

Relation to disease : Not incriminated as a malaria vector in Tripura so far, but its high density, high man-mosquito contact and high parity rate (59%) gives a very strong indication about its vectorial status (Das *et al.*, 1991). Sporozoites positive specimens were recorded in Burma-Bangladesh border areas (Khin-Maung-Kyi, 1972), Burnihat-Assam/Meghalaya border (Rajagopal, 1976).

Remarks : Further studies on this important vector species is urgently warranted in Tripura.

The present author feels that specimens of *An. philippinensis* collected from Tripura should be re-examined, if possible, as these might be having atleast few examples of *An. nivipes* Theobald, which is very much similar to *An. philippinensis*.

19. *Anopheles subpictus* Grassi, 1899

Rome University Museum, Rome, *Atti R. Accad. d. Lincei.*, **8** : 101.

Type locality : Calcutta (Bengal), India.

Synonyms : *Anopheles rossii* Giles, 1899, *J. trop. Med.*, **2** : 63.

Type-loc. : Calcutta, India.

Anopheles error Theobald, 1903a, *Mono. Cul.*, **3** : 353.

Type-loc. : Calcutta, India.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991), Tripura (Ray & Basu, 1952; Misra & Dhar, 1955).

Distinguishing characters : Female palpi has the dark pre-apical area almost equal to the apical white band. Tarsai of forelegs have broad pale bands.

Biting habits : Feeding on cattle and domestic animals, but in their absence, it may bite man in large numbers.

Susceptibility status : Not available for Tripura. Resistant to DDT in India and Pakistan (Ramachandra Rao, 1984).

Larval ecology : Breeding occurs in ground pools, ponds, tanks, lake-margins, wells, borrow-pits, irrigation channels, rice-fields, etc.

Distribution : Oriental species. India, Bangladesh, Pakistan, Nepal, Malaysia, Indonesia, Sri Lanka, Afganistan, New Guinea, Iran and China.

Relation to disease : No role in disease transmission.

20. *Anopheles tessellatus* Theobald, 1901

British Museum, London, Theobald, 1901a, *Mono Cul.*, **1** : 175.

Type locality : Taipang (=Taiping), Perak, Malaysia.

Taxonomy : The species was often called as *Anopheles punctualatus* Doenitz. There are 2 subspecies viz., *orientalis* Swellengrebel Swellengrebel de graff, 1919 and *kalavara* Stoker Koesoemawinangoen, 1949, but none occurs in India.

Synonyms : *Anopheles formosae* Hatori, 1901, Kwampo, no. 5534 : 275.

Type-loc. : Taihoka, Kielum and Tansui, Taiwan.

Anopheles deceptor Doenitz, 1902, *Zeit. f. Hyg.*, **41** : 60.

Type-loc. : Sumatra, Indonesia.

Anopheles thorntonii Ludlow, 1904, *Canad. Entom.*, **36** : 69.

Type-loc. : Oras Samar & Cottabato, Mindanao, Philippines.

Anopheles ceylonica Newstead & Carter, 1910, *Ann. Trop. Med. Parasit.*, **4** : 377.

Type-loc. : Trincomalee, Sri Lanka.

Anopheles kinoshitai Koidzumi, 1917, *Dobuts. Zs.*, **29** : 135.

Type-loc. : Ryukokosho, Taihoku (Taipai), Taiwan.

Anopheles taiwanensis Koidzumi, 1917, *Dobuts. Zs.*, **29** : 135.

Type-loc. : Banshoryo, Taiwan.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : The female palp has 3 broad and 1 short pale band. Apical half of the proboscis is also pale. Femur and tibia speckled (Wattal & Kalra, 1961).

Biting habits : Adults prefer to bite cattle than man.

Susceptibility status : Not known.

Larval ecology : Breeding in small pools, swamps, rice-fields, irrigation/seepage channels with preference for dirty stagnant water.

Distribution : Throughout the Oriental region. India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Thailand, Malaysia, Hong Kong, Taiwan, China, Philippines, Moluccas and New Guinea.

Relation to disease : Suspected vector of malaria. Regarded as minor malaria vector in Indonesia and Maldives.

21. *Anopheles vagus* Doenitz, 1902

Zoological Museum, Humboldt University, Berlin, *Zeit. f. Hyg.*, **41** : 80.

Type locality : Fort De Kock, Sumatra, Indonesia.

Taxonomy : The species was considered as a variety of *Anopheles rossii*. This species has 2 subspecies, viz., *limosus* King, 1932 and *albino* Stoker & Waktoedi, 1949, but none in India.

Synonyms : *Anopheles immaculatus* James, 1902, *Sci. Mem. med. sanit. Dep.*, (2) : 35.

Type-loc. : Ennur, near Madras (Tamil Nadu), India.

Anopheles indefinita Theobald, 1907, *Mono. Cul.*, **4** : 47.

Type-loc. : Unknown.

Anopheles flava Swellengrebel, 1917, *Geneesk. Tijds. Ned. Indie.*, **57** : 807.

Type-loc. : Soerabaia, Java, Indonesia.

Anopheles javanensis, Swellengrebel & Swellengrebel deGraff, 1920, *Bull. ent. Res.*, **11** : 91.

Anopheles flavescens Swellengrebel, 1921, *Zte-auflage. Meded. Kolon. Inst. Amst.*, **15** : 47.

Type-loc. : Soerabaia, Java, Indonesia.

Collection records : The species was found to be very common and collected at all the places of survey in Tripura (Ray & Basu, 1952; Misra & Dhar, 1955, Das *et al.*, 1991).

Distinguishing characters : Female palp has a long apical pale band followed by a narrow pale band, interrupted by a short dark area. Femur, tibia unspeckled (Ramachandra Rao, 1984).

Biting habits : Mainly zoophilic, but also occur in human dwellings. Indoor biter.

Susceptibility status : Resistant to DDT (Das *et al.*, 1991).

Larval ecology : Most predominant species found breeding in borrow-pits mostly along the road sides (Misra & Dhar, 1955). Breeding habitats are hoof-marks, rain-water pools, ditches, rice-fields, spring pools, canals, wells, irrigation channels, etc. (Ramachandra Rao, 1984).

Distribution : Most common species in the Oriental region. Extensively occurs in India, Pakistan, Bangladesh, Indonesia, Sri Lanka, Philippines, Malaysia, China, Moluccas and Mariana Islands.

Relation to disease : Not considered as a malaria vector but biting nuisance. Recently incriminated as malaria vector in neighbouring Bangladesh (Maheswary *et al.*, 1994).

Remarks : The species may play role of a minor malaria vector.

22. *Aedes pseudotaeniatatus* (Giles), 1901

British Museum, London, Giles, 1901b, *J. Bombay Nat. Hist. Soc.*, **13** : 607.

Type locality : Nainital (Uttar Pradesh), Bakloh (Punjab), India.

Taxonomy : Earlier, this species was referred as *Aedes notoscriptus* Skuse, an Australian species, not occurring in India.

Variety : *Aedes (Finlaya) banksi* Edwards, 1922.

Type-loc. : Philippines.

Collection records : Agartala (Das *et al.*, 1991).

Distinguishing characters : The species is well recognized by ornamentation of mesonotum, dark proboscis, striped femora and apical & basal white rings on hind tarsi (Barraud, 1934).

Biting habits : Zoophilic, occurring mainly in cow sheds.

Susceptibility status : Not known.

Larval ecology : Breed in cement sinks, drains, cisterns, rock-pools, tyres, drums, cut-bamboos and tree holes.

Distribution : India, Pakistan, Bangladesh, Sri Lanka, Myanmar and Nepal.

Relation to disease : No role in disease transmission.

23. *Aedes albopictus* (Skuse), 1894

Culex albopictus Skuse, 1894 (1895), Sydney National Museum, Sydney, Australia, *Indian Mus. Notes*, 3 : 20.

Type locality : Calcutta (Bengal), India.

Synonyms : *Aedes (Stegomyia) scutellaris* Ludlow, 1903, *J. N. Y. ent. Soc.*, 11 : 138.

Type-loc. : Samar, Philippines.

Aedes (Stegomyia) quasinigritia Ludlow, 1911, *Psyche.*, 18 : 129.

Type-loc. : Turucan, Mindanao, Philippines.

Aedes nigritia Ludlow, 1910, *Canad. Entom.*, 42 : 194.

Type-loc. : Cotabato, Mindanao, Philippines.

Aedes (Stegomyia) lamberti Ventrillon, 1904, *Bull. Mus. Hist. nat.*, 10 : 552.

Type-loc. : Ankazobe, Diego-Suarez, Majunga, Madagascar.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Narrow silvery-white median line, running almost the whole length of mesonotum. Broad white rings on all segments of hind tarsi.

Biting habits : Anthropophilic.

Susceptibility status : Not available. Larvae susceptible to synthetic insecticides in Assam (Chakraborty *et al.* 1981).

Larval ecology : Breeding in drums, cut-bamboos, tree-holes, artificial receptacles, cement sinks, drains, cisterns, rock pools, tyres, leaf-axils etc.

Distribution : Most common *Aedes* species found almost every where in India. Widely distributed in Oriental, Australian and certain parts of Palaearctic and Ethiopian regions.

Relation to disease : Recognised vector of dengue and dengue haemorrhagic fever.

Remarks : No dengue epidemic has so far been reported from Tripura, but its nuisance as day biter is very well known among tribals and troops (Malhotra, 1985, 1988).

24. *Armigeres subalbatus* (Coquillett), 1898

Culex subalbatus Coquillett, 1898, U. S. National Museum, *Proc. U. S. Nat. Mus.*, 21 : 302.

Type locality : Japan.

Synonyms : *Armigeres obturbans* Walker, 1859, *J. Proc. Linn. Soc. London Zool.*, 4 : 91.

Type-loc. : Amboyna, Moluccas.

Culex ventralis Walker, 1860, *J. Proc. Linn. Soc. London Zool.*, 5 : 144.

Type-loc. : Celebes, Moluccas.

Armigeres panalectoris Giles, 1902, Handbook of Gnats or Mosquitoes : 386.

Type-loc. : Calcutta (Bengal), India.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : A large size mosquito. Eyes bordered with creamy or white flat scales. A patch of broad white scales in middle of vertex. Scutellar scales flat and broad (Barraud, 1934).

Biting habits : Zoophilic. Preference for cattle-bloodmeal as compared to human, pigs and goats.

Susceptibility status : Not known.

Larval ecology : Breeding in cesspits, cesspools, drains, septic tanks and all types of containers having foul/polluted water.

Distribution : Oriental and South-west Palaearctic region. Occurs in India, Pakistan, Bangladesh, Sri Lanka, Nepal, Myanmar and Philippines. Species distributed all over India.

Relation to disease : An efficient vector of JE and filariasis.

Remarks : A prime nuisance mosquito due to its vicious diurnal man-biting activity.

25. *Coquillettidia crassipes* (Vander Wulp), 1892

Mansonia (*Coquillettidia*) *crassipes* (Vander Wulp), 1892 (1881), State Museum, Leyden, Netherlands, *Bijid. Fauna Mid. Sumatra Dipt.* : 9.

Type locality : Soeroelangoen (Sumatra), Indonesia.

Taxonomy : Earlier, *Coquillettidia* Dyar, 1905, was considered as a subgenus, under the genus *Mansonia* Blanchard, 1901.

Synonyms : *Taeniorhynchus brevicellulus* Theobald, 1901b, *Mono. Cul.*, 2 : 212.

Type-loc. : Selangor, Malaysia and Thayetmyo, Myanmar.

Chrysoconops pygmaeus Theobald, 1908, *Rec. Ind. Mus.*, 2 : 300.

Type-loc. : Sylhet, Bangladesh and Purnea (Bihar), India.

Chrysoconops fuscopteron Theobald, 1911, *Tijdschr. Ent.*, 54 : 233-240.

Type-loc. : Digoel River, New Guinea.

Chrysoconops diaeretus Dyar, 1920, *Insec. Inscit. menst.*, 8 : 181.

Type-loc. : Los Banos, Philippines.

Collection records : Maharani, Shantir Bazar, Dharmanagar (Das *et al.*, 1991).

Distinguishing characters : Characterised by its yellowish-brown thorax, dark wings and legs. Female head covered by upright forked yellow scales.

Biting habits : Zoophilic. Adult specimens can be collected in cow-sheds and sties. Rarely in human habitations.

Susceptibility status : Not Known.

Larval ecology : Breeding in water tanks, pools, swamps, marshy water-logged areas, with vegetation.

Distribution : India, Pakistan, Bangladesh, Sri Lanka, Nepal, Myanmar, Malaysia, Australia, Fiji and Solomon Islands.

Relation to disease : No role in disease transmission.

26. *Culex bitaeniorhynchus* Giles, 1901

Type Unknown. Giles, 1901b, *J. Bombay Nat. Hist. Soc.*, 13 : 607.

Type locality : Travancore (Kerala), India.

Synonyms : *Taeniorhynchus ager* Giles, 1901c, *Entom.*, 34 : 196.

Type-loc. : Chennai = Madras (Tamil Nadu), India.

Culex infula Theobald, 1901a, *Mono. Cul.*, 1 : 370.

Type-loc. : Taipang, Perak, Malaysia.

Grabhamia taeniarostris Theobald, 1907, *Mono. Cul.*, 4 : 299.

Type-loc. : Peradeniya, Sri Lanka.

Oculeomyia sarawaki Theobald, 1907, *Mono. Cul.*, 4 : 514.

Type-loc. : Sarawak, Borneo.

domesticus Leicester, 1908, *Cul. Malaya*, 3 : 169.

Type-loc. : Kuala Lumpur, Malaysia.

abdominalis Taylor, 1913, *Rep. Aust. Inst. trop. Med.*, 1911 : 53.

Type-loc. : Ayr and Townsville, Queensland, Australia.

karatsuensis Mochizuki, 1913, *Fukuoka Acta. med.*, 7 : 28.

Type-loc. : Karatsu, Kyushu, Japan.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Large sized mosquito. Speckled wings, banded proboscis and apical yellow bands on abdominal tergites.

Biting habits : Zoophilic. It's avidity to cattle is well documented (Rahman, 1988).

Susceptibility status : Not known.

Larval ecology : Breeding in open weedy pools (having abundance of green algae), ditches, paddy-fields, etc.

Distribution : Oriental, Palearctic, Ethiopian and Australian regions. The species has been recorded from all over India and all South-east Asian countries.

Relation to disease : Recognised vector of Japanese encephalitis.

27. *Culex gelidus* Theobald, 1901

British Museum, London, Theobald, 1901b, *Mono Cul.*, 2 : 20.

Type locality : Selangor, Malaysia.

Varieties : *cuneatus* Theobald, 1901b, *Mono. Cul.* 2 : 22.

Type-loc.: Taipang, Perak, Malaysia and Quilon, Travancore (Kerala), India.

bipunctata Theobald, 1907, *Mono. Cul.*, 4 : 374.

Type-loc. : India and Saravak.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Small sized mosquito with white scaling on mesonotum.

Anterior white area of mesonotum is not produced in lines to scutellum. Femur and tibia uniformly dark in front and above.

Biting habits : Zoophilic. Prefers bovine blood. Occasionally on pigs, man and birds (Rahman, 1988).

Susceptibility status : Not known.

Larval ecology : Breeding in ponds, pools, marshy tracks etc. Presence of weed is always preferred by this species.

Distribution : South-east Asia, Oriental, Palearctic and New Guinea in Australian region. Recorded from all over India.

Relation to disease : Suspected vector of JE in India.

28. *Culex quinquefasciatus* Say, 1823

U. S. National Museum, Washington, *J. Acad. Nat. Sci. Philad.*, 3 : 10; *Culex fatigans* Wiedemann, 1828, Barraud, 1934 : 420-423.

Type locality : United States.

Synonyms : *Culex fatigans* Wiedemann, 1828, *Aussereurop. zweifl. ins.*, 1 : 10.

Type-loc. : East Indies, Indonesia.

Culex cingulatus Doleschall, 1856, *Nat. Tijds. Ned. Indie* 10 : 405.

Type-loc. : Java, Indonesia.

Culex doleschallii Giles, 1900, *Handbook of Gnats or Mosquitoes* : 338.

Type-loc. : Indonesia.

Culex quasipipiens Theobald, 1901b, *Mono. Cul.*, 2 : 136.

Type-loc. : Sambalpur (Orissa), India.

Culex fouchowensis Theobald, 1901b, *Mono. Cul.*, 2 : 137.

Type-loc. : Fou Chow, China.

Culex reesii Theobald, 1901b, *Mono. Cul.*, 2 : 145.

Type-loc. : Hong Kong, China.

Culex sericeus Theobald, 1901b, *Mono. Cul.*, **2** : 147.

Type-loc. : Hong Kong, China.

Culex albolineatus Giles, 1901b, *J. Bombay Nat. Hist. Soc.*, **13** : 609.

Type-loc. : Shahjahanpur (Uttar Pradesh), India.

Culex christophersi Theobald, 1907, *Mono. Cul.* **4** : 453.

Type-loc. : India.

Culex minor Theobald, 1908, *Rec. Ind. Mus.*, **2** : 298.

Type-loc. : Lushai Hills, Sylhet, Bangladesh.

Collection records : Agartala, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Large size mosquito with narrow golden brown scales on the vertex. Dark scaling on mesonotum, with dark brown/nearly black legs. Dark tarsi.

Biting habits : Highly anthropophilic.

Susceptibility status : Not known for Tripura. Species resistant to chlorinated hydrocarbons and organosphosphates in most of the areas in India.

Larval ecology : Larvae occur in ditches, ponds, rocky pools, cement tanks, nalahs, discarded tyres/drums, etc.

Distribution : Cosmopoliton in distribution, occurs in tropical and subtropical regions. In India, it is the most common mosquito species which is encountered every where.

Relation to disease : Recognised vector of Bancroftian filariasis.

Remarks : Susceptibility status to conventional insecticides and its role in disease transmission should be taken up in Tripura as cases of filariasis have been reported from the northeast region in the recent past.

29. *Culex sinensis* Theobald, 1903

British Museum, London, Theobald, 1903a, *Mono. Cul.*, **3** : 180.

Type locality : Shaohyiling, China.

Taxonomy : This species was previously considered as a variety of *Culex gelidus*. Now it has been upgraded to species level.

Synonyms : *Culex sepositus* Leicester, 1908, *Cul. Malaya*, **3** : 152.

Type-loc. : Kuala Lumpur, Malaysia.

Taeniorhynchus tenax Leicester, 1908, *Cul. Malaya*, **3** : 167.

Type-loc. : Kuala Lumpur, Malaysia.

tripunctatus Mochizuki, 1913, *Fukuoka Acta. med.*, **7** : 24.

Type-loc. : Fukuoka, Kyushu, Japan.

Collection records : Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Resembles *Cx. bitaeniorhynchus* in general appearance. Differentiated by the presence of entirely dark scaled wings.

Biting habits : Zoophilic. Occur in human dwellings also.

Susceptibility status : Not known.

Larval ecology : Immatures are found in ditches, ponds, nalahs, puddles, road-side drains, paddy-fields, large sized pools having abundance of weed.

Distribution : Wide distribution in Oriental and Palearctic regions. Occurs in India, Pakistan, Bangladesh, Sri Lanka, Nepal, Taiwan, China, Thailand, Philippines and Japan.

Relation to disease : No role in human disease transmission.

30. *Culex tritaeniorhynchus* Giles, 1901

British Museum, London, Giles, 1901b, *J. Bombay Nat. Hist. Soc.*, **13** : 606.

Type locality : Travancore (Kerala), India.

Taxonomy : It was considered as one of the species under *Cx. vishnui* group, till it was redescribed by Reuben (1969).

Synonyms : *Culex vishnui* Theobald, 1901a, *Mono. Cul.*, 1 : 355.

Type-loc. : Quilon, Travancore (Kerala), India.

Culex annulus Theobald, 1901a, *Mono. Cul.*, 1 : 358.

Type-loc. : Tai Po, Pokfulam (Hong Kong), China.

Culex sitiens Theobald, 1901a, *Mono. Cul.*, 1 : 360.

Type-loc. : Taiping, Perak, Malaysia.

Culex biroi Theobald, 1905, *Ann. hist. nat. Mus. hung.*, 3 : 82

Type-loc. : Mumbai (= Bombay), (Maharashtra), India.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Small mosquito with dark brown scales, uniformly covering whole of the mesonotum. Femora and tibia dark brown.

Biting habits : Zoophilic. Mainly cattle (97%), others i.e. goat, sheep, bird, man (3%) (Rahman, 1988).

Susceptibility status : Not known for Tripura. Resistant to DDT is most of the north-eastern states.

Larval ecology : Breeds in rural situations and immatures are prevalent in ground pools, puddles, paddy-fields, road side ditches, rocky-pools, nalahs, etc. (Rahman, 1988; Das *et al.* 1991). Its breeding is restricted to water with abundant filamentous green algae.

Distribution : Oriental, Palearctic and Ethiopian regions, besides Mediterranean and Middle east countries. The species has been recorded from all over India.

Relation to disease : Recognised vector of Japanese encephalitis. Virus isolation has been done at number of places in India.

31. *Culex vishnui* Theobald, 1901

British Museum, London, Theobald, 1901a, *Mono. Cul.*, 1 : 355.

Type locality : Chennai = Madras (Tamil Nadu), India.

Taxonomy : Reuben (1969) redescribed *Cx. vishnui* group and distinguished it from other closely related species namely *Cx. pseudovishnui* and *Cx. tritaeniorhynchus*.

Synonyms : *Culex impellens* Theobald, 1901a, *Mono. Cul.*, 1 : 362.

Type-loc. : India.

Culex annulus Theobald, 1901a, *Mono. Cul.*, 1 : 358.

Type-loc. : Tai Po, Pokfulam, Hong Kong.

Culex pseudoinfula Theobald, 1911, *Tijdschr. Ent.*, 54 : 237.

Type-loc. : Pasuruan and Samarang, Java, Indonesia.

Culex adela Baisas, 1938, *Mon. Bull. Bur. Hlth. Philipp.*, 18 : 200.

Type-loc.: Tungcong Manga, Philippines.

Variety : *perplexus* Leicester, 1908, *Cul. Malaya*, 3 : 150.

Type-loc. : Kuala Lumpur, Malaysia.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Small brown mosquito with a pale band on proboscis. Distinguished by scaling of mesonotum and of male palpi and structure of male hypopygium.

Biting habits : Zoophilic. Cattle (87%), birds (5.1%), man (3.2%), amphibians (2.5%), pigs (0.2%), dogs (0.2%) (Rahman, 1988).

Susceptibility status : No studies have been carried out in Tripura. Resistant to DDT in other north-eastern states.

Larval ecology : Breeding in rural situations. Aquatic stages found in ground pools, road-side ditches, ponds, puddles, rice-fields, etc. where aquatic vegetation such as grass, paddy crops, water hyacinth, lemna, etc. are abundant (Rahman, 1988; Das *et al.*, 1991).

Distribution : Oriental and Palearctic regions. It ranges from northwest Frontiers of Pakistan to northeast India. Occurs in India, Pakistan, Sri Lanka, Bangladesh, Nepal, Myanmar, China, Japan and New Guinea.

Relation to disease : Recognised vector of JE in India.

32. *Culex malayi* (Leicester), 1908

Aedes malayi Leicester, 1908, British Museum, London, *Cul. Malaya*, 3 : 184.

Type locality : Kuala Lumpur, Malaysia.

Synonyms : *Aedes nigrescens* Theobald, 1907, *Mono. Cul.*, 4 : 540.

Type-loc. : Castle Rock, North Kanara (Karnataka), India.

Aioretomyia aedes Leicester, 1908, *Cul. Malaya*, 3 : 189.

Type-loc. : Kuala Lumpur, Malaysia.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : It differs from allied species in head scaling and colouration of pleurae. In the middle of the vertex, there is a small area of narrow scales.

Biting habits : Zoophilic.

Susceptibility status : Not studied in Tripura.

Larval ecology : Immatures occur in ponds, rocky-pools, discarded tyres, drums, cut-bamboos, rice-fields, etc.

Distribution : Oriental species, very common all through the south-east Asia. Occurs in India, Pakistan, Bangladesh, Sri Lanka, Malaya, Nepal, Maldives Islands, Myanmar, Thailand, Indochina, China, Indonesia, Formosa, New Guinea, Hong Kong.

Relation to disease : Not involved in disease transmission. Biting nuisance due to its high density and small size.

33. *Culex fuscus* Wiedemann, 1820

Type specimen unknown. *Dipt. Exot.*, 1 : 9.

Type locality : India.

Synonyms : *Culex concolor* Theobald, 1901b, *Mono. Cul.* 2 : 107.

Type-loc. : Unknown.

Culex setulosus Doleschall, 1857, *Nat. Tijds. Ned. Indie.*, 14 : 384.

Type-loc. : Gombong, Java, Indonesia.

Culex luridus Doleschall, 1857, *Nat. Tijds. Ned. Indie.*, 14 : 384.

Type-loc. : Gombong, Java, Indonesia.

Collection records : Maharani (Das *et al.*, 1991).

Distinguishing characters : Large sized mosquito. Head covered with narrow pale scales and numerous upright scales, which appear almost dark from all the sides.

Biting habits : Zoophilic. Females seldom attack man.

Susceptibility status : No data available.

Larval ecology : Occur in water pits, pools, shallow wells, discarded tyres, domestic containers, etc. Larvae are predaceous in nature.

Distribution : Oriental, Palearctic, Australian regions. Widely distributed-India, Pakistan, Bangladesh, Sri Lanka, Nepal.

Relation to disease : No role in disease transmission.

Remarks : Larvae of *Cx. fuscus* may be used in control of other mosquito larvae, due to their predaceous nature.

34. *Mansonia annulifera* (Theobald), 1901

British Museum, London, Theobald, 1901b, *Mono. Cul.*, 2 : 183.

Type locality : Chennai=Madras (Tamil Nadu), Quilon, Travancore (Kerala), India.

Synonyms : *Panoplitus seguini* Laveran, 1901, *C. R. Soc. Biol.*, 53 : 992.

Type-loc. : Hanoi, Tonkin, Vietnam.

Mansonioides septemguttata Theobald, 1907, *Mono. Cul.*, 4 : 499.

Type-loc. : Sarawak, Borneo.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Small yellowish-brown mosquito. Female head with some white scales along eye-margins and at sides.

Biting habits : Zoophilic.

Susceptibility status : No available for Tripura.

Larval ecology : Breeds profusely in tanks, ponds, open drainage, marshy water-logged areas, paddy-fields infested with aquatic weeds. Immatures always found attached to the roots of aquatic plants for respiration-an inherited behaviour.

Distribution : Oriental species. India, Pakistan, Bangladesh, Nepal, Sri Lanka, Malaysia, Philippines and New Guinea.

Relation to disease : Chief vector of Brugian filariasis. JE virus isolated from *M. annulifera* at Dibrugarh (Assam) (Chakraborty *et al.* 1980).

35. *Mansonia indiana* Edwards, 1930

British Museum, London, *Bull. ent. Res.*, 21 : 541.

Type locality : Bandjaran, South Preanger, Java, Indonesia.

Collection records : Agartala, Dharmanagar, Maharani (Das *et al.*, 1991).

Distinguishing characters : Brownish mosquito with complete absence of greenish stripes on the mesonotum.

Biting habits : Zoophilic.

Susceptibility status : Not available.

Larval ecology : Breeding in water tanks, ponds, paddy-fields, etc. infested with aquatic weeds. Immatures always found attached with roots (for respiration) of hydro-plants.

Distribution : Occurs in India, Pakistan, Bangladesh, Nepal, Myanmar, Malaysia,

Singapore, Java & Sumatra of Indonesia, Thailand, Indo-China and New Guinea.

Relation to disease : Recognised vector of Brugian filariasis.

36. *Mansonia longipalpis* (Vander Wulp), 1892

State Museum, Leyden, Netherlands, (Vander Wulp), 1892 (1881), *Bijid. Fauna Mid. Sumatra Dipt.* : 9.

Type locality : Alaham panjang (near Soeroelangoen), Sumatra, Indonesia.

Taxonomy : The species was earlier considered as a variety of *Mansonia dives* (Schiner).

Synonym : *Culex annulipes* Walker, 1856, *J. Proc. Linn. Soc. London Zool.*, 1 : 6.

Type-loc. : Singapore.

Collection records : Maharani (Das *et al.*, 1991).

Distinguishing characters : Large sized yellow-brown mosquito with dark colouration. Mesonotum marked with 2 or 3 white spots.

Biting habits : Mainly zoophilic, occasionally bites man when in high densities.

Susceptibility status : Not known.

Larval ecology : Breeding in water, rich in decaying organic matters. Larvae are found attached to aquatic plants.

Distribution : India, Pakistan, Bangladesh, Sri Lanka, Singapore, Malaysia, Thailand, Indonesia, New Guinea, Philippines, Australia and Hainan Islands.

Relation to disease : Principle vector of Brugian filariasis.

37. *Mansonia uniformis* (Theobald), 1901

British Museum, London, Theobald, 1901b, *Mono. Cul.*, 2 : 180.

Type locality : Quilon, Travancore (Kerala), India and Taiping, Malaysia.

Synonyms : *Mansonia reversus* Theobald, 1901b, *Mono. Cul.*, **2** : 189.

Type-loc. : Zomba, Nyasaland.

Mansonia australiensis Giles, 1902, Handbook of Gnats or Mosquitoes : 355.

Type-loc. : Burpengry, Queensland, Australia.

Mansonia marquesensis Dyar, 1925, *Insec. Inscit. menst.*, **13** : 43.

Type-loc. : Lorenzo Marques, Mozambique.

Collection records : Agartala, Dharmanagar, Maharani, Shantir Bazar (Das *et al.*, 1991).

Distinguishing characters : Large sized brownish mosquito with less defined rings on femora. Mesonotum marked with a pair of sublateral greenish stripes.

Biting habits : Zoophilic. Prevalent in cattle-sheds, sties and goat-cabins. Great affinity to pigs/piglets.

Susceptibility status : Not known.

Larval ecology : Breeding in swamps and pools, with thick vegetation. Larvae attached to the roots of aquatic plants i.e. *Eichhornia speciosa*, *Pistia* sp., *Salvania* sp., etc.

Distribution : Oriental, Ethiopian and Australian regions. Its range extends from Africa to Japan and Ryukya-Retto. India, Pakistan, Bangladesh, Sri Lanka and Nepal.

Relation to disease : Recognised vector of Brugian filariasis.

SUMMARY

The various mosquito surveys conducted in the state of Tripura, till date, show the presence of 37 species under 6 genera, viz., *Anopheles* (21 species), *Aedes* (2), *Armigeres* (1),

Coquillettidia (1), *Culex* (8) and *Mansonia* (4). All the documented species are furnished with synonymy, salient taxonomic characters, distribution, biology and their role in disease transmission.

Vectors of JE, viz., *Cx. tritaeniorhynchus*, *Cx. vishnui*, *Cx. bitaeniorhynchus* and *An. barbirostris* were reported breeding in various habitats and adult specimens were also trapped in enormous numbers during the recent survey. Similarly, malaria vectors, viz., *An. minimus*, *An. maculatus*, *An. philippinesis* and *An. culicifacies* were also encountered in good numbers. However, there are no much chances of transmission of filariasis as Tripura and other north-eastern states are non-endemic for the disease.

It is suggested that more extensive surveys should be undertaken in Tripura during different seasons, which may provide very useful information on the distribution and prevalence of various mosquito species, current susceptibility status and disease transmission. It is also recommended that indoor spraying with residual insecticides such as DDT/HCH (BHC) in houses, cattle-sheds and piggeries alongwith anti larval measures should be adopted as a routine, in addition to adequate chemotherapy to minimise the parasitic load in the tribal community.

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INSECTA : DIPTERA : ASILIDAE

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INTRODUCTION

The Asilidae or robberflies belong to the suborder Brachycera of the order Diptera. These flies are commonly found in arid and semi-arid regions of the world and help to maintain the natural balance among insect population. The group has, therefore, been studied well in various parts of the world. In India, Joseph and Parui made considerable contributions during 1976-1993 (see Joseph and Parui 1990).

Recently Zoological Survey of India undertook a number of surveys in Tripura and the asilid materials were collected by Dr. G. K. Srivastava (March 1991), Shri B. N. Das (October-November 1991), Shri S. Ahmed (December 1991) and S. K. Chakraborty (May 1992). The material contains 10 species inclusive of single new species under 8 genera of the subfamilies—Dasypogoninae and Asilinae. However, there was the record of only single species i.e. *Astochia muralidharani* Joseph and Parui of Asilidae from Tripura (Ratan Lal 1960, Oldroyd 1975) and, therefore, the other 10 species collected from the state are recorded for the first time.

MATERIAL AND METHOD

Adult robberflies are caught by the butterfly net. For further details the reader may be referred to "The Fauna of India and adjacent countries, Diptera, Asilidae Part I. by Joseph and Parui 1998.

MORPHOLOGY AND TERMINOLOGY

For details of its the reader may be referred to "The Fauna of India and adjacent countries, Diptera, Asilidae, Part I.

SYSTEMATIC ACCOUNT

Key to the subfamilies

1. Palpus one-segmented; first flagellomere long and slender; marginal cell closed.....
.....ASILINAE

Palpus two-segmented; first flagellomere spindle-shaped; marginal cell opened; females usually with circlet of spines on acanthophorites DASYPOGONINAE

Subfamily DASYPOGONINAE

Tribe STICHOPOGONINI

Frons and vertex strongly diverge; vertex expanded but less wider at antennal level; first flagellomere with thick spine-tipped style.

Key to the genera

1. First flagellomere nearly three times the basal two segments together, arista shorter than first flagellomere and with pectinate hairs clustered at tip*Michotamia* Macquart
(1 species only)

First flagellomere short, much shorter than the basal two segments together 2

2. Fourth posterior cell closed and stalked; mystax consists of plenty of bristles; arista

plumose *Cophinopoda* Hull
(1 species only)

Fourth posterior cell opened; mystax usually
of a single row of bristles above epistome;
arista bare *Stichopogon* Loew
(1 species only)

Genus *Stichopogon* Loew

1847. *Stichopogon* Loew, *Linn. Ent.*, 2 : 499.

Type-species : *Dasypogon elegantulus*
Wiedemann, 1820; original designation.

1. *Stichopogon dasi* n. sp.

A small black species with black and
yellowish-brown legs and lightly infuscated wing.
Male : 4.00-5.00 mm, wing 3.00-4.00 mm;
female : 5.00-6.00 mm, wing 4.00-5.00 mm.

Female : Head black with white tomentum;
mystax straw coloured; fronto-orbital pale yellow;
ocellar bristles pale yellow, postcranium with
pale yellow bristles; gena and postgena white
pilose. Antennal scape and pedicel dark-grey and
first flagellomere black. Proboscis and palpi black
with sparse white pile.

Thorax black, sparsely grey-tomentose;
pronotum with pale yellow pile; scutum with
sparse pale yellow vestiture and yellow bristles;
scutellum grey tomentose, disc bare, hind border
with pale yellow pile; pleura white tomentose.
Haltere yellow with brown base.

Leg black and yellowish-brown, coxa to femur
black; tibia and tarsal segments yellowish-brown
with dark brown apex, vestiture as well as bristles
pale-yellow; wing lightly infuscated.

Abdomen grey tomentose with distinct dark-
brown pattern from tergites 1-6, tergites 7-8 grey
tomentose. Female genitalia (Fig. 1) with eighth
tergite bearing a circlet of spines, lamella pale
yellow with dark brown base and sparsely haired.
Male : Similar. Male genitalia (Fig. 2) pale yellow.
The species is named after the collector.

Holotype : F, India : Tripura: West Tripura
district, Sonamura, Gumti river bed, 6. xi. 1991,
coll. B. N. Das. Paratypes 3M, 1F, other details

as in holotype; 1M, 1F, South Tripura district :
Belonia, 12. xi. 1991, Coll. B. N. Das.

Remarks : The species is similar to
Stichopogon indicus Joseph and Parui (1988)
but differs in the colouration of scape and pedicel,
in the shape of lamella of female and details of
male genitalia.

Genus *Cophinopoda* Hull

1958, *Cophinopoda* Hull, *Proc. ent. Soc. Wash.*; 60 : 351.

Type-species : *Asilus chinensis* Fabricius,
original designation

2. *Cophinopoda chinensis* (Fabricius)

1794. *Asilus chinensis* Fabricius, *Ent. Syst.*, 4 : 383.

Material examined: 1M, Tripura : North
Tripura district : Ambassa, 2. iii. 1991, Coll.
G. K. Srivastava.

Diagnosis : Mystax pale-yellow; scape and
pedicel yellowish-brown, first flagellomere black;
thorax black with golden yellow tomentum;
femora black, tibiae orange-yellow except hind
tibia with dark brown apex; wing almost wholly
infuscated; abdomen golden-yellow with tergum
2 basally black; tergites 3-4 medially black; male
genitalia yellowish-brown with pale yellow setae.

Distribution : Tripura (North Tripura), Andhra
Pradesh, Assam, Bihar, Kerala, Meghalaya, Orissa,
Sikkim, Tamil Nadu, Uttar Pradesh and West
Bengal; China; Japan; Korea; Sri Lanka; Sumatera.

Genus *Michotamia* Macquart

1838. *Michotamia* Macquart, *Dipt. exot.*, 1(2) : 72.

Type-species *Michotamia analis* Macquart, by
monotypy.

3. *Michotamia aurata* (Fabricius)

1794. *Asilus aurata* Fabricius, *Ent. Syst.* 4 : 387.

Material examined : 1M, Tripura : South
Tripura district : Belonia, 12. xi. 1991, coll. B. N.
Das.

Diagnosis : Mystax pale yellow; antennal scape
and pedicel orange-yellow, first flagellomere

black; thorax black with dense greyish-yellow and grey tomentum; scutum with a mediolongitudinal black stripe; legs yellowish brown and pale yellow; basal half of wing pale yellow, rest infuscated; tergites 1-4 and 7 yellowish-brown, remaining tergites black; male genitalia dark brown and yellowish brown.

Distribution : Tripura (South Tripura), Andhra Pradesh, Bihar, Kerala, Madhya Pradesh, Orissa, Pondicherry and Tamil Nadu; Celebes; Myanmar; Taiwan and W. Pakistan.

Subfamily ASILINAE

Tribe ASILINI

Key to the genera

1. Submarginal cells 2 2
Submarginal cells 3; radial fork longer than second posterior cell; antenna closely situated *Philodicus* Loew (2 species only)
2. Fourth posterior cell bulged forward causing discal cell constricted; first longitudinal vein almost fused with costa
..... *Clephyroneura* Becker (1 species only)
Fourth posterior cell not bulged 3
3. Basitarsus of foreleg highly thickened; male genitalia pedunculata; female ovipositor of 5-elongate, slender segments
..... *Astochia* Becker (2 species only)
Basitarsus of fore-leg of normal thickness; male and female genitalia of different pattern 4
4. Facial tubercle highly developed with numerous bristles on it
..... *Machimus* Loew (2 species only)
Facial tubercle less developed with a few bristles on it
..... *Neomochtherus* Osten Sacken (1 species only)

Genus *Astochia* Becker

1913. *Astochia* Becker, *Ann. Mus. zool. Acad. St. Petersburg*, 17 : 538.

Type-species : *Astochia metatarsata* Becker.

Key to the species

1. Femora wholly black; scutellar disc black pilose *muralidharani* Joseph & Parui
Femora brownish-yellow with black stripe, scutellar disc yellow pilose
..... *philus* (Walker)

4. *Astochia muralidharani* Joseph and Parui

1987. *Astochia muralidharani* Joseph and Parui, *Bull. Zool. Surv. India*, 8(1-3) : 99

Material examined: 1M, Tripura : South Tripura district : Belonia 1 km. east of Forest Rest house, 28. ix. 1977. Coll. N. Muralidharan.

Distribution : Tripura (South Tripura).

5. *Astochia philus* (Walker)

1849. *Asilus philus* Walker, *List Dipt. Colln. Br. Mus.* 2 : 393.

Material examined : 1F, Tripura : South Tripura District : Belonia, 12. xi. 1991. Coll. B. N. Das.

Distribution : Tripura (South Tripura), Assam, Sikkim; and West Bengal ; Bangladesh; Bhutan; Myanmar; Nepal.

Genus *Clephyroneura* Becker

1925. *Clephyroneura* Becker, *Ent. Mitt.*, 14 : 68.

Type-species : *Asilus xanthopus* Wiedemann, designated by Oldroyd, 1938.

6. *Clephyroneura minor* Oldroyd

1938. *Clephyroneura minor* Oldroyd, *Ann. Mag. nat. Hist.*, (11) 1 : 461.

Material examined : 1M, Tripura : North Tripura district : Ambassa, 2. iii. 1991, Coll. G. K. Srivastava.

Diagnosis : Moustache white; scape and pedicel yellow, rest of antenna black; scutum black, yellow tomentose, humeri yellow; scutellum

with black pile on disc and margin with black bristles; abdomen yellow with grey segmentations; legs yellow; costa moderately dilated.

Distribution : Tripura (North Tripura), Assam and Meghalaya.

Genus *Machimus* Loew

1849. *Machimus* Loew, *Linn. Ent.*, 4 : 94.

Type-species : *Asilus chrystis* Meigen, by original designation.

Key to the species

1. Eighth sternite highly produced and with a brush of long pile at the apex; mystax pale yellow *assamensis* Ricardo
- Eighth sternite moderately produced and with a few pile at its apex; mystax medially pale yellow surrounded by black bristles
..... *hirtipes* Ricardo

7. *Machimus assamensis* Ricardo

1919. *Machimus assamensis* Ricardo, *Ann. Mag. nat. Hist.*, (9)3 : 46.

Material examined: 1M; Tripura : West Tripura district : Hawa Bari, 11. v. 1992, Coll. S. K. Chakraborty.

Distribution : Tripura (West Tripura) and Assam.

Remarks : Femora not wholly black and eighth sternite with only black pile.

8. *Machimus hirtipes* Ricardo

1919. *Machimus hirtipes* Ricardo, *Ann. Mag. nat. Hist.*, (9)3 : 49.

Material examined : 1M. Tripura : West Tripura district : Chakma forest : Teliamura F. R. H., 15. xii. 1991, Coll. S. Ahmed.

Distribution : Tripura (West Tripura), Kerala, Meghalaya and Tamil Nadu.

Genus *Neomochtherus* Osten Sacken

1878. *Neomochtherus* Osten Sacken, *Smithson. Misc. Colln.*, 16 : 82, 235. (replacement name of *Mochtherus* Loew, 1849).

Type-species : *Asilus pallipes* Meigen, automatic.

9. *Neomochtherus gnavus* (van der Wulp)

1872. *Mochtherus gnavus* van der Wulp, *Tijdschr. Ent.*, 15 : 243.

Material examined : 1M, Tripura : South Tripura district : Belonia, 12. xi. 1991, Coll. B. N. Das.

Diagnosis : Mystax yellow; antenna yellowish-brown; thorax black, grey tomentose, humeri with pale pile; scutellum black; legs yellow, hind femur and tibia with a black area at apex; wing infuscated at apex which extends up to fifth posterior cell; abdomen black, with lateral pale yellow pile and bristles, male genitalia black, epandrium bifurcated with upper arm small and truncate at apex.

Distribution : Tripura (South Tripura), Assam, Arunachal Pradesh, Meghalaya, Sikkim and Uttar Pradesh; Borneo; Celebes; Java, Thailand; Sri Lanka.

Genus *Philodicus* Loew

1848. *Philodicus* Loew, *Linn. Ent.*, 3 : 391.

Type-species : *Asilus javanus* Wiedemann, by original designation.

Key to the species

1. Legs black and red; moustache yellow and black *javanus* (Wiedemann)
- Legs black; moustache white
..... *femoralis* Ricardo

10. *Philodicus femoralis* Ricardo

1921. *Philodicus femoralis* Ricardo, *Ann. Mag. nat. Hist.*, (9) 8 : 190

Material examined: 2M, 2F, Tripura : South Tripura district : Belonia, 12.xi. 1991, Coll. B. N. Das.

Distribution : Tripura (South Tripura), Assam, Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Meghalaya, Orissa, Rajasthan, Uttar Pradesh and West Bengal; Myanmar.

Remarks : Male and female genitalia (Fig. 3, 4, 5) figured here for the first time.

11. *Philodicus javanus* (Wiedemann)

1819. *Asilus javanus* Wiedemann, *Zool. Mag.* (Wied.), 1 (3) : 4.

Material examined : 1M, 1F, Tripura : South Tripura district : Peratia, 10.xi.1991, Coll. B. N. Das.

Distribution : Tripura (South Tripura), Assam, Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Tamil Nadu and Uttar Pradesh; Bangladesh; Java; Myanmar; Pakistan; Sri Lanka; Sumatera; Timar Islands.

Remarks : Male genitalia (Fig. 6,7) is figured here for the first time.

SUMMARY

The Asilidae are represented in Tripura by 11 species of which *Cophinopoda chinensis*, *Neomochtherus gnavus*, *Michotamia aurata* and *Philodicus javanus* are the wide spread Oriental

species ranging eastward but not crossed Weber's line, while the latter two species further radiated westward to Pakistan. *Philodicus femoralis* a species described from Myanmar migrated to India and became widely distributed. *Machimus hirtipes* was described from Assam and spreaded to southern India. *Machimus assamensis* and *Clephydroneura minor* are endemic to northern India. The genus *Microstylum* is widely distributed in Bangladesh but Tripura being adjacent to it there is no record of it. Other two recorded species of Bangladesh i.e. *Astochia philus* and *Philodicus javanus* have been recorded from Tripura.

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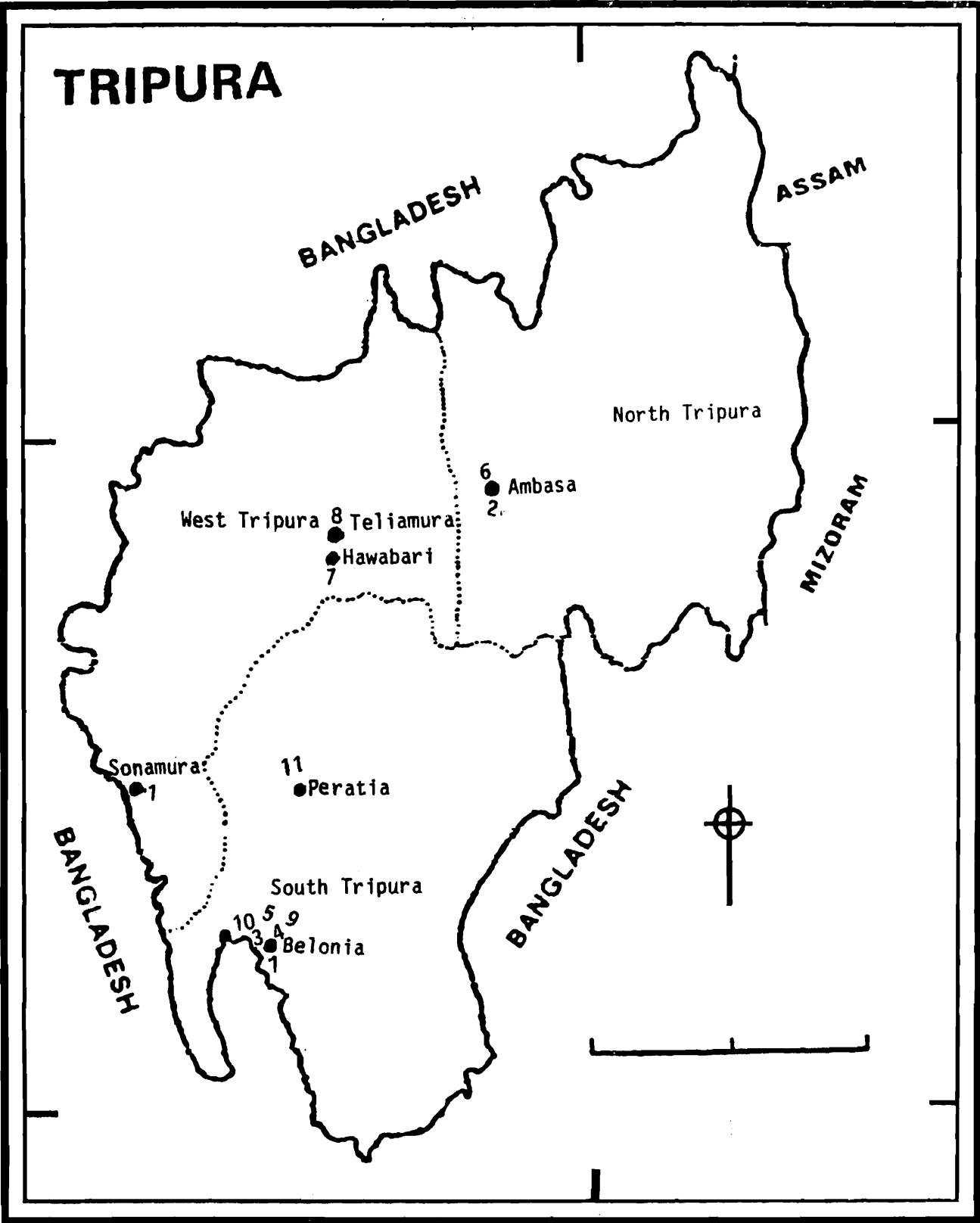
The author is grateful to Dr. A. K. Ghosh, ex-Director, for permitting to study the material. The author records his sincere thanks to Drs. S. K. Tandon, the than Scientist-SF and J. K. Jonathan, Scientist-SG for constant encouragement as well as to Dr. M. Datta, Scientist-SE for his generous advice in preparing the manuscript.

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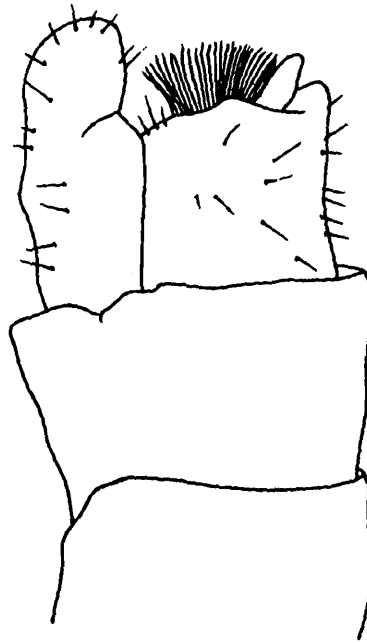
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Table I. Distributions of the species in India

11.	10.	9.	8.	7.	6.	5.	4.	3.	2.	1.	Sl. No. of Species
								+	+	-	Andaman Is.
								+	+	-	Andhra Pradesh
+	+	+								-	Arunachal Pradesh
+	+	+		+	+	+			+	-	Assam
+	+							+	+		Bihar
											Chandigarh
											Dadra & Nagar Haveli
											Delhi
											Goa
											Gujarat
											Haryana
+	+										Himachal Pradesh
											Jammu & Kashmir
+	+										Karnataka
			+					+	+		Kerala
											Lakshadweep
								+			Madhya Pradesh
											Maharashtra
											Manipur
	+	+	+		+			+			Meghalaya
											Mizoram
											Nagaland
	+							+	+		Orissa
								+			Pondicherry
											Punjab
	+										Rajasthan
		+				+			+		Sikkim
+			+					+	+		Tamil Nadu
+	+	+							+		Uttar Pradesh
	+					+			+		West Bengal



Map showing distributions of the species.



5 mm

Fig 1

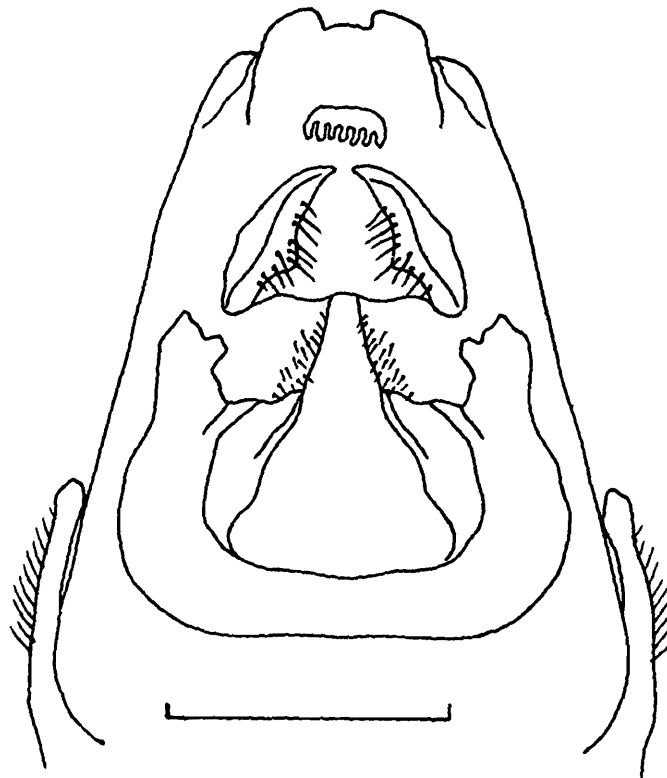


Fig 2

Fig. 1 : *Stichopogon dasi* n. sp. lateral view of female genitalia.Fig. 2 : *Stichopogon dasi* ventral view of male genitalia.

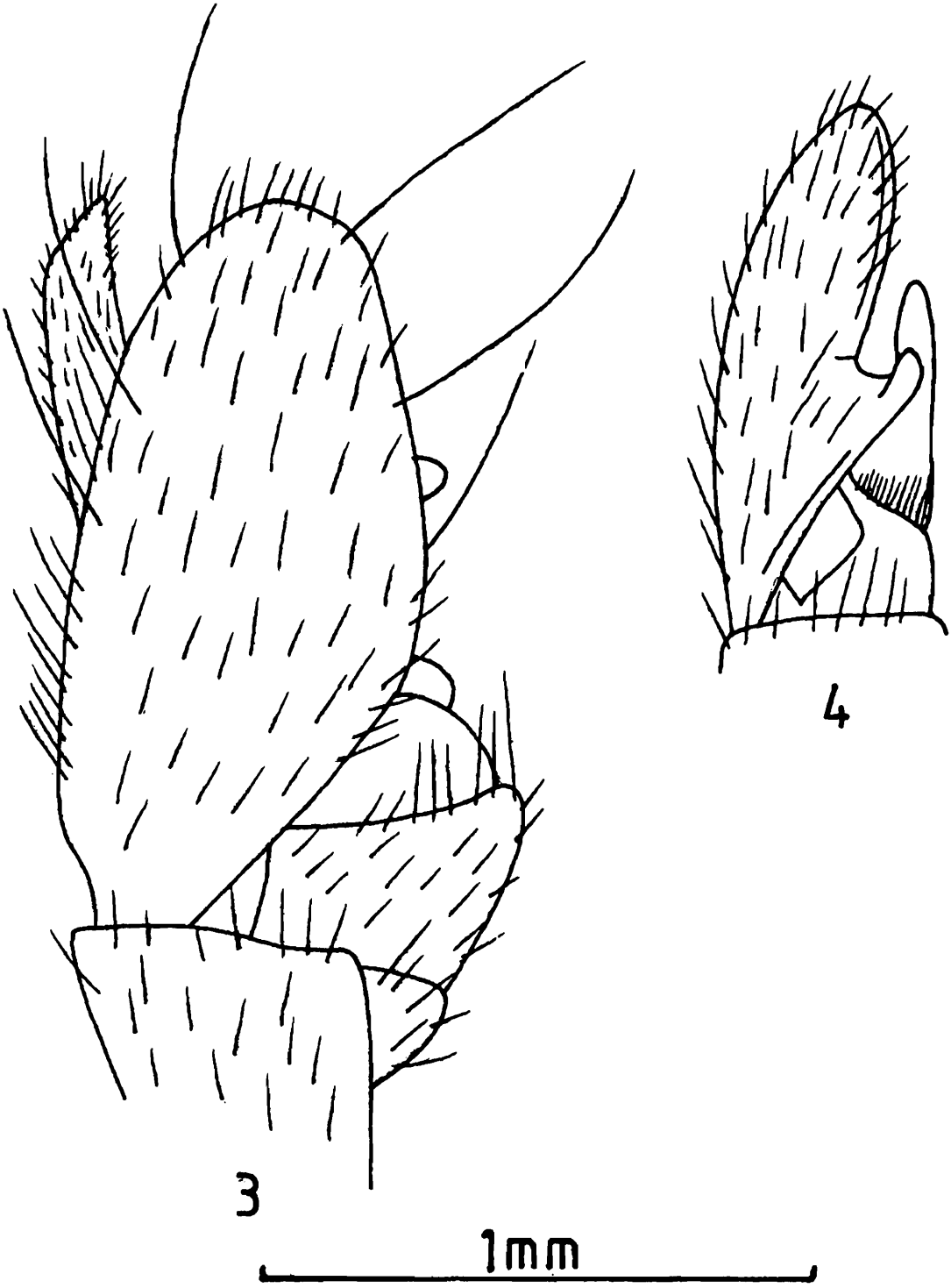


Fig. 3 : *Philodicus femoralis* lateral view of male genitalia.

Fig. 4 : *Philodicus femoralis* ventral view of male genitalia.

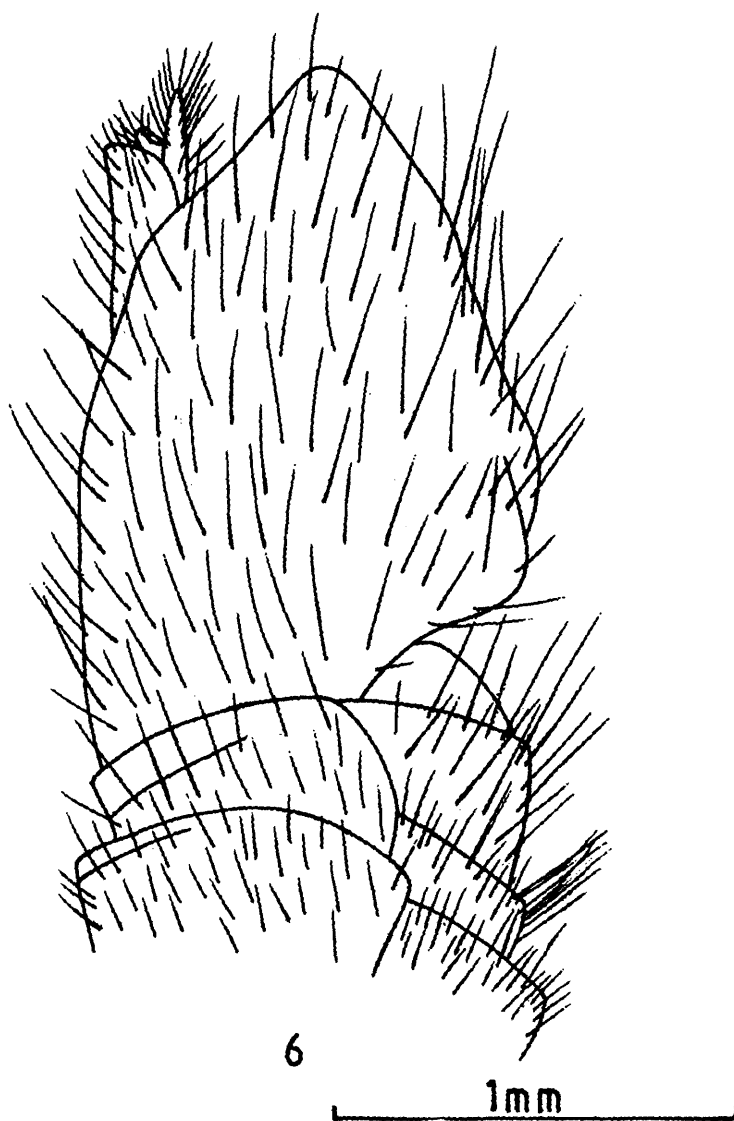
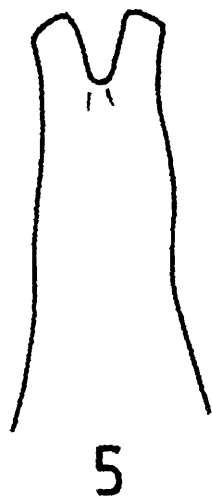


Fig. 5 : *Philodicus femoralis* ventral view of eighth sternite.
Fig. 6 : *Philodicus javanus* lateral view of male genitalia.

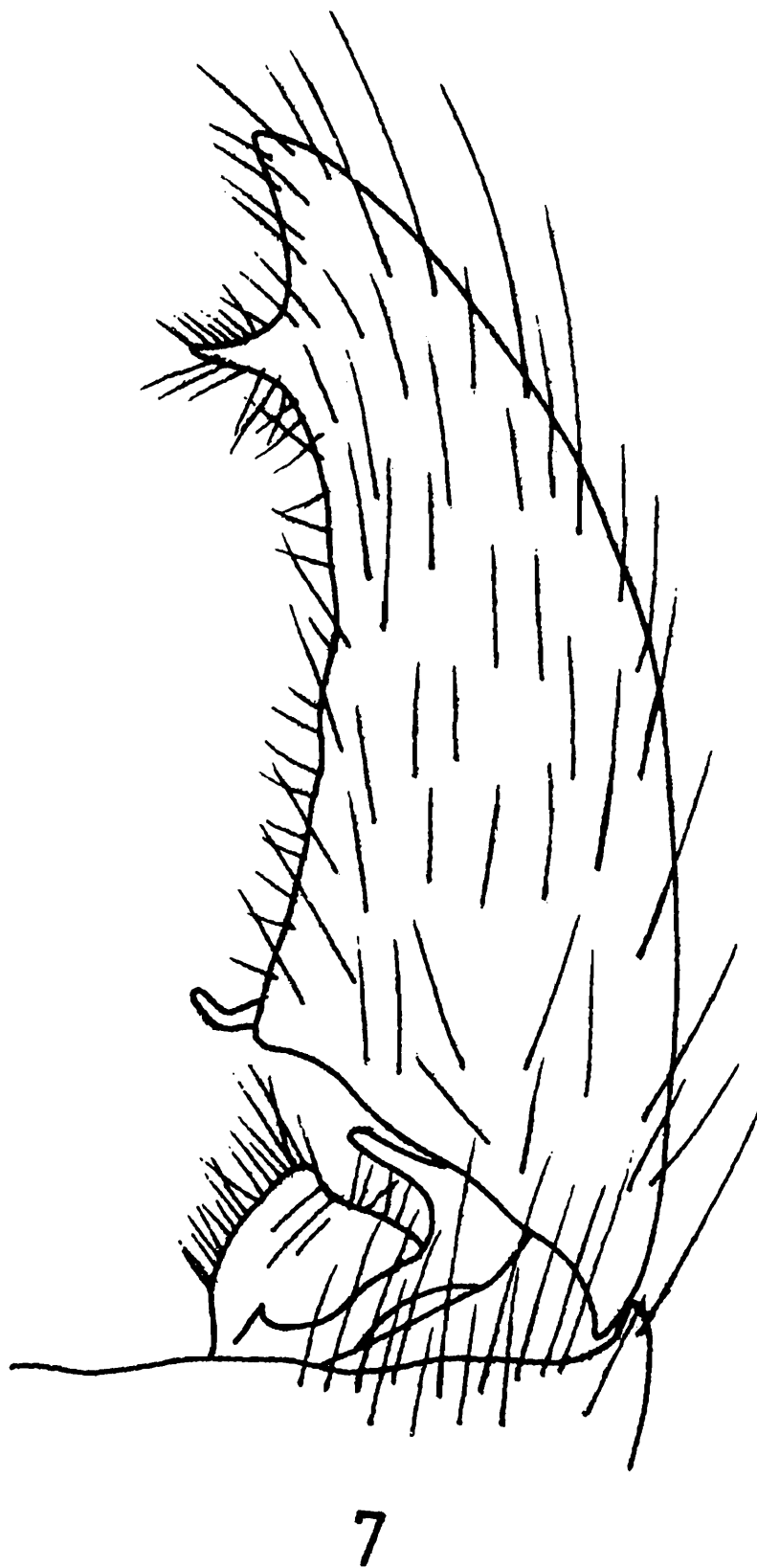


Fig. 7 : *Philodicus javanus* ventral view of male genitalia.

INSECTA : DIPTERA : SYRPHIDAE

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INTRODUCTION

The Syrphidae, popularly called hover flies, flower flies or sun flies, belong to the Aschiza of the suborder Cyclorrhapha in the order Diptera. These flies are mainly flower-visitors and are often seen hovering over flowers in that they are highly beneficial as pollinators. Many of them are mimics of stinging Hymenoptera, e.g. bees, wasps, etc. frequenting flowers but they can be readily recognized by their brilliant colouration, characteristic hovering and droning sound they produce while flying. Indeed, the Syrphidae interest people more in their economic importance than in their attractive appearance (cf. Datta, 1998).

Syrphid flies are nearly cosmopolitan in distribution, and no doubt, India holds a rich fauna (presently with 256 species and 5 subspecies under 62 genera in 2 subfamilies) but our knowledge does not go to the extreme extent of richness because of lack of extensive exploration throughout the country. Tripura (Map 1), the smallest state in the north-east India, lying adjacent to the country of Bangladesh on the north, west, south and south-east, and to the Aizawl district of Mizoram and the Cachar district of Assam on the east, is likely to harbour a rich and interesting fauna but has ever been neglected because of its remote and inconvenient situation (cf. Datta and Parui, 1999).

Recently, several collecting trips (*vide* Datta and Parui, *op. cit.*) were organized by this institute in all 3 districts (West, North and South) of the picturesque hilly state of Tripura in order to

reveal the fauna of the state. Those trips that brought the syrphid material for this study were led by the following personalities : B. N. Das (October-November, 1991), M. Datta (December, 1991-January 1992), B. C. Das (May, 1992) and B. Mitra (May, 1992).

All the 21 species with their 13 genera dealt with here are, however, recorded for the first time from the state and certainly many more await discovery in times to come.

MATERIALS AND METHODS

The methods described by Datta (1998) were used here for collecting, killing and preserving adult syrphid flies.

MORPHOLOGY AND TERMINOLOGY

The morphology and terminology is followed as in the 'Fauna of Meghalaya: Syrphidae' (Datta, 1998).

LIST OF TAXA

Subfamily SYRPHINAE

Tribe SYRPHINI

1. *Allograpta javana* (Wiedemann)
2. *Asarkina* (*Asarkina*) *ericetorum* (Fabricius)
3. *Dideopsis aegrotus* (Fabricius)
4. *Epistrophe* (*Epistrophe*) *griseocincta* (Brunetti)
5. *Episyrphus balteatus* (De Geer)
6. *Ischiodon scutellaris* (Fabricius)

7. *Sphaerophoria indiana* Bigot
Tribe BACCHINI
8. *Baccha* (*Allobaccha*) *amphithoe* Walker
Tribe MELANOSTOMATINI
9. *Melanostoma orientale* (Wiedemann)
10. *M. univittata* (Wiedemann)
Tribe PARAGINI
11. *Paragus* (*Paragus*) *serratus* (Fabricius)
12. *P.* (*Pandasyophthalmus*) *tibialis* (Fallén)
13. *P.* (*P.*) *rufiventris* Brunetti
Subfamily MILESINAE
Tribe ERISTALINI
14. *Eristalinus* (*Eristalinus*) *arvorum*
(Fabricius)
15. *E.* (*E.*) *laetus* (Wiedemann)
16. *E.* (*E.*) *polychromatus* (Brunetti)
17. *E.* (*E.*) *quinquestriatus* (Fabricius)
18. *Mesembrius bengalensis* (Wiedemann)
19. *M. quadrivittatus* (Wiedemann)
20. *Phytomia* (*Phytomia*) *errans* (Fabricius)
21. *P.* (*P.*) *zonata* (Fabricius)

SYSTEMATIC ACCOUNT

Family SYRPHIDAE

Key to the subfamilies

1. Pronotum bare (excepting a few long hairs occasionally in *Baccha*) ; 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 (excepting some Bacchini with petiolate abdomen); scutellum posteriorly smooth and not denticulate; abdomen usually slender 2

2. Abdomen distinctly petiolate; anterior flat portion of mesopleuron at its postero-dorsal corner with a few distinct, erect and coarse hairs; metasternum bare; face usually flat and with very weak tubercle BACCHINI

Abdomen usually equilateral or oval; mesopleural hairing, if present, different or disposed otherwise; metasternum bare or haired; face neither distinctly produced nor narrowed below but usually with well-developed tubercle 3

3. 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

1. Mesopleuron at its anterior flat portion with long, fine, erect or sub-erect hairs at least postero-dorsally; wing with discrete black sclerotized dots along posterior margin; abdominal tergites with double-banded pattern*Episyrphus* Matsumura & Adachi

Mesopleuron at its anterior flat portion with only microscopic pubescence or pollinose; wing margin without such dots posteriorly; abdominal tergites patterned otherwise 2

2. Wing with distinct transverse brown band at mid-length extending from costa at least across

posterior cross-vein*Dideopsis* Matsumura

Wing occasionally darkened otherwise but never with distinct transverse dark band 3

3. Metasternum haired 4

Metasternum bare (excepting a few *Epistrophe* with haired eyes) 6

4. Mesonotum usually with anterior collar of long erect hairs; metathoracic epimeron with a tuft of short hairs*Asarkina* Macquart

Mesonotum without such anterior collar of hairs; metathoracic epimeron bare 5

5. Male terminalia small and inconspicuous; cerci set in a deep U-shaped notch of tergite 9

.....*Allograpta* Osten Sacken

Male terminalia greatly enlarged, globose; cerci entirely surrounded by tergite 9

.....*Sphaerophoria* Lep. & Serv.

6. Antennal segment 3 rounded apically; lateral mesonotal stripe less-defined, dull or pale yellow; sternopleuron without distinct spot; hind trochanter in males without any process; female tergite 8 normal

.....*Epistrophe* Walker

Antennal segment 3 subovate apically; lateral mesonotal stripe comparatively well-defined, usually bright yellow; sternopleuron at its upper margin with distinct yellow spot; hind trochanter in males with ventral spine-like process; female tergite 8 well-developed, sclerotized and exposed*Ischiodon* Sack

Genus *Allograpta* Osten Sacken

Allograpta Osten Sacken, 1875, *Bull. Buffalo Soc. nat. Sci.*, 3 : 49.

Type-species : *Scaeva obliqua* Say.

1. *Allograpta javana* (Wiedemann)

1824. *Syrphus javanus* Wiedemann, *Analecta Ent.* : 34.

Material examined : 1M, 3 F, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M. Datta; 1F, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. B. Mitra.

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 : Tripura (South), Arunachal Pradesh, Assam, Karnataka, Meghalaya, Sikkim, Tamil Nadu and West Bengal; Andalus, China, E Malaysia, Java, Kalimantan, Malaya, Philippines, Sri Lanka, Taiwan and Thailand; Australia, Fiji, Guadal-canal, Hawaii, Japan, Korea and New Guinea (Maps 2 & 3 and Diag. 1).

Genus *Asarkina* Macquart

Asarkina Macquart, 1842, *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 : 1M, Jalefa, Sabrum, South Tripura district, 4.i.1992, Coll. B. Mitra; 1M, 1F, Kanthalchhari, Sabrum, South Tripura district, 6.i.1992, Coll. M. Datta; 1M, Kumarghat forest range, North Tripura district, 19.v.1992, 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.

Distribution : Tripura (North and South), Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya, Sikkim, Tamil Nadu and West Bengal, and other parts of the Oriental region; Africa, Australia, Fiji, Moluccas, New Guinea and Samoa (Maps 2 & 3 and Diag. 1).

Genus *Dideopsis* Matsumura

Dideopsis Matsumura, 1917, *Ent. Mag. Kyoto*, 2 : 142.

Type-species : *Eristalis aegrotus* Fabricius.

3. *Dideopsis aegrotus* (Fabricius)

1805. *Eristalis aegrotus* Fabricius, *Syst. Antliat.* : 243.

Material examined : 1F, Jampujhola, West Tripura district, 7. xi. 1991, Coll. B. N. Das; 1M, Sipahijala, South Tripura district, 27. xii. 1991, Coll. M. Datta.

Diagnosis : Eye bare; frons black with black hairs; face black with yellow hairs; a black stripe extending from base 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 portion of aedeagus with broad flattened apically rounded postero-dorsal process.

Distribution : Tripura (West and South), Assam, Kerala, Meghalaya and West Bengal; Nepal and other parts of the SE Asia; Australia, Moluccas and New Guinea (Maps 2 & 3 and Diag. 1).

Genus *Epistrophe* Walker

1852. *Epistrophe* Walker, *Insecta Saundersiana*, 3 : 242.

Type-species : *Epistrophe conjungens* Walker = *Syrphus grossulariae* Meigen.

Subgenus *Epistrophe* Walker

Diagnosis : Eye practically bare or with short hairs above; face usually entirely yellow, at most indistinctly darkened medially; metasternum haired or bare; abdominal tergite 4 with undivided or partly divided yellow band; in male terminalia antero-ventral process of aedeagal base vertical, ending in a pair of distinct teeth.

4. *Epistrophe (Epistrophe) griseocincta* (Brunetti)

1923. *Syrphus griseocinctus* Brunetti, *Fauna Br. India, Dipt.*, 3 : 77.

Material examined : 1M, 1F, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta.

Diagnosis : Eye with short hairs; mesonotum greenish aeneous with dense yellow hairs; hind leg entirely black; abdominal segment 1 aeneous, rest black; segment 2 with a narrow greyish band across middle; segments 3 and 4 with similar bands just behind base.

Distribution : Tripura (South), Meghalaya and Uttar Pradesh (Maps 2 & 3).

Genus *Episyrphus* Matsumura & Adachi

1917. *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 : 1F, Badarghat Agricultural Farm, Agartala, West Tripura district, 24. xii. 1991, Coll. M. Datta; 1M, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M. Datta; 2M, 3F, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. B. Mitra; 2 M, 1F, Sabrum township area, South Tripura district 3. i. 1992, Coll. M. Datta; 1M, 1F, Dolbari, Sabrum, South Tripura district, 3. i. 1992, Coll. M. Datta; 1M, 2F, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta; 2 M, 1F,

Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. B. Mitra; 1F, Sabrum township area, South Tripura district, 6. i. 1992, Coll. B. Mitra; 1F, Ananda Bazar, North Tripura district, 26. v. 1992, Coll. B. Mitra.

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.

Distribution : Tripura (West, North and South), Arunachal Pradesh, Assam, Jammu & Kashmir, Kerala, Meghalaya, Orissa, Sikkim and West Bengal; China, Malaya and other parts of the Oriental region; Australia, Bonin Islands and Palearctic region (Maps 2 & 3 and Diag.1).

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 : 2M, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M. Datta; 1 M, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. B. Mitra; 1 M, Dolbari, Sabrum, South Tripura district, 3. i. 1992, Coll. M. Datta; 1 M, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta; 1 M, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. B. Mitra.

Diagnosis : Eye bare; wing with vein R_{4+5} upcurved apically and ending well before wing-apex; hind femur with a subapical black ring;

surstylus in male terminalia elongate, broadened beyond base, dorsally curved and serrate, ventrally straight and smooth; aedeagal base very large and strongly sclerotized.

Distribution : Tripura (South), Jammu & Kashmir, Karnataka, Meghalaya, Orissa, Tamil Nadu and West Bengal; Java, Philippines, Taiwan and other parts of the SE Asia; Australia, Hawaii, Japan and Micronesia (Maps 2 & 4 and Diag. 1).

Genus *Sphaerophoria* Lep. & Serv.

1828. *Sphaerophoria* Lepeletier and Serville, 1828, *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 nigratarsis* Brunetti, *Rec. Indian Mus.*, 11 : 216 (as form).

Material examined : 1F, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. M. Datta; 1M, 1F, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. M. Datta; 1M, Choraibari, North Tripura district, 27. v. 1992, Coll. B. Mitra.

Diagnosis : Face entirely yellow, without median stripe; frons in females with a broad black median stripe; mesonotum black, with 2 more or less distinct greyish submedian stripes; 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.

Distribution : Tripura (North and South), Arunachal Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Uttar Pradesh and West Bengal; China and ? Sri Lanka; Korea and eastern part of the erstwhile U. S. S. R. (Maps 2 & 4 and Diag. 1).

Tribe BACCHINI

Genus *Baccha* Fabricius1805. *Baccha* Fabricius, *Syst. Antliat.* : 199.Type-species : *Syrphus elongatus* Fabricius.

Diagnosis : Flies with head broader than thorax and more than hemispherical, hollowed behind; eye practically bare; frons slightly prominent; antenna short, with bare dorsal arista; wing with rudimentary or almost no alula; squama inconspicuous; leg long and thin; hind femur much longer than others and slender; abdomen very much longer than thorax, segments 2 and 3 very long and narrow, succeeding segments widening gradually before apex.

Subgenus *Allobaccha* Curran1928. *Allobaccha* Curran, *J. fed. Malay St. Mus.*, 14 : 251
(as subgenus of *Baccha* F.).Type-species : *Baccha rubella* van der Wulp.

Diagnosis : Species with a row of hairs on humerus behind or almost half haired.

8. *Baccha (Allobaccha) amphithoe* Walker1849. *Baccha amphithoe* Walker, *List Dipt. Br. Mus.*, 3 : 549.1913. *Baccha flavopunctata* Brunetti, *Rec. Indian Mus.*, 8 : 165.

Material examined : 1F, Udaipur, South Tripura district, 11. xi. 1991, Coll. B. N. Das; 1F, Pulikhet, South Tripura district, 29. xii. 1991, Coll. M. Datta.

Diagnosis : Antennal process inconspicuous; wing with a large median diffused dark spot apically above vein R_{4+5} in continuation with costal and subcostal darkening in smoky ground-colour; abdomen predominantly yellow with black bands much more distinct on tergites 3 and 4.

Distribution : Tripura (South), Assam, Meghalaya, Sikkim and West Bengal; Sri Lanka and Taiwan south to Flores Islands (Indonesia) (Maps 2 & 4 and Diag. 1).

Tribe MELANOSTOMATINI

Genus *Melanostoma* Schiner1860. *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 normal and not dilated; 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)

9. *Melanostoma orientale* (Wiedemann)1824. *Syrphus orientalis* Wiedemann, *Analecta Ent.* : 36.

Material examined: 1F, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta; 2 F, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. B. Mitra; 4 F, Kanthalchhari, Sabrum, South Tripura district, 6. i. 1992, Coll. M. Datta.

Distribution : Tripura (South), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Bhutan, Nepal, Pakistan, Sri Lanka and other parts of the Oriental region; Palaearctic region (Maps 2 & 4 and Diag. 1).

10. *Melanostoma univittata* (Wiedemann)1824. *Syrphus univittatus* Wiedemann, *Analecta Ent.*, : 36.

Material examined: 1M, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. B. Mitra; 1 M, Manughat, Sabrum, South Tripura district, 3. i. 1992, Coll. B. Mitra; 3 M, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta; 1M, Sabrum, South Tripura district, 6. i. 1992, Coll. B. Mitra.

Distribution : Tripura (South), Assam, Bihar, Karnataka, Kerala, Meghalaya, Tamil Nadu, Uttar Pradesh and West Bengal; Andalus, E Malaysia, Myanmar, Nepal, Sri Lanka and other parts of the SE Asia; ? Australian and Palaearctic regions (Maps 2 & 4 and Diag.1).

Tribe PARAGINI

Genus *Paragus* Latreille

1804. *Paragus* Latreille, *Nouv. Dict. 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 striped; 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* Stuckenberg

Subgenus *Paragus* Latreille

11. *Paragus* (*Paragus*) *serratus* (F.)

1805. *Mulio serratus* Fabricius, *Syst. Antliat.* : 186.

Material examined: 1F, Badarghat Agricultural Farm, Agartala, West Tripura district, 24. xii. 1991, Coll. M. Datta; 1M, Pulikhet, South Tripura district, 29. xii. 1991, Coll. M. Datta; 3 M, 1F, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. B. Mitra; 1M, 3F, Kanthalchhari, Sabrum, South Tripura district, 1-6. i. 1992, Coll. M. Datta & B. Mitra; 1M, Dolbari, Sabrum, South Tripura district, 3. i. 1992, Coll. B. Mitra;

1M, 1F, Ananda Bazar, North Tripura district, 26. v. 1992, Coll. B. Mitra.

Diagnosis : Eye with 3 vittae of white hairs; scutellum black with yellow margin, strongly denticulate posteriorly; abdomen yellow with brown markings, punctate; tergites 3 and 4 each with a whitish band on each side anteriorly broken in mid-line; tergite 5 with a similar but continuous band placed diagonally.

Distribution : Tripura (West, North and South), Assam, Bihar, Goa, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal; Jakarta, Java, E Malaysia, Nepal, Pakistan and Sri Lanka; Africa and Papua (Maps 2 & 5 and Diag.1).

Subgenus *Pandasyophthalmus* Stuckenberg

1954. *Pandasyophthalmus* Stuckenberg, *Revue Zool. Bot. afr.*, **49** : 100.

Type-species : *Paragus longiventris* Loew.

Key to the species

1. Abdomen entirely shining black; male terminalia with short and broad surstylus, even broader apically; superior lobe short, slightly longer than surstylus *tibialis* (Fallén)

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 *rufiventris* Brunetti

12. *Paragus* (*Pandasyophthalmus*) *tibialis* (Fallén)

1817. *Pipiza tibialis* Fallén, *Syrphici Sveciae* : 60.

1983. *Paragus* (*Pandasyophthalmus*) *tibialis* (Fallén) : Datta and Chakraborti, *Rec. zool. Surv. India*, **81** : 244.

Material examined : 3F, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M.

Datta; 1F, Kanthalchhari, Sabrum, South Tripura district, 1. i. 1992, Coll. B. Mitra; 1M, 1F, Dolbari, Sabrum, South Tripura district, 3. i. 1992, Coll. M. Datta; 1F, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. B. Mitra.

Distribution : Tripura (South), Bihar, Himachal Pradesh, Jammu & Kashmir, Kerala, Meghalaya, Uttar Pradesh and West Bengal; Nepal and other parts of the Oriental region; Palaearctic region (Maps 2 & 5 and Diag. 1).

13. *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 : 2M, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M. Datta; 3M, Kanthalchhari, Sabrum, South Tripura district, 1-2. i. 1992, Coll. M. Datta & B. Mitra.

Distribution : Tripura (South), Assam, Bihar, Jammu & Kashmir, Sikkim, Uttar Pradesh and West Bengal; Bhutan, Nepal, Pakistan and Sri Lanka (Maps 2 & 5 and Diag. 1).

Subfamily MILESINAE

Tribe ERISTALINI

Diagnosis : Face usually with a tubercle; antenna short, usually shorter than face, arista basal, usually bare, rarely pilose on basal half; mesopleuron at its anterior portion bare; metasternum pilose; scutellum usually without apical rim; hind femur with basal patch of setulae and usually ventral spines; wing with anterior cross-vein at or beyond middle of discal cell; vein R_{4+5} usually forming a strong loop in cell R_5 ; apical and discal cells usually without external appendices; abdomen oval and never constricted.

Key to the genera

1. Wing with marginal cell (R_1) narrowly open *Mesembrius* Rondani
Wing with marginal cell (R_1) closed 2
2. Eye bare; wing with normal submarginal cell (R_3) due to normal length of anterior cross-vein (r-m); antennal arista usually plumose; metathoracic spiracular pile-patch present.....
..... *Phytomia* Guérin-Ménéville
Eye at least partially pilose; if bare, then submarginal cell narrowed basally due to longer anterior cross-vein; antennal arista virtually bare; metathoracic spiracular pile-patch usually absent
..... *Eristalinus* Rondani

Genus *Eristalinus* Rondani

1845. *Eristalinus* Rondani, *Nouvi Annali Sci. nat. Bologna*, 2(2) : 453.

Type-species : *Musca sepulchralis* L.

Subgenus *Eristalinus* Rondani

Diagnosis : Subscutellar fringe absent; metathoracic spiracle at its front without any patch of hairs; hind femur normal and never dilated.

Key to the species

1. Femur normally orange or brownish orange.
..... *arvorum* (Fabricius)
Femur black, at most narrowly pale apically 2
2. Black or aeneous species; abdominal tergites 2, 3 and 4 with paired spots placed transversely
..... *laetus* (Wiedemann)
Black and yellow species; abdominal tergites 2, 3 and 4 patterned otherwise (usually banded) but never with paired spots 3
3. Tergites 2, 3 and 4 all orange excepting posterior margin and a median stripe; arcuate whitish bands absent
..... *polychromatus* Brunetti

Tergites 2, 3 and 4 never all orange and predominantly with black colour; arcuate whitish bands present.....

.....*quinquestriatus* (Fabricius)

14. *Eristalinus* (*Eristalinus*) *arvorum* (F.)

1787. *Syrphus arvorum* Fabricius, *Mantissa Insect.*, 2 : 335.

Material examined : 1M, Sonamura, West Tripura district, 6. xi. 1991, Coll. B. N. Das, 1F, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. M. Datta.

Distribution : Tripura (West and South), Arunachal Pradesh, Jammu & Kashmir, Meghalaya, Orissa, Sikkim and West Bengal; China and other parts of the SE Asia; Australia, Hawaii, Japan and Micronesia (Maps 2 & 5 and Diag. 1).

15. *Eristalinus* (*Eristalinus*) *laetus* (Wied.)

1830. *Eristalis laetus* Wiedemann, *Aussereurop. zweifl. Insekt.*, 2 : 192.

1986. *Eristalinus* (*Eristalinus*) *laetus* (Wiedemann) : Datta & Chakraborti, *Opusc. zool. flumin.*, 6 : 14.

Material examined : 1F, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. B. Mitra; 1M, Manughat, Sabrum, South Tripura district, 5.i.1992, Coll. M. Datta.

Distribution : Tripura (South), Bihar, Jammu & Kashmir, Karnataka, Meghalaya, Rajasthan, Tamil Nadu and West Bengal; China, Nepal, Philippines, Sri Lanka and Taiwan (Maps 2&5 and Diag. 1).

16. *Eristalinus* (*Eristalinus*) *polychromatus* (Brunetti)

1923. *Eristalis polychromatus* Brunetti, *Fauna Br. India, Dipt.*, 3 : 180.

Material examined : 1M, Pulikhet, South Tripura district, 29. xii. 1991, Coll. B. Mitra; 1M, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. M. Datta; 1M, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta.

Distribution : Tripura (South), Kerala, Orissa and West Bengal (Maps 2 & 6).

17. *Eristalinus* (*Eristalinus*) *quinquestriatus* (Fabricius)

1794. *Syrphus quinquestriatus* Fabricius, *Ent. Syst.*, 4 : 289.

Material examined : 3M, 2F, Birchandra Nagar, South Tripura district, 30. xii. 1991, Coll. M. Datta; 3F, Jalefa, Sabrum, South Tripura district, 4. i. 1992, Coll. M. Datta; 1M, 1F, Kanthalchhari, Sabrum, South Tripura district, 6. i. 1992, Coll. B. Mitra; 1M, Choraibari, North Tripura district, 27. v. 1992, Coll. B. Mitra.

Distribution : Tripura (North and South), Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Uttar Pradesh and West Bengal; China and other parts of the Oriental region; Japan (Maps 2 & 6 and Diag. 1).

Genus *Mesembrius* Rondani

Mesembrius Rondani, 1857, *Dipterol. ital. Prodr.*, 2 : 50.

Type-species : *Helophilus peregrinus* Loew.

Key to the species

1. Mid femur in males with a tooth below near base, and suddenly contracted at tip; abdominal tergite 4 with an inverted, widely open V-mark*bengalensis* (Wiedemann)
- Mid femur in males without such tooth and very gradually narrowed apically; abdominal tergite 4 without a V-mark.....
-*quadrivittatus* (Wiedemann)

18. *Mesembrius bengalensis* (Wiedemann)

1819. *Eristalis bengalensis* Wiedemann, *Zool. Mag.*, 1 : 16.

Material examined: 1M, Badarghat Agricultural Farm, Agartala, West Tripura district. 24. xii. 1991, Coll. M. Datta; 2F, Abhoynagar, Agartala, West Tripura district, 8. v. 1992, Coll. B. C. Das; 1F, Ananda Bazar, North Tripura district, 26. v. 1992, Coll. B. Mitra.

Distribution : Tripura (West and North), Assam, Bihar, Gujarat, Kerala and West Bengal, and other parts of the SE Asia to New Guinea and northern Australia (Maps 2 & 6 and Diag.1).

19. *Mesembrius quadrivittatus* (Wiedemann)

1819. *Eristalis quadrivittatus* Wiedemann, *Zool. Mag.*, 1 : 17.

Material examined: 1M, Badarghat Agricultural Farm, Agartala, West Tripura district, 24. xii. 1991, Coll. M. Datta; 1 M, Abhoynagar, Agartala, West Tripura district, 8. v. 1992, Coll. B.C. Das; 1M, 1F, Teliamura, West Tripura district, 21. v. 1992, Coll. B. C. Das; 1F, Kanthalbari, Ambasa, North Tripura district, 13. v. 1992, Coll. B. Mitra.

Distribution : Tripura (West and North), Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Orissa, Tamil Nadu and West Bengal; Java, Moluccas (Indonesia), Nepal and Sri Lanka (Maps 2 & 6 and Diag. 1).

Genus *Phytomia* Guérin-Ménéville

Phytomia Guérin-Ménéville, 1834, in Bélanger, *Voyage Ind.-Orient.*, 7 : 509.

Type-species : *Eristalis chrysopygus* Wiedemann.

Subgenus *Phytomia* Guérin-Ménéville

Diagnosis : Scutellum devoid of apical rim; hind femur unarmed in that subapical tooth on front side lacking.

Key to the species

1. Antennal arista bare; hind femur without any stiff bristly hairs; wing pale grey, brown at base and pale yellowish brown on about basal half or two-thirds anteriorly
.....*errans* (Fabricius)
- Antennal arista plumose on basal half; hind femur with short, stiff bristly hairs; wing yellowish grey, with dark brown suffusion anteriorly, extending to apex of basal cell 1 and base of submarginal cell (R_3)
.....*zonata* (Fabricius)

20. *Phytomia (Phytomia) errans* (Fabricius)

1787. *Syrphus errans* Fabricius, *Mantissa Insect.*, 2 : 337.

Material examined : 1F, Chandrapur, South Tripura district, 28. xii. 1991, Coll. M. Datta; 2M, 1F, Pulikhet, South Tripura district, 29. xii. 1991, Coll. M. Datta; 1F, Kanthalbari, Ambasa, North Tripura district, 13. v. 1992, Coll. B. Mitra; 1F, Radhapur, Dharmanagar, North Tripura district, 24. v. 1992, Coll. M. Sil; 1M, 3F, Ananda Bazar, North Tripura district, 26. v. 1992, Coll. B. Mitra.

Distribution : Tripura (North and South), Assam, Bihar, Karnataka, Jammu & Kashmir, Kerala, Tamil Nadu and West Bengal, and other parts of the SE Asia; Japan (Maps 2 & 6 and Diag.1).

21. *Phytomia (Phytomia) zonata* (Fabricius)

1787. *Syrphus zonatus* Fabricius, *Mantissa Insect.*, 2 : 337.

1923. *Megaspis zonatus* Fabricius : Brunetti, *Fauna Br. India, Dipt.*, 3 : 203.

Material examined : 1F, Kanthalchhari, Sabrum, South Tripura district, 2. i. 1992, Coll. M. Datta; 1M, 1F, Manughat, Sabrum, South Tripura district, 5. i. 1992, Coll. B. Mitra.

Distribution : Tripura (South), Arunachal Pradesh, Assam, Karnataka, Kerala, Meghalaya, Sikkim, Tamil Nadu and West Bengal; Bangladesh, China, Philippines and other parts of the SE Asia; Japan, Korea and Manchuria (Maps 2 & 6 and Diag.1).

GENERAL REMARKS

The state of Tripura consisting of 3 districts (Map 1) is a hilly terrain that parts with the 'Assam Hills' Obviously, the fauna of the state would be no different from the remainder of the north-east India or even Bangladesh lying closely. According to our present revelation, all the 21 species (except *E. polychromatus*) of Tripura occur in one or other states of this part of India, and account for only about 8% of the species that

India holds (cf. Brunetti, 1923; Knutson, Thompson and Vockeroth, 1975; Hippa, 1990). Indeed, this deficient figure does give us the enigmatic picture of the state, and, therefore, we refrain from discussing the fauna elaborately. However, for the sake of brevity only a few but indispensable comments seem necessary in the light of the fauna of Meghalaya recently discussed in detail (*vide* Datta, 1998).

The fauna of Tripura comprises 13 genera, viz., *Allograpta* Osten Sacken, *Asarkina* Macquart, *Dideopsis* Matsumura, *Epistrophe* Walker, *Episyrphus* Matsumura & Adachi, *Ischiodon* Sack, *Sphaerophoria* Lep. & Serv., *Baccha* Fabricius, *Melanostoma* Schiner, *Paragus* Latreille, *Eristalinus* Rondani, *Mesembrius* Rondani and *Phytomia* Guérin-Méneville with 21 species, of which *P. rufiventris* Brunetti, *Er. polychromatus* (Brunetti), *Ms. bengalensis* (Wied.), *Ms. quadrivittatus* (Wied.) and *Ph. errans* (F.) hitherto remain unknown from Meghalaya. It may be re-called that the genus *Mesembrius* Rondani occurring in Tripura is yet to be recorded from the state of Meghalaya.

The genus *Paragus* is represented in Tripura by 3 species, of which *rufiventris* is in addition to those in Meghalaya. The species mainly exhibits its range of distribution along the northern states of India as *tibialis* predominantly does but is known from Jammu and Kashmir, Uttar Pradesh, Bihar, Sikkim, West Bengal and Assam (Map 5), and outside India, from Pakistan in the west, Bhutan and Nepal in the north and Sri Lanka in the south (Diag. 1). The species is, however, confined to the Oriental region unlike *serratus* and *tibialis*. Of the 4 species of *Eristalinus* that occur in Tripura, *polychromatus* is so far unknown from any other country beyond India wherein it is recorded only from West Bengal, Orissa and Kerala (Map 6). By the way, the only other species that is poorly represented in India and is unknown beyond the country is *Epistrophe griseocincta* (Brunetti) occurring in Meghalaya and Uttar Pradesh only (Map 3). The genus *Mesembrius* comprises 2 species, viz., *bengalensis* and *quadrivittatus*. The former is extremely

widespread throughout the south-east Asia invading as far as in the northern Australia across New Guinea (Australian region) despite its reported occurrence only in Assam, Bihar, West Bengal, Gujarat and Kerala within the Indian peninsula (Map 6 and Diag. 1). However, the latter species is more widely known in India in that it shows east-west distribution from Assam to Gujarat through West Bengal, Bihar, Orissa and Madhya Pradesh as well as from Karnataka to Tamil Nadu towards the south (Map 6). Although the species extends its range northward to Nepal and southward to Sri Lanka or even far away to the Aru Islands (Australian region) across Java, its distribution suffers from disjunct records in the vast stretch of intervening territories beginning from the very eastern-most edge of India to the northern Indonesia across Myanmar, Thailand and Malaysia (Diag. 1), regarded as the possible course of dispersal. While 3 species of *Phytomia* are known from Meghalaya, 2 are from Tripura but only *zonata* is of common occurrence in either state. The other species, namely, *errans* is not only registered from the eastern part (Assam, West Bengal and Bihar) and southern part (Karnataka, Kerala and Tamil Nadu) but also from the northern part as Jammu and Kashmir in India (Map 6). However, it is in concurrence with *zonata* extensively distributed in the remainder of the south-east Asia, but with a bare encroachment in Japan of the Palaearctic region (Diag. 1).

To conclude, the fauna of Tripura comprises 21 species belonging to 13 genera (up to May, 1994) but it does not seemingly come at the entirety of taxa composition. Many a species that is reasonably abundant and widely known at least in the neighbouring states shall have been held forth in the fauna of the state. Barring citation of a good many species in question, absence of a cosmopolitan species like *Eristalis tenax* L.) by name puts us in a piteous challenge. However, no species is hitherto known only from the state and merely 2 species out of 21 are confined to India. In addition to these 2, 5 species unlike other 16 species do not extend their range of distribution beyond the Orient.

SUMMARY

The paper deals with 21 species under 13 genera, all of which are recorded for the first time from the state of Tripura. The species are systematically keyed and characterized and are discussed, if and when necessary, in the light of their zoogeographical distribution.

ACKNOWLEDGEMENTS

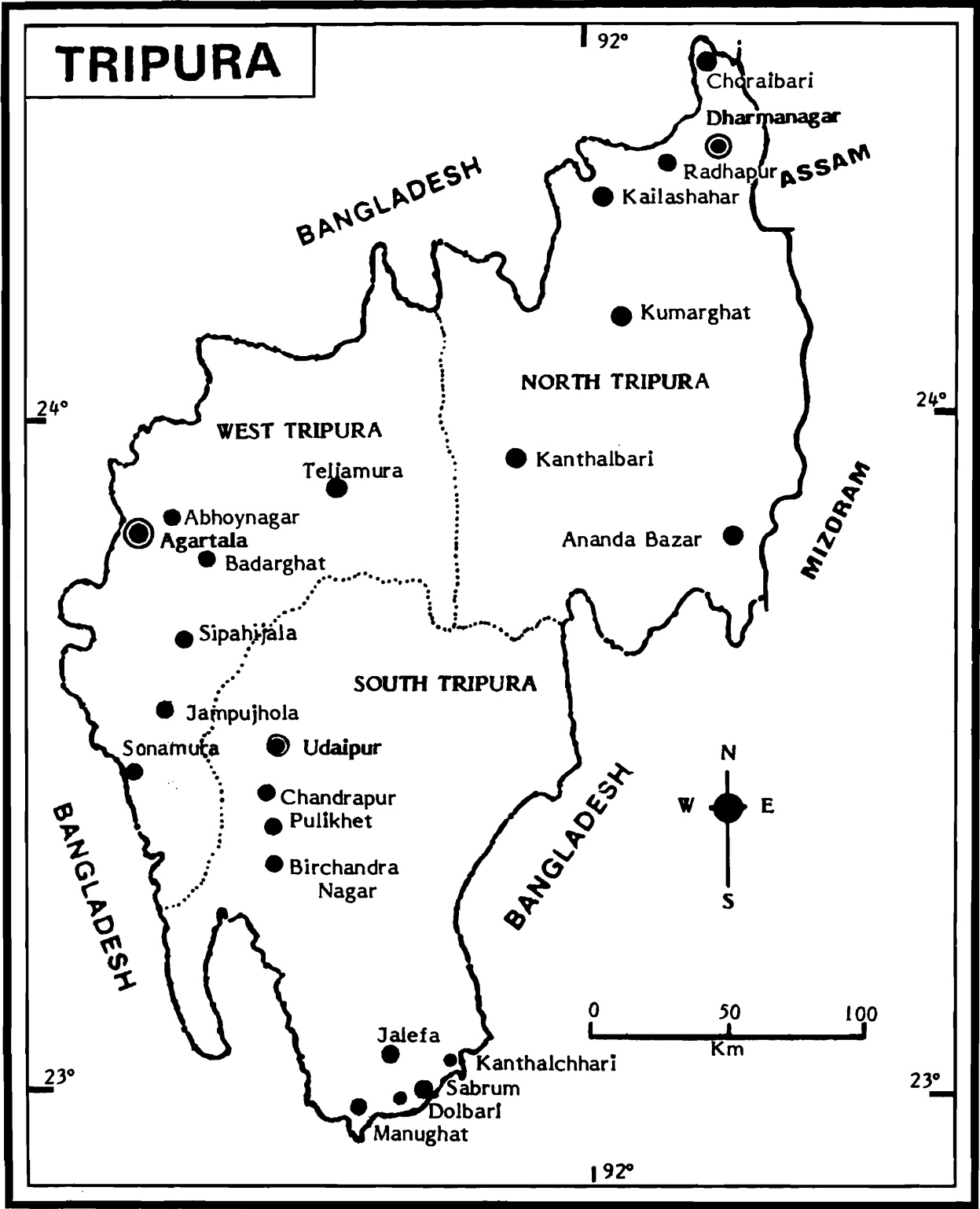
We express our deep sense of gratitude to Drs. A. K. Ghosh, the ex-Director, and S. K. Tandon, ex-Scientist 'SF' and J. K. Jonathan, Scientist 'SG' of the Entomology Division, Zoological

Survey of India, Calcutta, for kindly placing the material at our disposal and for extending laboratory facilities during the course of this study. We are sincerely thankful to Dr. J. R. B. Alfred, Director 'SG' & Project Coordinator, for kindly taking trouble for us in running the project. Our heart-felt gratitude is also due to Dr. F. C. Thompson of the U. S. D. A., U. S. National Museum, Washington, for kindly providing us with a few pertinent literature.

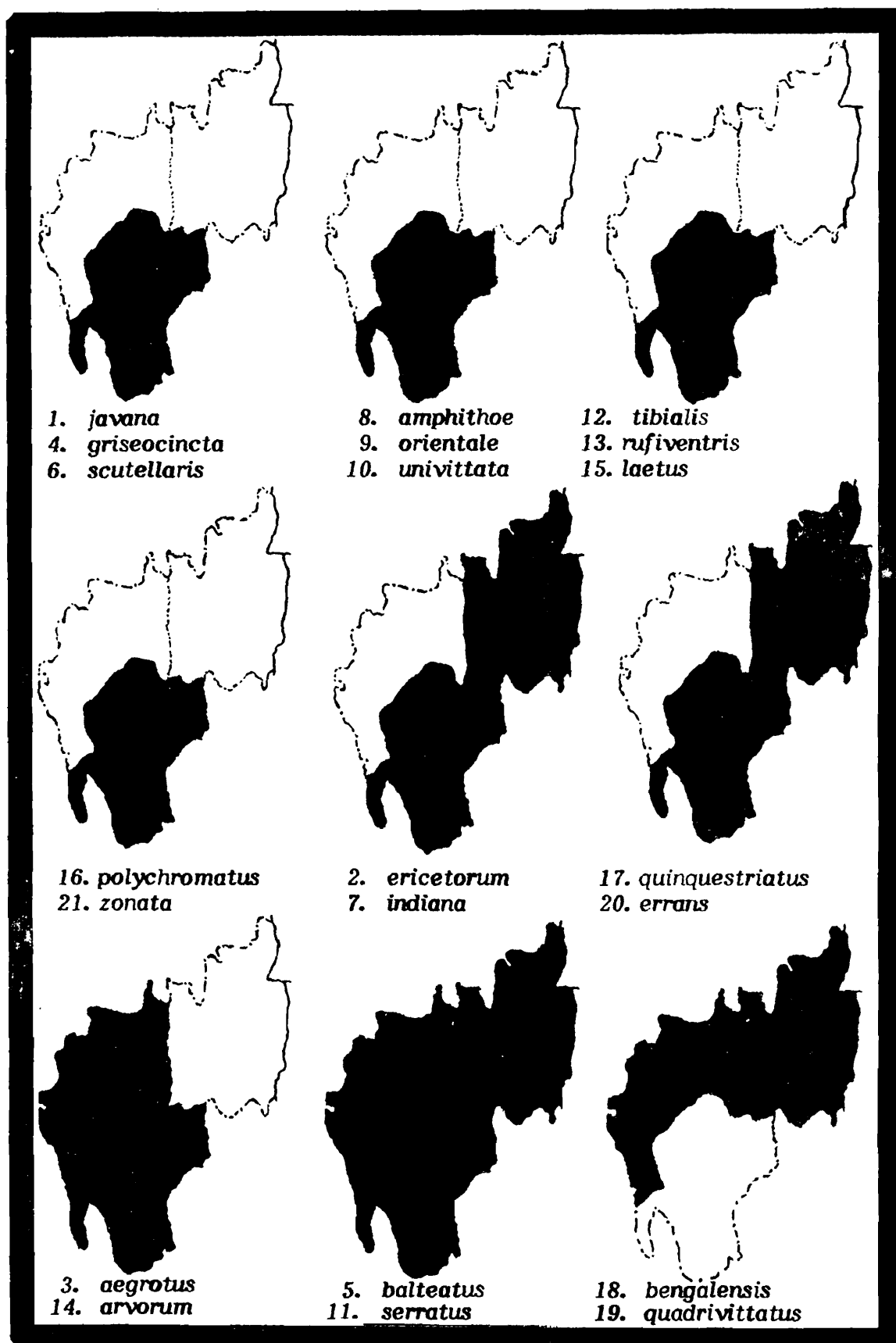
In fine, we can not pass over without acknowledging the valuable assistance received from our colleagues Messers. Anil K. Bhattacharyya and Haradhan Das in bringing about the final form of the MS.

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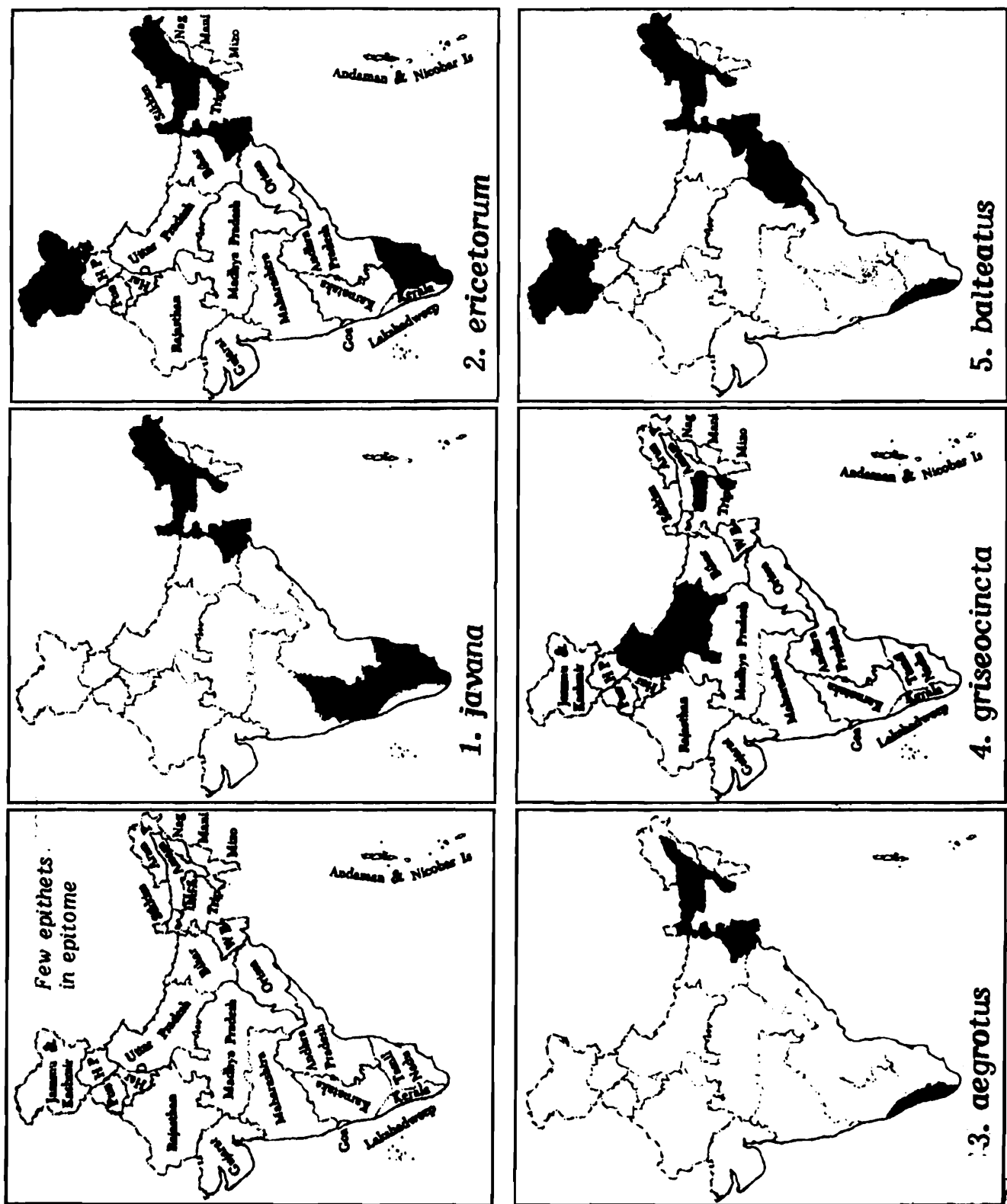
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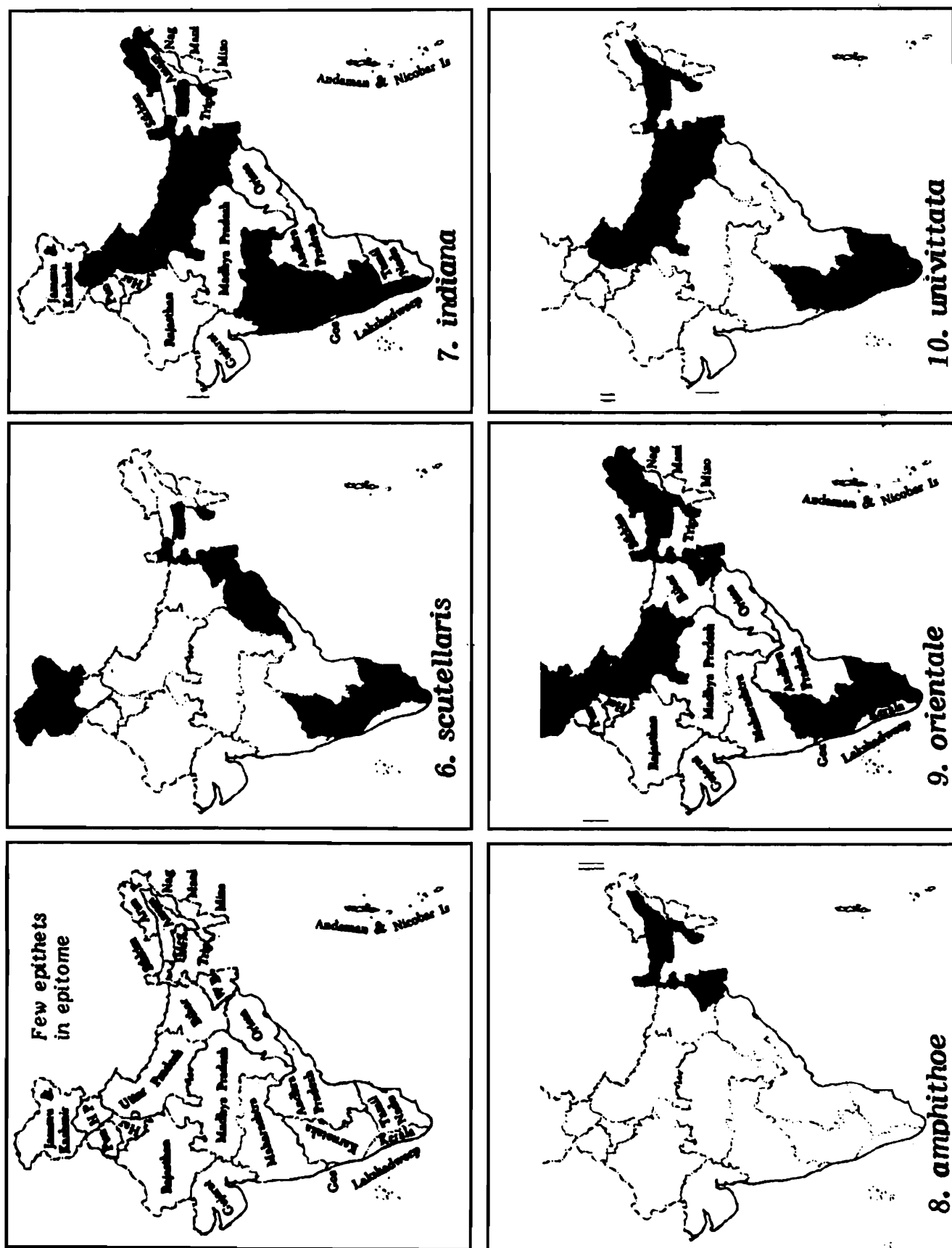
Map 1. Tripura showing its location, districts, district headquarters and recorded places of occurrence of the Syrphidae dealt with.



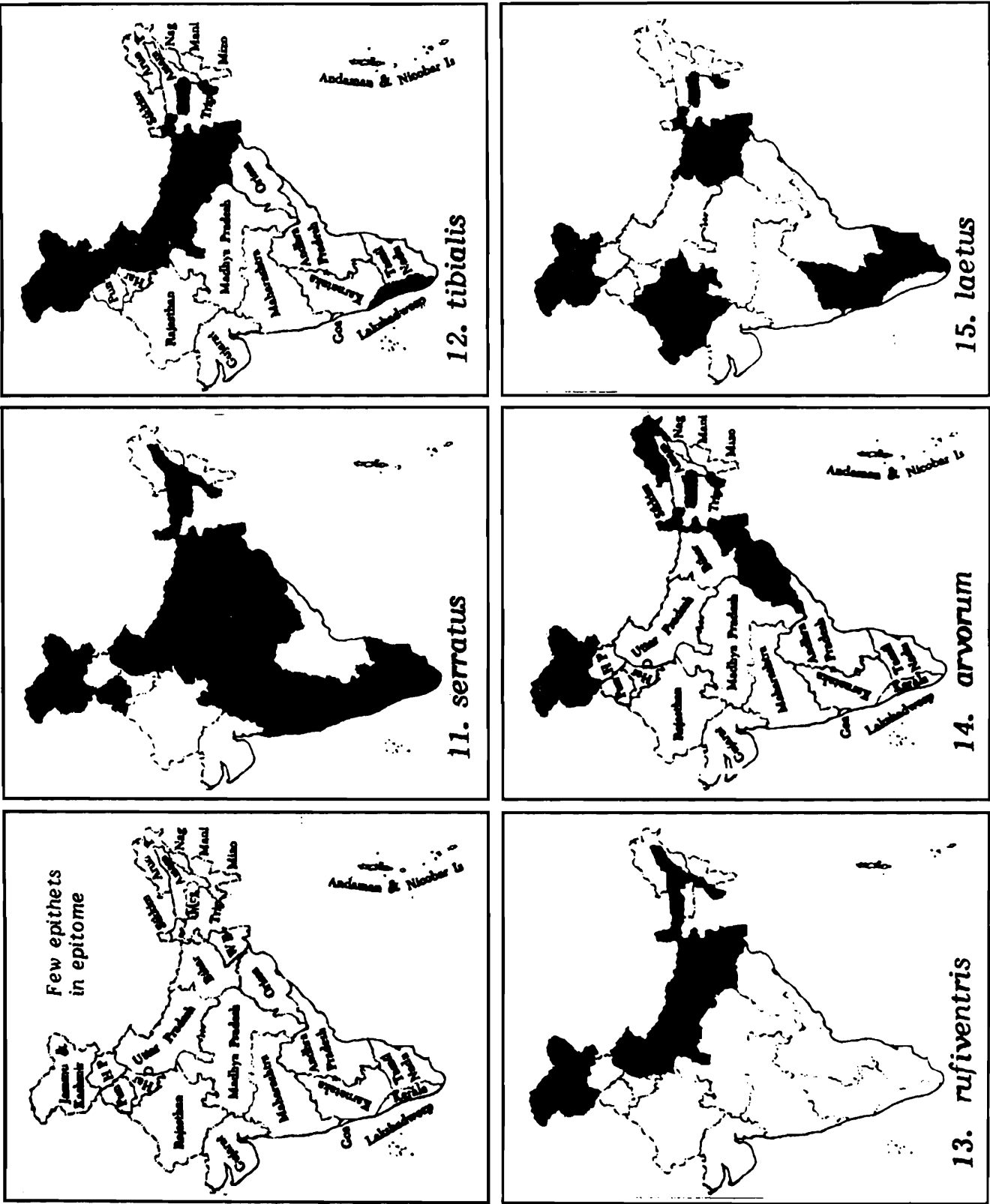
Map 2. Recorded districts of occurrence of the species (as per serial number) in Tripura (in black shade).



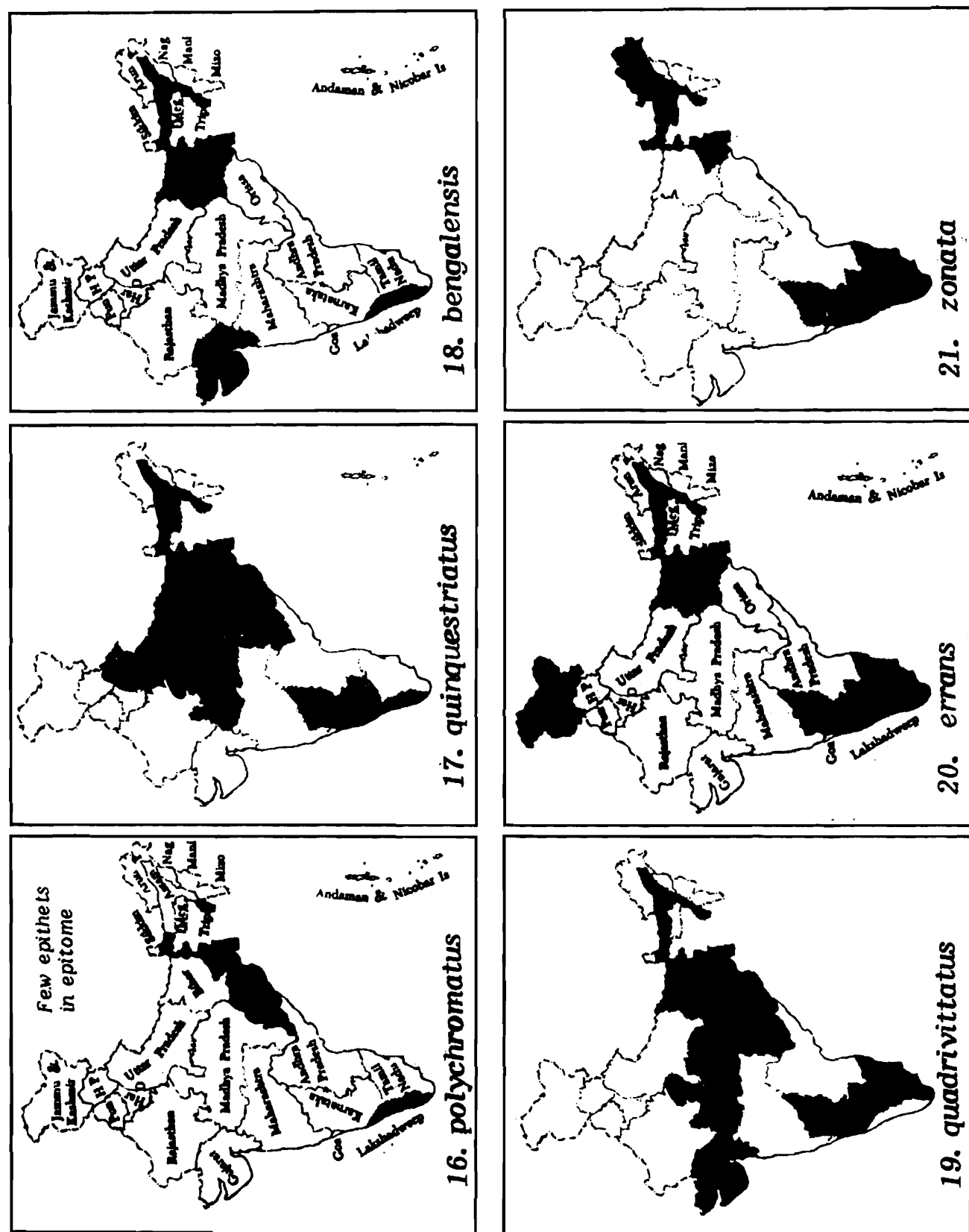
Map 3. Distribution of (1) *Allograpta javana*, (2) *Asarkina ericetorum*, (3) *Dideopsis aegrotus*, (4) *Epistrophe griseocincta* and (5) *Episyrphus balteatus* in India (in black shade).



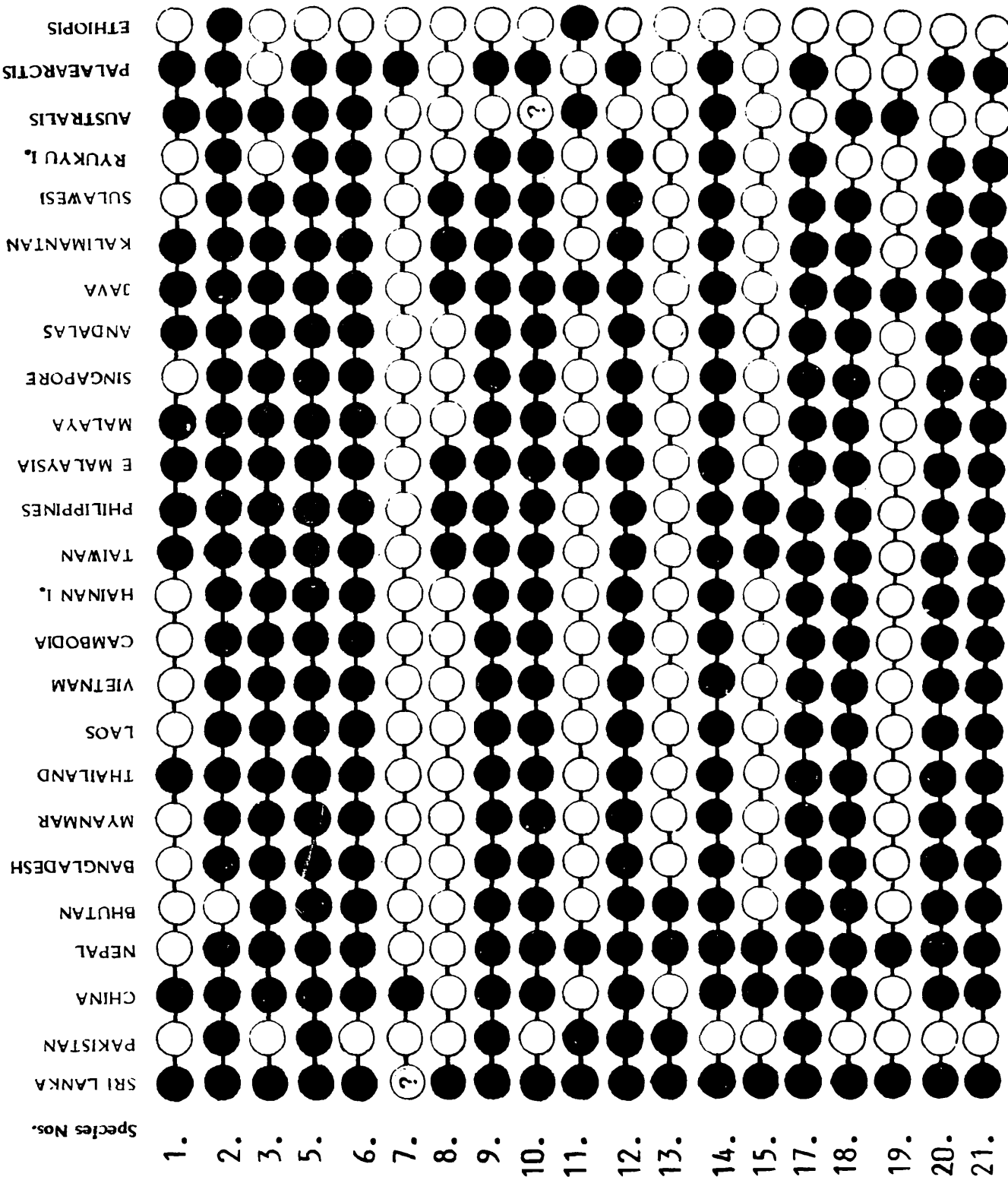
Map 4. Distribution of (6) *Ischiodon scutellaris*, (7) *Sphaerophoria indiana*, (8) *Baccha amphithoe*, (9) *Melanostoma orientale* and (10) *M. univittata* in India (in black shade).



Map 5. Distribution of (11) *Paragus serratus*, (12) *P. tibialis*, (13) *P. rufiventris*, (14) *Eristalinus arvorum* and (15) *E. laetus* in India (in black shade).



Map 6. Distribution of (16) *E. polychromatus*, (17) *E. quinquestriatus*, (18) *Mesembrius bengalensis*, (19) *M. quadrivittatus*, (20) *Phytomyia errans* and (21) *P. zonata* in India (in black shade).



Diag. 1. Distribution of species (as per serial number) in and around the Oriental region excepting India (in black shade).

INSECTA : DIPTERA : MUSCIDAE

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INTRODUCTION

The family Muscidae or 'Common true flies' belonging to the suborder Cyclorrhapha, is one of the most diversified and economically important group of the Calyptrate Diptera.

The family has great economic importance, as most of the flies are responsible for spreading several diseases of man and animals, such as, cholera, dysenteries, typhoids etc. Adults are found almost everywhere and generally saprophagous but some flies (eg. *Stomoxys*) have biting habits and act as a mechanical carrier of diseases like Sura. The saprophagous flies (eg. *Musca*) are much attracted to dung, decaying organic matters and human ordure etc. Larvae have varied habits being saprophagous, parasitic or phytophagous as leaf miners. Therefore, these flies have attracted the attention of workers dealing with agricultural entomology, medical entomology, veterinary parasitology and other environmental sciences.

The Muscidae are well represented in all zoogeographical regions and include about 3,800 species all over the world (Skidmore, 1985). The muscid fauna of the country has been studied by workers like Fabricius (1794), Wiedemann (1824, 1830), Senior-White (1924), Joseph & Parui (1972), Pont (1972, 1973) and many others (c. f. Datta & Parui, 1991). But the most notable contribution has been made by Emden (1965) in the "Fauna of India and the adjacent countries"

Out of 253 species under 39 genera of 6 subfamilies in India, the north-east India claimed

to have only 85 species under 28 genera of 6 subfamilies. But nothing was reported from Tripura by name till to date as evidenced from the published works.

Recently Zoological Survey of India undertook a number of surveys in Tripura, and the muscid materials were collected by G. K. Srivastava (1991), M. Datta (1991, 1992), M. Sil (1992), B. Mitra (1992) and S. K. Chakraborty (1992).

In fact, this is the first attempt which has been suitably rewarded by the procurement of 6 species under 3 genera of 2 subfamilies so far collected from this state.

GENERAL MORPHOLOGY

Head : It is remarkable on account of its mobility and its relatively large size. The major portion of the head is occupied by two compound eyes and the eyes of males are larger than those of females. Generally, the eyes are separated by an interfrontalia (if) which is an extension of ptilinum (pt). When the interfrontalia is narrower the head is called holoptic in contrast to the dichoptic head where the interfrontalia is wider by means of another stripe called parafrontalia (pf). The antennae are inserted close to each other between the compound eyes and are three-segmented, the third one being the longest and most complex carrying the dorsal arista (ar). The various forms of the arista are of classificatory values and they may be either bare, plumose (subfamily Muscinae) or pectinate (subfamily Stomoxyinae). The area between the outer margin

of ptilinal suture and the anterior outer margin of eyes is called parafacialia (pa), equivalent to the gena of many Diptera. These parafacialia extend downwards and dilate into areas called jowls (j). The lower part of the border of the mouth is characterized by a row of strong seta, the vibrissa (v). In the Muscidae the labium is usually expanded distally to form a pair of prominent fleshy lobes or labella. In most of the Cyclorrhapha, all the mouth organs contribute to the formation of the proboscis, either licking type (as in the subfamily Muscinae) or blood-sucking type (subfamily Stomoxyinae).

Thorax : It is characterised by the great development of its second segment which carries the wings, and the correlated reduction of the segments in front and behind it. It is composed of three segments pro-, meso- and metathorax. The entire surface of the thorax is beset with numerous setulae, out of which the prominent ones have been named according to their position. The scutellum (Sc), is the hindmost section of the dorsal surface of the thorax, and just in front of the scutellum lies the scutum separated by a deep groove. There are three pairs of humeral bristles (h) present on the humeral callosities and one post humeral seta (ph) lies behind the inner humeral on either side. Presutural acrostichal (prst acr) setae are located in front of the transverse suture, one on either side. Each presutural acrostichal is followed by intra alars (ia). Inner to the post humerals are located the dorsocentral (dc), both in pre and post suturally. The propleuron (pp) is the area of the lateral wall of the thorax just anterior to the prostigmata. The pteropleuron (tp) is a large, somewhat convex plate beneath the root of the wing. In case of the genus *Musca* this portion is hairy. The sternopleuron (stpl) is the area in between fore coxa and mid coxa just behind the mesopleuron. The notopleuron (ntpl) lies in between humerus and wing base just above the mesopleuron (mp). There is another lateral area called hypopleuron (hp) just behind the pteropleuron. In case of the genus *Musca* hypopleuron is without bristles. Along the ventral side of the postalar declivity and just above the

innermargin of the lower calyptra, there is a ridge called the suprasquamal ridge (sr), sometimes it is bare (eg. *Musca*) and sometimes it is hairy (eg. *Orthellia*).

Wing : The wings as in all Diptera, are the anterior pair only. The hind pair are represented by the halteres. The bare or hairy areas on the wing and the presence or absence of setulae on the veins provide important characters in some species. There are seven longitudinal veins in addition to costa (c) and subcosta (sc). These are 1st longitudinal (Radius 1), 2nd longitudinal (Radius 2 + 3), 3rd longitudinal (Radius 4 + 5), 4th (Median), 5th (Cubitus 1) & six and seventh (cubitus 2 & cubitus 3). The hind margin of the wing is connected with the body by two membraneous lobes, the upper (UC) and lower (Lc) calyptra.

Leg : The chaetotaxy of the legs plays an important role in taxonomy of the flies. The position of the prominent bristles may be anterior and posterior or dorsal, and ventral. The marginal ones are named as anterior dorsal (ad), antero ventral (av), postero dorsal (pd) and postero ventral (pv) seta.

Abdomen : It consists of four visible segments with the first two segments are extremely reduced and the remaining segments are telescoped and modified as genital segments. In females, following the sixth segments, the seventh, eighth and ninth segments are in the retracted condition and form a small telescopic ovipositor. In males, the eighth tergite is asymmetrically placed to one side but the ninth tergite is well-developed and bears a pair of lobes.

Besides this, the colouration of thorax and abdomen is also provide important characters for identification of certain species.

LIST OF SPECIES

A. Subfamily MUSCINAE

1. *Musca (Musca) domestica* Linnaeus
2. *Orthellia indica* (Robineau-Desvoidy)

- 3. *Orthellia lauta* (Wiedemann)
- 4. *Orthellia timorensis* (Robineau-Desvoidy)
- 5. *Orthellia viridis* (Wiedemann)

B. Subfamily STOMOXYINAE

- 6. *Stomoxys calcitrans* (Linnaeus)

MATERIAL AND METHOD

Adult Muscidae are caught by the insect net. Sweeping by an insect net through a site of grasses, herbs, shrubs or the leaf blades along the sides of the water bodies or in crop fields, or even in the forest is the usual method of acquiring a great number of specimens in the shortest possible time. The other ideal spots for collection are the animals farms, cowdungs, rotten materials, fish markets, where they breed or live on animal or their excrements.

SYSTEMATIC ACCOUNT

Key to the Subfamilies

- 1. Arista long plumose, proboscis licking type, rather short and stout, labella well developed, usually 1 + 2 Sternopleural MUSCINAE
- Arista pectinate, proboscis elongate, strongly sclerotized, adapted for piercing, tapering from a broad base to a slender apex, labella atrophied, never more than 1+1 Steronpleural STOMOXYINAE

B. Subfamily MUSCINAE

Key to the genera

- 1. Suprasquamal ridge with black setulose hairs on posterior part; mid tibia with a strong pv seta beyond middle. Prostigmal seta distinct, except in a few brightly metallic blue or green flies, bend of m angular, or in a gentle curve*Orthellia* Robineau-Desvoidy
- Suprasquamal ridge bare, bend of m subangular*Musca* Linnaeus

Genus *Musca* Linnaeus

1758. *Musca* Linnaeus, *Syst. Nat. Ed. 10* : 589.

Type-species : *Musca domestica* Linnaeus.

1. *Musca (Musca) domestica* Linnaeus

1758. *Musca domestica* Linnaeus, *Syst. Nat. Ed. 10*, 589.

Material examined : South Tripura district : 1 F, 2 MM, Birchandranagar, 30. xii. 1991, coll. M. Datta; 1 M, Birchandranagar, 30. xii. 1991, coll. B. Mitra; 1 M, Kanthalchhari, Sabrum, 1. i. 1992, coll. B. Mitra; 1 M, Kanthalchhari, Sabrum, 1. i. 1992, coll. M. Datta; 3 FF, Kanthalchhari, Sabrum, 2. i, 1992, coll. M. Datta; North Tripura district : 3 MM., Ananda Bazar, 26. v. 1992, coll. M. Sil.

Diagnosis : Four black vittae on the thorax, inner pair terminating towards posterior end of thorax; propleural depression with fine setulose hairs, suprasquamal ridge without black setulae, all post dc strong, mid tibia without av and ad setae.

Distribution : Andaman Islands, Andhra Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Kashmir, Maharashtra, Punjab, Tripura, Cosmopolitan.

Genus *Orthellia* Robineau-Desvoidy

1863. *Orthellia* Robineau-Desvoidy, *Hist. nat. Dipt. env. Paris 2* : 837,

Type-species : *Orthellia cornicina* (Fabricius)

Key to the species

- 1. Thorax without prst dc; anterior mesopleural absent; prst acr absent; parafrontalia polished; interfrontalia narrower than parafrontalia in females*lauta* (Wiedemann)
- Thorax with two pairs of conspicuous post dc; anterior mesopleural distinct; one pair of strong prst acr present or interfrontalia wider than one parafrontalia in female 2

2. Thorax with a pair of strong prst acr and 3 pair of post dc; m with deep behind bend; wing covered with hairs throughout; antennae black to fuscus; 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 3

3. Discal cell wholly hairy; m usually without a deep behind bend; mesonotum either conspicuously dusted in front, or with only three post dc, the anterior two of which are subequal, midibia without an ad seta
.....*timorensis* (R. & D.)

— Discal cell with a bare strip; m with a distinct deep behind bend; mesonotum not markedly dusted in front and with more than three post dc, the anterior 2-4 of which are inconspicuous; palpi slender*indica* (R. & D.)

2. *Orthellia indica* (Robineau-Desvoidy)

1930. *Lucilia indica* Robineau-Desvoidy; *Mem. Pres. div. Sav. Acad. Sci. Inst. Fr.* 2 : 453.

Material examined : West Tripura district : 1 F, Amarapur, 5. iii. 1991, Coll. G. K. Srivastava; 1 F, Kunjaban, Agartala, 19. ii. 1991, Coll. G. K. Srivastava; 2 M, Hawaibari, 11. v. 1992, Coll. B. Mitra; 3 M, 1 F, Pulinpur (South), 10. V. 1992, Coll. B. Mitra; North Tripura district : 2 MM, 1 F, Kumarghat, 7. xii. 1998, Coll. R. C. Basu; 1 M, 3 FF, Kulai, Ambassa, 15. v. 1992, Coll. B. Mitra; 1 F, Pachorthol, 20. v. 1992, Coll. M. Sil; 1 F, Pachorthol, 20. v. 1992, Coll. B. Mitra; 2 MM, Radhapur, Dharmanagar, 24. v. 1992, Coll. M. Sil; 2 MM, Jaithang village, Bagbasa, 25. v. 1992, Coll. B. Mitra, South Tripura district 1 M, 1 F, Birchandra Nagar, Sabrum, 30. xii. 1991, Coll. B. Mitra; 1 F, Kanthalchhari, Sabrum, 2. i. 1992, Coll. B. Mitra; 1 F, Kanthalchhari, Sabrum, 1. i. 1992, Coll. M. Datta; 1 M, Sabrum, 4. i. 1992, Coll. M. Dutta.

Distribution : Andaman Islands, Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal; Java, Laos, Malay, Mayanmar, Philippines, Ryukyu Island, Sumatera, Sumbawa and Thailand.

3. *Orthellia lauta* (Wiedemann)

1830. *Musca lauta* Wiedemann, *Aussereurop. Zweifl. Insekt.* 2 : 410.

Material examined : West Tripura district : 1 F, Pulinpur (South), 10. v. 1992, Coll. B. Mitra; North Tripura district : 1 F, Pachorthol, 20. v. 1992, Coll. M. Sil; 1 F, Pachorthol, 20. v. 1992, Coll. B. Mitra; South Tripura district : 1 F, Jalefa, Sabrum, 4. i. 1992, Coll. M. Datta.

Distribution : Andaman Islands, Andhra Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal; Australia, China, E. Malaysia, Flores Island, Iran, Java, Kalimantan, Laos, Lombok, Malay, Myanmar, Nepal, Pakistan, Philippines, Ryukyu Island, Sumatera, Sumbawa, Sri Lanka, Taiwan and Thailand.

4. *Orthellia timorensis* (Robineau-Desvoidy)

1830. *Lucilia timorensis* Robineau-Desvoidy. *Mem. Pres. div. sav. Acad. Sci. Inst. Fr.* 2 : 460.

Material examined : South Tripura district : 1 F, Birchandranagar, 30. xii. 1991, Coll. M. Datta; 1 M, Dolbari, Sabrum, 3. i. 1992, Coll. B. Mitra.

Distribution : Andhra Pradesh, Assam, Bihar, Kerala, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal; Borneo, Bangladesh, Sulawesi, China, Dammar, Island, Flores Island, Jawa, Japan, Malay, Myanmar, Nepal, Philippines, Papuan subregion, Ryukyu Island, Simeulue Island, Sri Lanka, Sumatera, Thailand and Vietnam.

5. *Orthellia viridis* (Wiedemann)

1826. *Musca caesarion* Meigen *Syst. Besch. europ. zweifl. Insekt.*, 5 : 57.

Material examined : North Tripura district : 1 M, Jaithang village, Bagbasa, 25. v. 1992, Coll. B. Mitra.

Distribution : Himachal Pradesh, Kashmir, Punjab, Sikkim, Tripura, Uttar Pradesh and West Bengal; Nepal, Pakistan, Tibet, Hawaii, Holarctic.

B. Subfamily STOMOXYINAE

Genus *Stomoxys* Geoffroy

1762. *Stomoxys* Geoffroy, *Hist. abreg. Ins. Paris* 2 : 499, 538.

Type-Species : *Stomoxys calcitrans* (Linnaeus).

6. *Stomoxys calcitrans* (Linnaeus)

1758. *Conopos calcitrans* Linnaeus *Syst. Nat. Ed.* 10, 1 : 604.

Material examined : West Tripura district : 1 F, Kunjaban, Agartala, 19. ii. 1991, Coll. G. K. Srivastava; South Tripura district : 1 M, Kanthalchhari, Sabrum, 1. i. 1992, Coll. M. Datta; North Tripura district : 1 F, Kanthalipara, Ambassa, 13. v. 1992, Coll. M. Sil; 3 MM, Kulai, Ambassa, 15. v. 1992, Coll. B. Mitra.

Diagnosis : Propleural depression and hypopleura embossed with erect setulose hairs, apex of the proboscis slender; stpl 0+1, arista pectinate dorsally.

Distribution : Andhra Pradesh, Assam, Bihar, Goa, Kerala, Maharashtra, Orissa, Sikkim, Tamil

Nadu, Tripura, Uttar Pradesh and West Bengal; Bali, Bangladesh, China, Jawa, Malay, Myanmar, Nepal, Pakistan, Philippines, Simeulue Island, Sri Lanka, Sulawesi, Sumatera, Sumbawa, Taiwan, Thailand, and Vietnam; Cosmopolitan.

GENERAL REMARKS AND DISCUSSION

A review of literature reveals that nothing was reported from the Tripura by name till to date. Though there are number of surveys undertaken in this state but the faunal information is very poor. So, it may need still a thorough and intensive exploration for a fuller knowledge on the species diversity of the family Muscidae. With the present knowledge it would not be proper to make any zoogeographical interpretation.

ACKNOWLEDGEMENT

The author is grateful to Dr. A. K. Ghosh, ex-Director, and Dr. J. R. B. Alfred, Director, Dr. J. K. Jonathan, Scientist -SG, Zoological Survey of India, Calcutta, for their kind encouragement and co-operation and premission for facilities in this work. The author owes much to Dr. M. Datta, Scientist -SE, for critically going through the manuscript of this paper. The help rendered by Sri P. Parui, Assistant Zoologist in various ways is also duly acknowledged.

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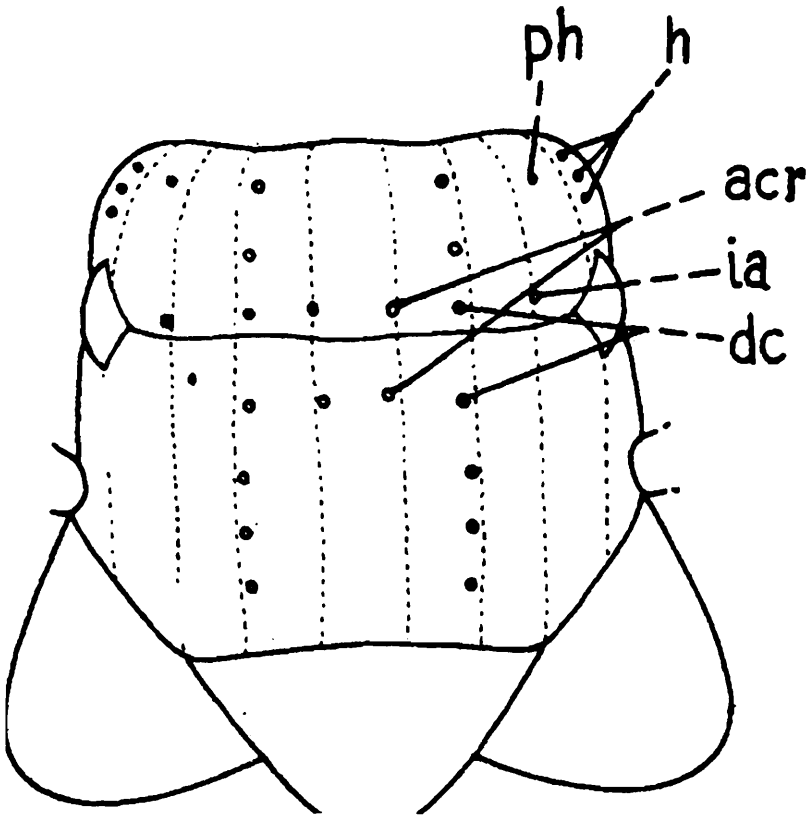
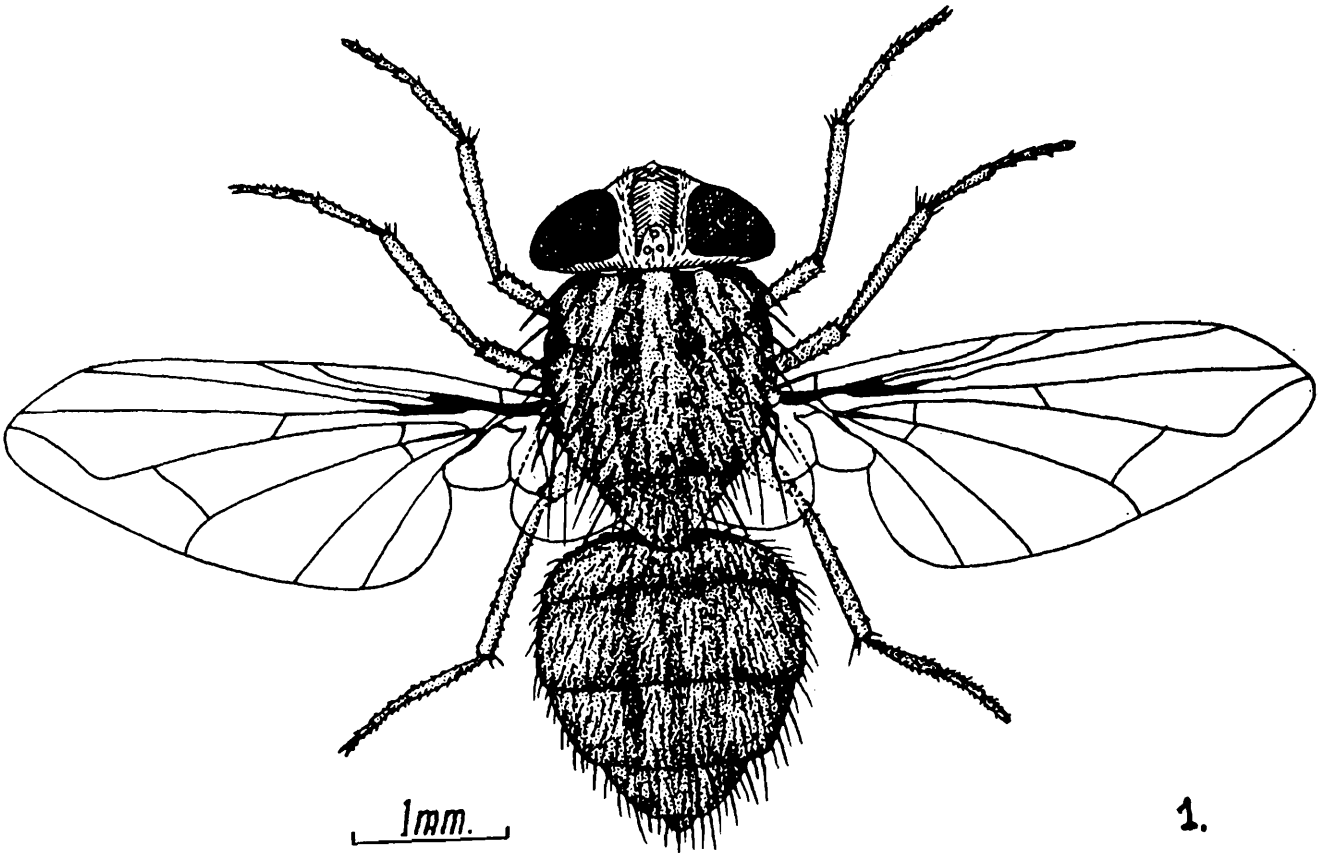


Fig. 1. A female of *Musca (Musca) domestica* Linnaeus (dorsal view).
Fig. 2. Thorax of *Musca (Musca) domestica* Linnaeus (dorsal view).

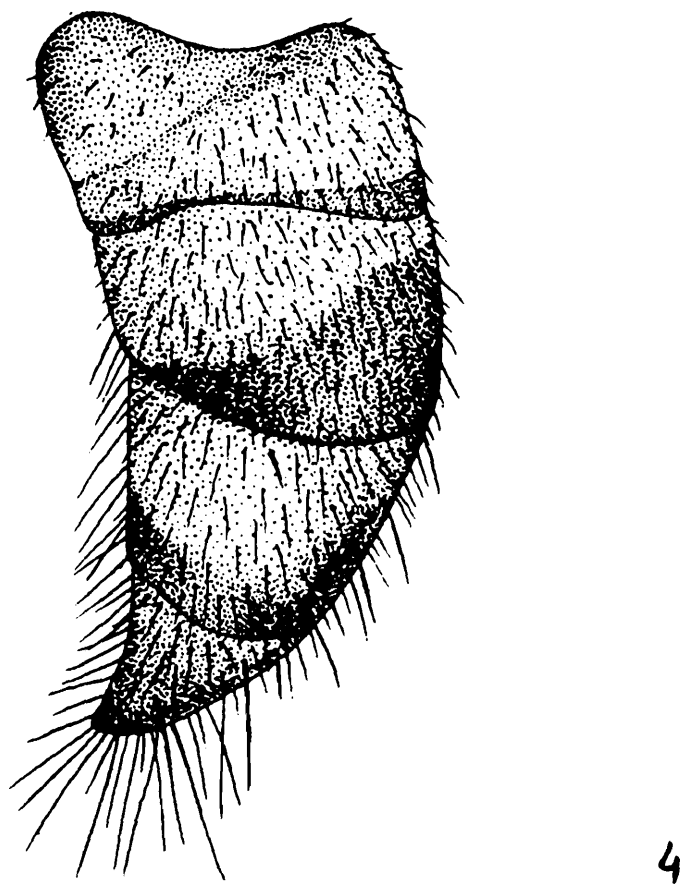
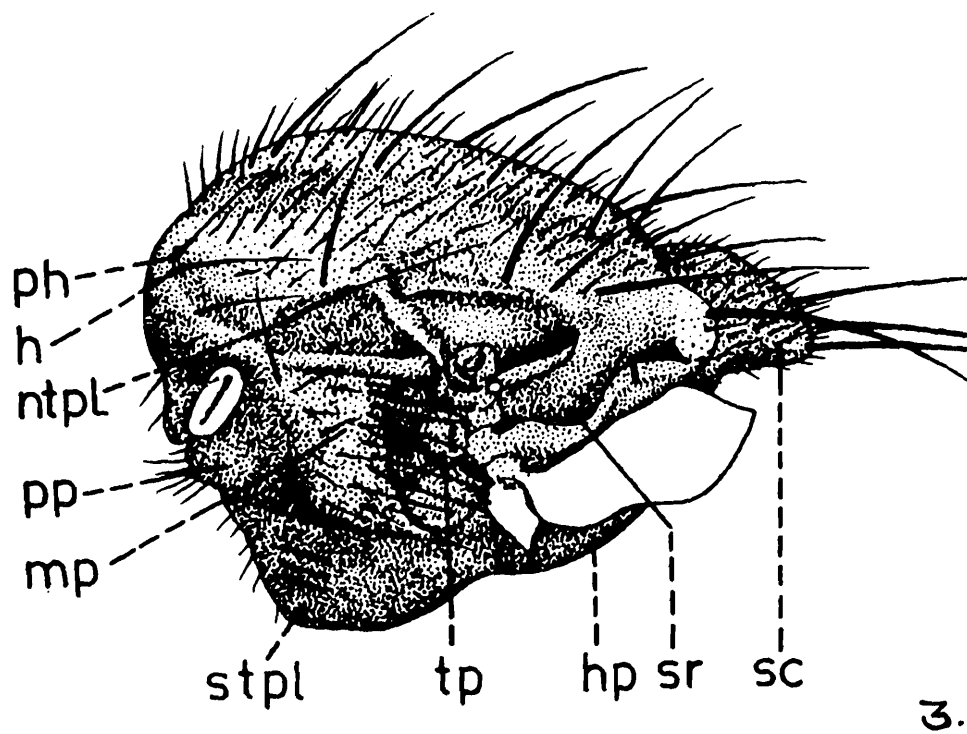
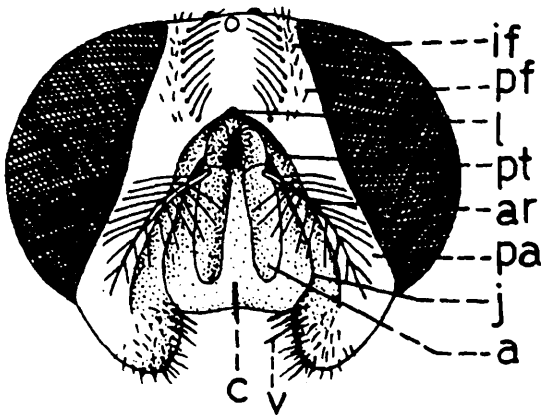


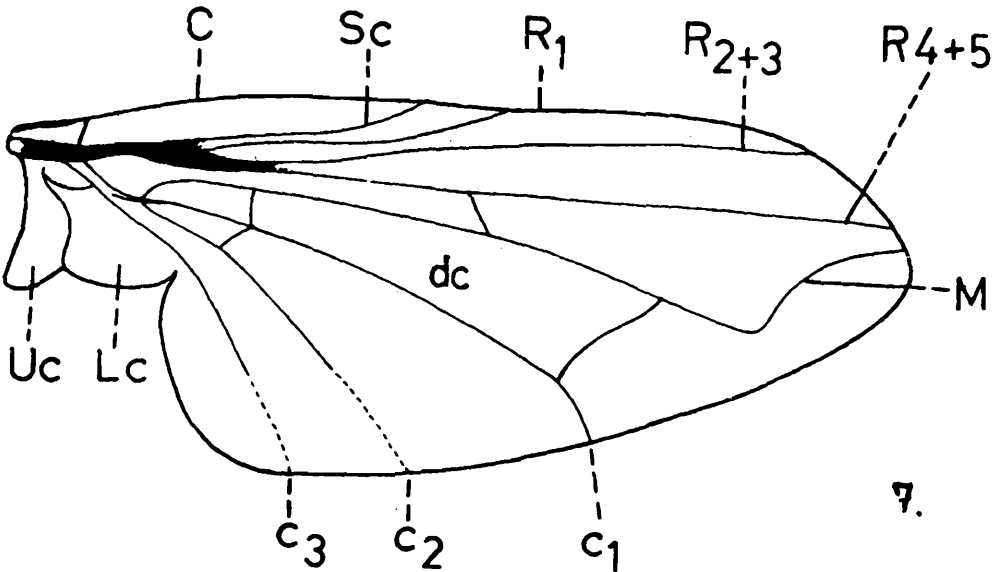
Fig. 3. Thorax of *Musca (Musca) domestica* Linnaeus (lateral view).
- Fig. 4. Abdomen of *Musca* sp. (lateral view).



5.

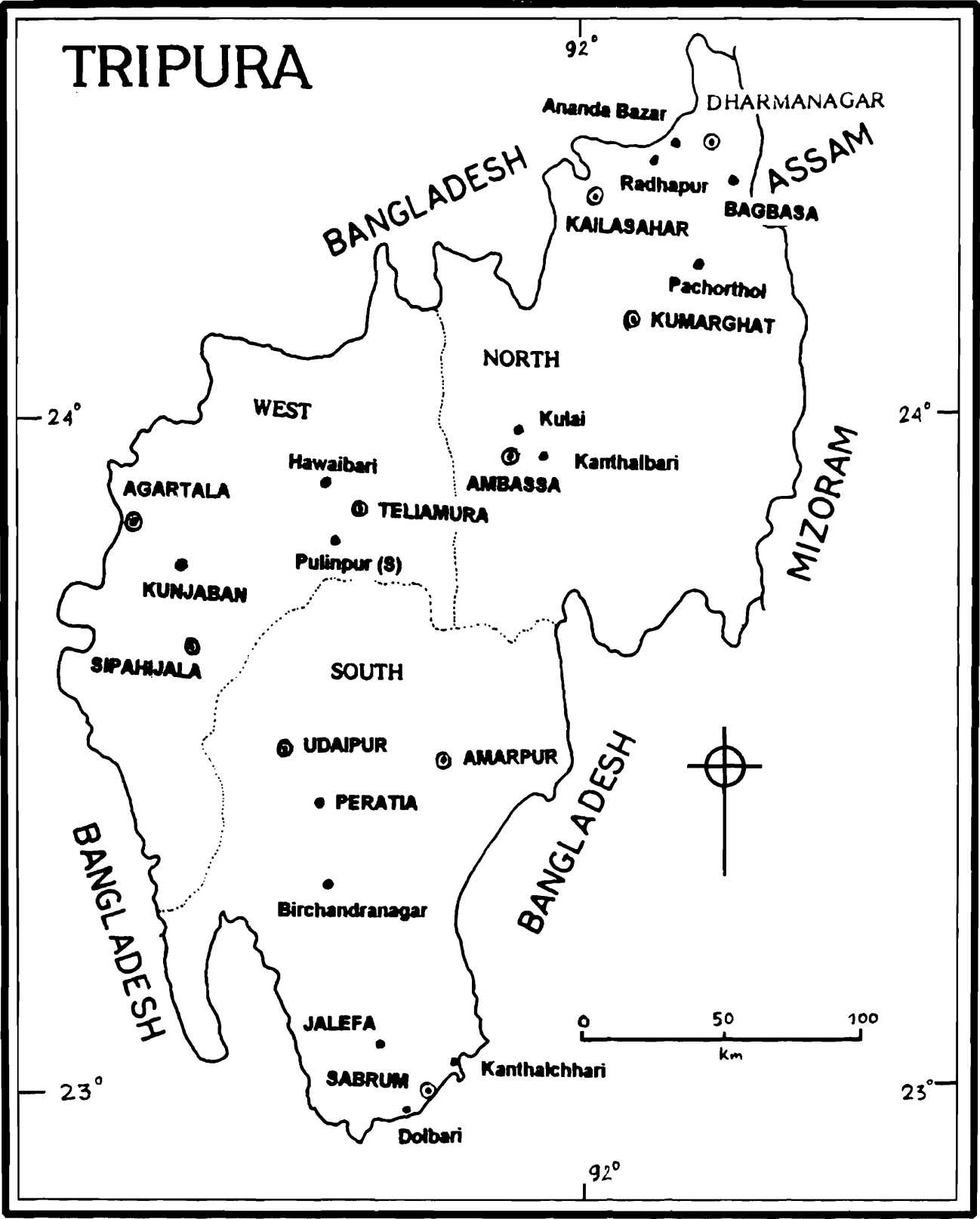


6.



7.

Fig. 5. Leg of *Musca (Musca) domestica* Linnaeus (dorsal view).
Fig. 6. Head of *Musca (Musca) domestica* Linnaeus (frontal view).
Fig. 7. Wing of *Musca (Musca) domestica* Linnaeus



Map 1. Tripura State, showing its location, districts, district headquarters, important places (○) and recorded places of occurrence (●) of the species dealt with.

INSECTA : DIPTERA : TACHINIDAE

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INTRODUCTION

Tachinids are Calyptrate (or Muscoid) dipteran flies belonging to suborder Cyclorrhapa. They are commonly known as 'tachina' or 'oozy' fly. The adults are found on vegetation, in particular on flowers, while the larvae are endoparasites on immature stages of other insects, specially those of Orthoptera and Lepidoptera. Biologically therefore, they assume great significance for the role they play as natural control agents of the population of many insects harmful to mankind. However, a number of species cause serious damage to sericulture by parasitising larvae of silk producing moths.

Adult tachinid flies have their body conspicuously covered with bristles. They are also characterised by moderately developed non-convex post-scutellum and sides of 2nd sternite visible above the tergites. Some species, specially those belonging to tribes Rutiliini (subfamily Proseninae) and Ernestiini (Subfamily Tachininae) are beautifully coloured with shades of metallic colours. In appearance they may be as slender as ants or as hefty as a bumble-bee. They are also quite variable in size (5.00 mm to 20.00 mm).

Tachinids are world-wide in distribution. Crosskey (1977) reported 709 species under 233 genera from the entire Oriental region. The Indian fauna consists of 207 species under 111 genera of five subfamilies, Goniinae being by far the most predominant. (124 species under 59 genera). The subfamily Tachininae with 53 species under 36 genera ranks second while rest of the fauna

pertains to remaining three subfamilies, e. g. Phasiinae, Proseninae and Dufourinae.

Oriental Tachinid fauna has been treated by Crosskey (1973, 1976, 1977). Emden (1954) dealt with the British fauna and Mesnil (1944-1975) did so for the Palearctic Tachinidae. Emden (1945, 1947, 1960) and Crosskey (1973b) published accounts of the Ethiopian and Australian Tachinidae respectively. The North and South American Tachinidae have been dealt with by Sabrosky and Arnaud (1965) and Guimaraes (1971) respectively besides other workers.

No record of occurrence of a tachinid species in Tripura state of the Indian Union is available in literature, although a number of species have been reported from the erstwhile 'Assam' province and neighbouring 'Bangladesh'.

Zoological Survey of India in recent years conducted a number of faunistic surveys in the Tripura state of the Indian Union. Of these, tachinid collections were available from four surveys, viz.,

(i) Tripura survey by Dr. J. K. Jonathan and party (May, 1978).

(ii) Tripura survey by Dr. M. Datta and party (January, 1992).

(iii) Tripura survey by Shri B. Mitra and party (May, 1992) and

(iv) Tripura survey by Dr. B. Das and party (May, 1992).

Altogether 10 specimens of six species were obtained from these surveys.

MATERIAL AND METHOD

Adult tachinid flies were collected, set, pinned and processed for male genitalia by the methods prescribed by Datta, Parui and Mukherjee (in press).

GENERAL MORPHOLOGY

Tachinidae are flies having body conspicuously covered with bristles, moderately developed non-convex post-scutellum and sides of 2nd sternite visible above tergites. Essential features of different taxa of the family with special reference to those occurring in Tripura are discussed below for an easy access to the keys provided for their identification.

Head (Figs. 1 and 2) : Eyes (E) are usually wide apart (dichoptic) (e. g. *Blepharipa*, *Palexorista*) but may also be partly contiguous (holoptic) in either or both sexes over the parafrontal area. The eyes vary in size with inversely proportionate change in the depth of genae and may be bare (e. g. *Blepharipa*) or hairy (e. g. *Palexorista*). Shape of the head varies in relation to situation of the antennal axis (AA), i. e. an imagined horizontal line through head profile at the level of antennal insertions, against the eyes, being oval (when AA is at about eye middle) (e. g. *Cuphocera*), or angulated (when AA is near the top of the eyes). Genae (G) at the anteroventral side of the head between eyes and peristome may be bare or hairy and its depth is inversely proportionate to the height of the eyes, being less or more (e. g. *Goniini*). Face (F) situated at the antero-median surface of head below antennal base is bounded on either side by a narrow strip, the facial ridge (FR) separating face from parafacials (PF), lying between the face and the eyes. The facial surface may be raised to variable extent forming the facial carina or facial keel (FC) separating antennal base at its upper part. Lower end of the facial ridge is provided with a prominent pair of setae, the vibrissae (V) while rest of the facial ridge may be setulose to variable extent. Parafacials may be bare (e. g. *Blepharipa*), covered with small setulae

(e. g. *Servillia*), or even provided with a few strong, larger setae (e. g. *Cuphocera*). Lower anterior part of head below the face is epistome (EP) and is marked by a raised strip—the epistomal margin (EPM). The vibrissae in profile, may be situated at or above (e. g. *Tachina*) the epistomal margin. Margin of the buccal opening is known as the peristome (P). Proboscis (PR) is the extended tube-like labium embracing mouth parts and could be shorter or longer than the height of the head. Labial palpi (LP) near apex of proboscis vary in shape (filiform, clubbed etc.) and may be longer (e. g. *Blepharipa zebina*) or shorter (e. g. *Palexorista*) than the third antennal segment or even vestigial (e. g. *Cuphocera*). The pair of three segmented antennae (A) situated above the face and separated from each other by a crescentic sclerite, the lunula (L), could be relatively short and falling short of the level of vibrissae (e. g. *Palexorista vicarium*) or long and extending beyond the level of vibrissae (e. g. *Servillia sobria*). Usually the third antennal segment is longest but rarely (e. g. *Servillia sobria*) the 2nd antennal segment is longer than the third segment. Arista (AR) situated on third antennal segment at its base (e. g. *Tachina*) or even at its apex, may be bare (e. g. *Cuphocera*), pubescent or even plumose. Anterodorsal surface of head bounded by eyes and lying in between ocellar triangle and lunula is the frons (FRN) and is distinguished into parafrons (PFN) or the outer part against the paraface and interfrons (IF) or the inner part in between the parafrons. The parafrons are largely obliterated in forms with holoptic eyes. Vertex (VT) is the upper surface of head around the ocellar triangle (OT), i. e. the elevated triangular area accommodating single anterior and paired posterior ocelli (O). The area of transition between the parafrons and parafacials is referred to as profrons (PFR) while the posterior surface of head behind vertex is known as occiput (OC).

Thorax (Figs. 3 and 4) as seen from dorsum is broadly divisible into an anterior, subsquarish mesonotum and a posterior semioval scutellum (SCL). The mesonotum is further divided into an

anterior prescutum (PSC) and posterior scutum (SCT) by a transverse suture (TS). Raised convexities at the antero-and posterolateral corners of mesonotum are respectively designated as humeral (HC) and posterior (PC) calli. Acrostichal (AC), dorsocentral (DC) and intra-alar (IA) refers to subsequent longitudinal rows of setae from near the mid-dorsum of thorax outwards. These are preceded by prefixes 'pre-' or 'post-' depending on their situation anterior or posterior to the transverse suture. One or more setae standing anterolaterally on prescutum just behind humeral callus are known as posthumeral setae (PH) and the single isolated setae standing on the outermost part of the pre-scutum near notopleuron is known as pre-sutural (PS) seta. Alar row of setae differentiating on post-scutum in between the intra-alar row and the wing base include one pre-alar (PRA), two supra-alars (SA) and one postalar (PA), differentiating respectively in front of, above and posterior (in fact, on the posterior callus) to wing base. The sides of thorax are covered by a series of sclerotised plates; thus, on upper part from front to rear end, one comes across the propleuron (PPL), mesopleuron (MPL), pteropleuron (PTP), pleurotergite (PTG), and mediotergite (MTG). A subtriangular sternopleuron (STP), followed behind by a subsquarish hypopleuron (HPL) largely constitute the lower part of thoracic side. More important of the minor sclerite areas of mesonotum are notopleuron (NPL) in between pre-scutum and mesopleuron, suprasquamosal ridge (SR) behind the wing base and barette (B) in between pteropleuron and hypopleuron. Moderately developed well extended but non-convex post-scutellum (PSCL) can be seen beneath scutellum from a posterodorsal angle. Prosternum (PST) on the ventral thoracic plate lying in between and in front of fore coxae may be bare (Tachininae) or setulose (Goniinae).

The three pairs of legs on the ventral side of thorax have usual sections, e. g., coxa, trochanter, femora, tibiae and five segmented tarsus ending in a pair of claws and pulvilli in between. Fore-coxa may be bare (e. g. *Blepharipa zebina*) or

hairy on most of its inner anterior surface while the hind coxae too, may be bare (e. g. *sturmiini*) or hairy (e. g. Tachinini) on its posterodorsal surface. Besides, presence and situation (anterior, posterior, dorsal or ventral) of setae on shaft of tibiae are often considered to be important taxonomic criteria.

The only pair of functional (fore-pair) wings (Fig. 5) are generally uniform in shape and venation. These are mostly transparent, but may also be partly coloured (e. g. *Blepharipa zebina*) or even striped with reddish or blackish shades. The longitudinal veins are costa (C)—the strong vein forming the fore margin of wing; subcosta (SC) running independently from base but ending in costa shortly thereafter; R_1 which also runs as an independent vein from near wing base but terminate in costa before crossing half way along the length of wing. The next longitudinal vein soon after origin bifurcates (at a point known as the 'basal node of R_{4+5} ') (BN) into two, e. g., R_{2+3} and R_{4+5} , each running independently to terminate at wing margin subapically. Media (M) that runs as the next independent vein from wing base bifurcates upon crossing about three-fourth the length of the wing into M_1 and M_2 . M_1 runs obliquely outwards to terminate at wing margin close to the point of termination of R_{4+5} or even terminating at R_{4+5} before reaching wing margin. M_2 , often referred to as M_2 appendix, if present, runs obliquely downwards and usually ends up on wing membrane long before reaching the wing-margin. The next longitudinal vein Cu_1 runs towards the hind margin of wing but is usually incomplete and terminates well before reaching wing margin.

Cross-veins worth mentioning are r-m, a short isthmus joining R_{4+5} and M at about basal third of wing and m-cu, that obliquely connects M and Cu_1 enclosing a triangular space known as the discal cell. The subtriangular space enclosed by R_{4+5} , M and M_1 is known as the cell R_5 is considered as 'open' when M_1 terminates at wing-margin independent of R_{4+5} (e. g. *Cuphocera varia*), and is considered as 'closed' when M_1 terminates at R_{4+5} before the wing-margin.

Basal node of R_{4+5} usually bears two or three setulae. Veins otherwise are usually bare but may be setulose for variable extent.

Halteres (H) are knob-like organs at the posterolateral end of scutum representing the degenerated, second pair of wing.

The wing membrane is differentiated near the base into alula (AL), lower calypter (LC) and upper calypter (UC). Usually the lower calypter is larger than and projecting far beyond the upper calypter (e. g. Tachinini) but rarely the situation may be reverse.

Abdomen is almost entirely covered by four visible tergites, e. g. T_{1+2} , T_3 , T_4 and T_5 while a narrow median strip of ventral surface is formed by five visible sternites, e. g., St 1, St 2, St 3, St 4 and St 5. Sternites are almost entirely concealed in Goniini. T_5 may be less than half the length of T_4 (e. g. *Blepharipa*) or vice versa (e. g. *Palexorista*). Shape of abdomen varies in being subcylindrical, subovate or broad and flattened. T_{1+2} may be excavated medially partly or the excavation may extend upto apex (e. g. Sturmiini). St 5 is deeply excavated accommodating genitalia in between the lobes.

Male genitalia (Fig. 6) hypopygium (HY) consists of a large curved plate, epandrium (EPN) bearing the paired cerci (CE) and surstyli (S) at its apical end and the aedeagus (AE) at its proximal end. Apical part of the aedeagus is known as distiphallus (DT).

Chaetotaxy : The setae and hairs may cover a body part partly or entirely, or these may be oriented in definite pattern. Usually the setae and hairs are named after the body part on which these are differentiated, e. g. 'ocellar' are those differentiated on the ocellar triangular, etc. However, prefixes are often used to indicate their situation and/or direction, as follows :

Marginal : Setae differentiated along the margin of a body part.

Discal : Setae differentiated on the surface of a body part.

Apical : Setae differentiated at the apex of a body part or the one situated most apically in a series or row of setae.

Subapical : Setae situated just prior to the apical one.

Proclinate : Setae directed anteriorly against the long axis of the body.

Reclinate : Setae directed posteriorly against the long axis of the body.

Inclinate : Setae directed inwards in relation to the long axis of the body.

Classified list of Tachinid species from Tripura

- Family TACHINIDAE
Subfamily TACHININAE
Tribe TACHININI
Sp. 1. *Cuphocera varia* (Fabricius)
Sp. 2. *Servillia sobria* Walker

- Subfamily GONIINAE
Tribe EXORISTINI
Sp. 3. *Exorista velutina* Mesnil

- Tribe GONIINI
Sp. 4. *Pseudogonia rufifrons* Br. & Bergenst.

- Tribe STURMIINI
Sp. 5. *Blepharipa ? zebina* (Walker)

- Tribe ETHILIINI
Sp. 6. *Phorocerosoma vicarium* (Walker)

SYSTEMATIC ACCOUNT

Family TACHINIDAE

Key to the Subfamilies

- Prosternum bare TACHININAE
Prosternum haired or setulose GONIINAE

Subfamily TACHININAE

Diagnostic character : Head without a facial carina; arista pubescent or plumose; reclinate

orbital setae usually present; thoracic and abdominal chaetotaxy often fine or reduced, Prosternum usually bare; prealar setae usually weaker than first post-dorsocentral setae or even absent. T_{1+2} excavated to hind margin or not so; sternites of abdomen concealed or exposed.

Tribe TACHININI

Diagnostic characters : Epistome strongly projecting; arista inserted at or near the base of the third antennal segment; antennal axis below the level of top of the eyes; antenna with third segment not more than seven times as long as the second segment. Prosternum not inflated or visible in profile; hind coxae with fine soft hairs on posterodorsal surface; basal node of R_{4+5} with only a few weak hairs; veins otherwise usually bare; cell R_5 open.

Key to the genera

Palpi vestigial **Cuphocera** Macquart
 Palpi fully developed
 **Servillia** Robineau Desvoidy

Genus **Cuphocera** Macquart

1845. *Cuphocera* Macquart, *Annls Soc. ent. Fr.*, (2) 3 : 267.

1976. *Cuphocera*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 205.

Diagnostic characters : Antennal axis at about eye-middle; antenna of normal length and falling well short of epistomal margin; palpi vestigial vibrissae only a little above epistomal margin; parafacial with 2/3 strong setae at lower end. 1+3 intra-alar setae. Hairs normal and short, not furry in nature; T_{1+2} with only one pair of apical marginal setae.

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 : 2 exs., Pulinpur, coll. S. K. Chakraborty, 10. v. 1992; 1 ex., Amarpur,

coll. B. C. Das, 15. v. 1992; 1 ex., Unakoti, coll. B. Mitra, 22. v. 1992.

Diagnostic characters : Length : 12.0-13.0 mm (body), 9.0 mm (wing); black marked with pruinulent white; four scutellars, the subapical being stronger than apical.

Distribution : India : Tripura (North district), Assam, Kerala, Sikkim, Tamil Nadu and West Bengal. Outside India : China, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Papua, Sri Lanka, Taiwan, Thailand and Queensland.

Genus **Servillia** Robineau-Desvoidy

1830. *Servillia* Robineau-Desvoidy, *Mem. pres. div. Sav. Acad. Control* : 49.

1976. *Servillia*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 207.

Diagnostic characters : Antennal axis well above eye-middle; antenna long, reaching or even extending beyond epistomal margin; palpi well developed; vibrissae well above epistomal margin; parafacial without strong setae, 1+2 intralar setae. At least some of the setae are long and furry in nature; T_{1+2} with at least three pairs of apical marginal setae.

2. **Servillia sobria** Walker

1852. *Tachina sobria* Walker, *Insecta Saundersiana : or characters of undescribed insects in the collection of William Wilson Saunders, Esq. F. R. S., & C.*, 1 (Diptera, pt. iv) : 272.

1976. *Servillia sobria*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 208.

Material examined : 1 ex., Garjee, coll. J. K. Jonathan, 2. v. 1978.

Diagnostic characters : Length : 12.0-14.0 mm (body), 10.0-11.5 mm (wing); black, scutellum yellow and abdomen marked with three complete narrow yellow bands. Five scutellars, the subapical being stronger than apical.

Distribution : India : Tripura (South district), Assam, Himachal Pradesh and Kashmir. Outside India : China, Indonesia, Malaysia, Myanmar and Pakistan.

Subfamily GONIINAE

Diagnostic characters : Head without a facial carina; arista pubescent, rarely plumose; reclinate orbital setae usually absent; thoracic and abdominal chaetotaxy usually strongly developed. Prosternum usually setulose; prealar setae usually present, either weaker or even stronger than first post-dorsocentral setae. T_{1+2} usually excavate to hind margin; sternites of abdomen usually concealed or mainly so.

Key to the Tribes

1. Prealar setae short and weak, always shorter than first post-dorsocentral setae EXORISTINI
- Prealar setae strong, always sub-equal or longer than first post-dorsocentral setae 2
2. Ocellar setae reclinate GONIINI
- Ocellar setae proclinate or absent 3
3. M_2 appendix present STURMIINI
- No M_2 appendix ETHILIINI

Tribe EXORISTINI

Diagnostic characters : Eyes moderately large; genal depth much greater than the width of the third antennal segment; epistome visible laterally in front of vibrissae; vibrissae situated well above epistomal margin; ocellar setae proclinate or absent. Prealar setae weak and not quite as large as first post-dorsocentral setae; scutellum with more than three pairs of marginal setae of which the subapical pairs are parallel or divergent. T_{1+2} excavate at hind margin.

Genus *Exorista* Meigen

1830. *Exorista* Meigen, *Magazin Insektenk.* (Illiger), 2 : 280.
1976. *Exorista*, 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-dorsocentral setae. Wings with cell R_5 open.

3. *Exorista velutina* Mesnil

1953. *Exorista velutina* Mesnil, *Bull. Anns Soc. ent. Belg.*, 89 : 101.
1976. *Exorista velutina*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 222.

Material examined : 2 exs., Anandabazar, coll. B. Mitra and party, 26. v. 1992.

Diagnostic characters : Small in size, length 8.00 mm (body), 6.00 mm (wing); black with restricted pruinose white markings on thorax and abdomen. Frons rather narrow. Bristles on thorax and abdomen appreciably long. Apical marginal setae on dorsum of segments T_3 and T_4 are very much erect and almost reaching apex of following segments.

Distribution : India : Tripura (North district) and Tamil Nadu. Outside India : Malaysia (Malaya) and New Guinea.

Tribe GONIINI

Diagnostic characters : Eyes normal in size; genal depth greater than the width of the third antennal segment; epistome visible laterally in front of vibrissae; vibrissae situated well above epistomal margin; ocellar setae reclinate. Prealar setae strong and larger than first post-dorsocentral setae; scutellum with four or five marginal setae of which the subapical pairs are subparallel. T_{1+2} excavate at hind margin.

Genus *Pseudogonia* Brauer & Bergenstamm

1889. *Pseudogonia* Brauer & Bergenstamm, *Denkschr. Acad. Wiss. Wien*, 56 : 100.
1976. *Pseudogonia*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 244.

Diagnostic characters : Facial ridge substraight and bare but for the few setulae near the vibrissae;

parafacial setulose, the setulae adjacent to facial ridge stronger than the rest; genal and parafacial vestiture entirely black; second segment of arista elongate, several times as long as broad and at least as long as the rest of arista apical to second segment; Four sternopleurals.

4. *Pseudogonia rufifrons* Wiedemann

1830. *Pseudogonia rufifrons* Wiedemann, *Aussereuropaische sweifflugelige Insekten*, 2 : 318.

1976. *Pseudogonia rufifrons*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 244.

Material examined : 1 ex., Pacharthal, coll. S. K. Chakraborty, 21. v. 1992.

Diagnostic characters : Medium in size, length : 10.00 mm (body), 7.00 mm (wing); Black marked with pruinosed white on thorax and abdomen, face and frons shining silvery white. Frons very wide, its width more than the height of genae. Three humerals; Four scutellars of which the subapicals are the longest and the apicals are directed straight backwards; four sternopleurals situated in curve.

Distribution : India : Tripura (North district), Andhra Pradesh, Kashmir, Kerala, Orissa and Punjab. Outside India : Australia, China, Indonesia, Japan, Malaku, Malaysia, Myanmar, New Guinea, Pakistan, Solomons, Sokotra, Taiwan and Thailand; widespread in southern Palaearctic and Ethiopian regions.

Tribe STURMIINI

Diagnostic characters : Eyes moderately large; genal depth greater than the width of the third antennal segment or profrons; epistome visible laterally in front of vibrissae; vibrissae situated well above epistomal margin; ocellar setae proclinate or absent. Humeral callus with less than five (usually three or four) setae; prealar setae strong and larger than first post-dorsocentral setae. Lower calypter with inner posterior angle well developed and inner margin closely abutted

against scutellum. M_2 appendix or dark bold present.

Genus *Blepharipa* Rondani

1856. *Blepharipa* Rondani, *Dipterologiae italicae prodromus*, 1 : 71.

1976. *Blepharipa*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 235.

Diagnostic characters : Larger forms (Length, body : 9.00-18.00 mm). Parafacial bare; only one pair of reclinate orbital setae; ocellar setae proclinate or absent. Scutellum usually with a pair of subapical discal setae; lateral scutellar setae very strong, subequal in size to basal and subapicals. T_5 less than half as long as T_4 .

5. *Blepharipa ? zebina* Walker

1849. *Tachina zebina* Walker, *List of the specimens of dipterous insects in the collection of William Wilson Saunders, Esq., f. R. S., & C.* 1 : 772.

1976. *Blepharipa zebina*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, 26 (Suppl.) : 236.

Material examined : 1 ex., Palinpur, coll. M. Sil, 10. v. 1992.

Diagnostic characters : Black marked with light brown on face, frons and scutum and sublateral patches of same colour on first three abdominal segments. Length : body : 18.00 mm, hindwing : 15.00 mm. Five scutellar and three sternopleural setae. Wings with brownish tinge around basal node of R_{4+5} .

Remarks : The only specimen under study differs from published accounts of the species in being smaller in size (body 14.00 vs 18.00 mm, wing 10.00 vs 15.00 mm), in having 4-5 (vs 3) sternopleural bristles, wings almost clear of basal marking and T_3 and T_4 in being marked with narrow pruinosed white basal rings.

Distribution : India : Tripura (North district), Assam, Bihar, Kerala, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. Outside India : ? China; ? Japan; Myanmar; Nepal; Sri Lanka; ? Taiwan and Thailand.

Tribe STURMIINI

Diagnostic characters : Eyes hairy ; epistome visible laterally in front of vibrissae ; vibrissae situated about the level of epistome. prealar setae strong and larger than first post-dorsocentral setae. No M_2 appendix.

Genus *Phorocerosoma* Townsend

1921. *Phorocerosoma* Townsend, *Suppl. Ent.*, **16** : 61.

1976. *Phorocerosoma*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent.*, (Suppl.) **26** : 238.

Diagnostic characters : Smaller forms (length, body : 7.00-11.00 mm). Parafacial with some fine hairs on upper part; one or two pairs of reclinate orbital setae; ocellar setae absent. Scutellum without subapical discal setae; lateral scutellar setae weaker and usually shorter than the basal and subapical. T_5 more than half the length of T_4 .

6. *Phorocerosoma vicarium* (Walker)

1856. *Masicera vicaria* Walker, *J. Proc. Linn. Soc. Lond.*, **1** : 20.

1976. *Phorocerosoma vicarium*, Crosskey, *Bull. Brit. Mus. (nat. Hist.) Ent. Suppl.* **26** : 238.

Material examined : 1 ex., Dolbari, coll. M. Datta, 3. i. 1992.

Diagnostic characters : Black marked with pruinosed bluish tinge on sides of thorax and transverse band of same colour on abdomen. Length : body : 9.00 mm, hindwing : 7.00 mm. Antenna shorter than palpi and the third segment seen laterally falling well short of vibrissae. Scutellum pruinosed blue, about two third as long as broad and with a total of four marginals; three sternopleurals.

Remarks : The species has been recorded here for the first time from India.

Distribution : India : Tripura (South district). Outside India : China; Indonesia (Sumatra); Japan; Malaysia (Malaya) and Singapore.

DISCUSSION

All six tachinid species reported in this paper are new records from Tripura state of the Indian Union and of these, *Phorocerosoma vicarium* (Walker) is additionally, a new record from Indian subcontinent. Distribution of various species in India indicates commonness higher with southern India (4 out of total 6 species or 66%) than that with northern India (3 out of total 6 species or 50%). *Blepharipa zebina* (Walker) is the only species confined to the Oriental region and it is also fairly well distributed all over India. However, commonness of fauna to regions outside India indicates the same as strong with China, Taiwan and /or Japan as that with rest of the Oriental region, i. e., Indo-China, Malaysia and Indonesia (4 out of total 6 species or 66% in either case). Two species exhibit patchy or disjunctive distribution in not having been reported from anywhere in Indo-china so far but being known beyond this gap from Malaya, China and Japan [*Phorocerosoma vicarium* (Walker)] and from Malaya and New Guinea (*Exorista velutina* Mesnil). More extensive surveys in future is likely to reveal the existence of more tachinid species in the state.

SUMMARY

Six tachinid species (Diptera : Tachinidae) have for the first time been reported from the Tripura state of the Indian Union, viz., *Cuphocera varia* (Fabricius) and *Servillia sobria* Walker (subfamily TACHININAE), *Exorista velutina* Mesnil, *Pseudogonia rufifrons* Br. & Bergnst., *Blepharipa ? zebina* (Walker) and *Phorocerosoma vicarium* (Walker) (subfamily GONIINAE). Important taxonomic features of the group have been discussed with illustration for an easy access to the running keys provided for identification of all the taxa reported in the paper and an attempt has been made to analyse the nature of the tachinid fauna of the state.

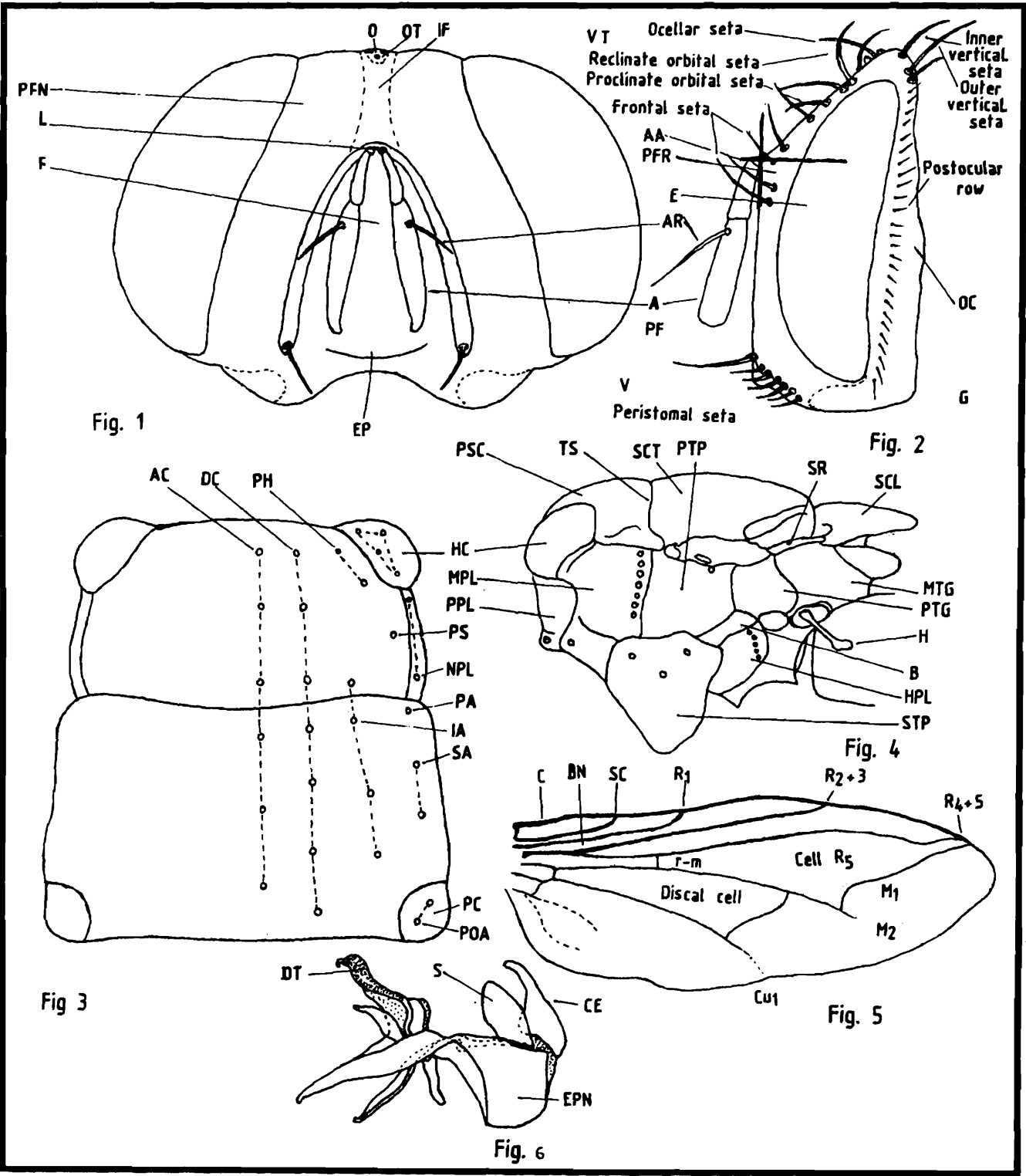
ACKNOWLEDGEMENT

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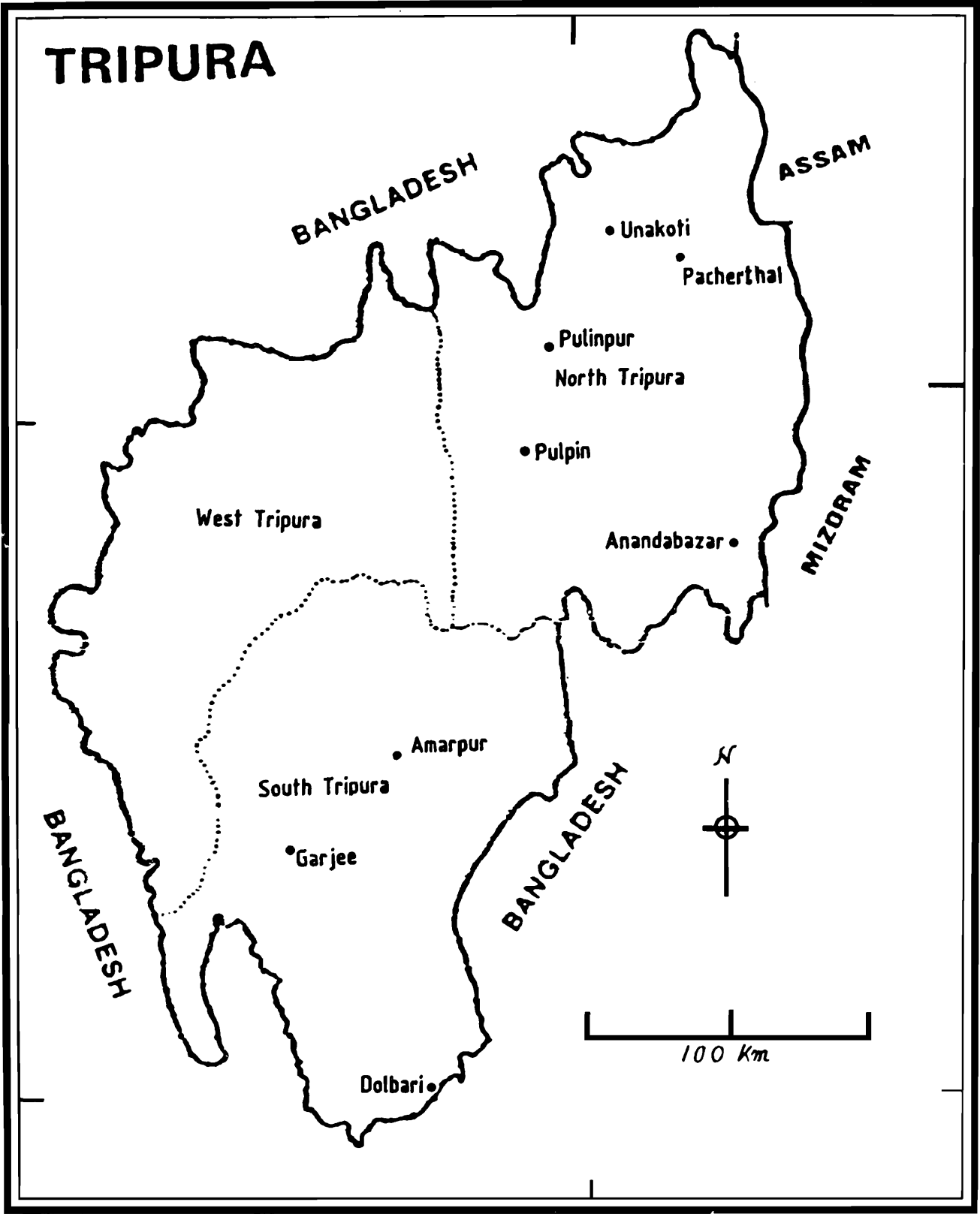
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Figs. 1 to 6 : structure and terminology of a typical tachinid fly. Figs. 1 and 2, head; Fig. 1, in dorsal view; Fig. 2, in lateral view; Figs. 3 and 4, thorax; Fig. 3, in dorsal view; Fig. 4, in lateral view; Fig. 5, right forewing; Fig. 6, male genitalia. For lettering, see text. .



Map of Tripura showing collection localities.

INSECTA : LEPIDOPTERA

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INTRODUCTION

A consolidated account of 135 species and subspecies in 106 genera under 22 families of butterflies and moths (order Lepidoptera) from the state of Tripura is provided. Earlier, Nandi and Varshney (1988) and Mandal and Ghosh (1991) reported 45 butterflies and 47 moths respectively from the state, whence there is no further mention of the group, except one moth, i.e., *Leucinodes orbonalis* Guenée, from Agartala (vide Roy and Pande, 1991), on record since ever. Quite a many insects of Lepidoptera have freshly been brought to the laboratory on extensive surveys of the state during 1988-'92 by eight insect survey parties from the Zoological Survey of India. Studies on these material comprising 268 specimens (118 M, 150 F) reveal that 26 butterflies and 6 moths confirm their earlier reported occurrence, while the remaining members represented by 13 butterflies and 29 moths constitute new locality records for Tripura, amongst the latter of which two are reported for the first time from entire N.-E. India. The article is accompanied by discussion, references and also one appendix, two tables and five figures giving respectively the material data, district-wise distribution and number, and cartographically plotted serial number of species and subspecies from the state of Tripura.

SYSTEMATIC ACCOUNT

[For coded "Material examined" vide Appendix ; * new record]

Order LEPIDOPTERA

Superfamily PAPILIONOIDEA

Family PAPILIONIDAE

Genus *Graphium* Scopoli

1777. *Graphium* Scopoli, *Intr. Hist. Nat.*, : 433.

Distribution : South East Asia to Australo-Papuan and Solomons ; Africa and Malagasy ; East Palaearctic (vide Hancock, 1983).

*1. *Graphium doson axion* (C. & R. Felder)

1864. *Papilio axion* C. & R. Felder, *Verh. zool.-bot. Ges. Wien.*, 14 : 305.

1939. *Graphium doson axion* : Talbot, *Fauna Brit. India, Butterflies*, 1 : 223, fig. 61.

1985. *Graphium doson axion* : Mandal, *Pap. Int.*, 1(4) : 78.

Material examined : XXXVII.

Distribution : India : Tripura (South district), Assam ; Arunachal Pradesh (vide Mandal, 1985); West Bengal (vide Mandal & Maulik, *in press*, a); Sikkim ; Uttar Pradesh. *Elsewhere* : Bhutan ; Myanmar ; Vietnam ; South China ; Thailand.

Genus *Atrophaneura* Reakirt

1865. *Atrophaneura* Reakirt, *Proc. ent. Soc. Philad.*, 3 : 446.

Distribution : South East Asia to East Palaearctic, Australia and Malagasy (vide Hancock, 1983).

2. *Atrophaneura aristolochiae aristolochiae* (Fabricius)

1775. *Papilio aristolochiae* Fabricius, *Syst. Ent.*, : 443.

1939. *Polydorus aristolochiae aristolochiae* : Talbot, *Fauna Brit. India*, Butterflies, **1** : 86, figs. 15, 16 a-c ; pl.
1988. *Atrophaneura aristolochiae aristolochiae* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 122.

Material examined : III, XVII, XXI.

Distribution : India : Tripura (North, West and South districts). Throughout the rest of the Indian subregion except Myanmar (*vide* Talbot, 1939; Mandal & Maulik, *in press*, a, b).

Genus *Troides* Huebner

1819. *Troides* Huebner, *Verz. bek. Schmett.*, (6) : 88.

Distribution : Oriental, Australo-Papuan and Solomons (*vide* Hancock, 1983).

3. *Troides helena cerberus* (C. & R. Felder)

1864. *Papilio cerberus* C. & R. Felder, *Verh. zool.-bot. Ges. Wien.*, **14** : 291.
1939. *Troides helena cerberus* : Talbot, *Fauna Brit. India*, Butterflies, **1** : 66.
1988. *Troides helena cerberus* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 122.

Material examined : XXII.

Distribution : India : Tripura (West district); East Himalaya and the adjoining belts (*vide* Mandal & Maulik, *in press*, a, b) ; eastern and southern Peninsula. *Elsewhere* : Nepal ; Bhutan; Bangladesh ; Myanmar ; Vietnam; Indonesia ; Malaysia.

Genus *Chilasa* Moore

1881. *Chilasa* Moore, *Lep. Ceylon*, **1** : 153.

Distribution : South East Asia to Papua and Solomons ; also Central China and Taiwan (*vide* Hancock, 1983).

4. *Chilasa clytia clytia* (Linnaeus)

1758. *Papilio clytia* Linnaeus, *Syst. Nat.*, ed. **10** : 479.
1939. *Chilasa clytia clytia* : Talbot, *Fauna Brit. India*, Butterflies, **1** : 116, figs. 28, 29 ; pl.
1983. *Chilasa clytia clytia* : Hancock, *Smithersia*, **2** : 48 (*Papilio*, Nandi & Varshney, 1988).

Material examined : XVI, XXI.

Distribution : India : Tripura (West and South districts), throughout the rest of mainland. *Elsewhere* : Myanmar.

Remarks : The form *dissimilis* (Linnaeus) of this butterfly is reported here for the first time from Tripura.

Genus *Princeps* Huebner

1807. *Princeps* Huebner, *Samml. exot. Schmett.*, **1** : pl. 116.

Distribution : Predominant in the Old World except Europe (*vide* Hancock, 1983).

5. *Princeps memnon agenor* (Linnaeus)

1758. *Papilio agenor* Linnaeus, *Syst. Nat.*, ed. **10** : 460.
1939. *Papilio memnon agenor* : Talbot, *Fauna Brit. India*, Butterflies, **1** : 129, figs. 32-34.
1983. *Princeps memnon agenor* : Hancock, *Smithersia*, **2** : 48 (*Papilio*, Nandi & Varshney, 1988).

Distribution : India : Tripura (West and South districts); East Himalaya and adjoining belts (*vide* Mandal & Maulik, *in press*, a, b); Andaman and Nicobar Is. *Elsewhere* : Myanmar.

Remarks : Nandi & Varshney (1988) reported the form *agenor* of this butterfly from Tripura.

6. *Princeps polytes romulus* (Cramer)

1775. *Papilio romulus* Cramer, *Pap. Exot.*, **1** : 67, pl. 43, fig. A.
1939. *Papilio polytes romulus* : Talbot, *Fauna Brit. India*, Butterflies, **1** : 178, figs. 46-48; pl.
1983. *Princeps polytes romulus* : Hancock, *Smithersia*, **2** : 48 (*Papilio*, Nandi & Varshney, 1988).

Material examined : XXI, XXVII, XXVIII.

Distribution : India : Tripura (North, West and South districts) ; East to North-West Himalaya and adjoining belts (*vide* Mandal & Maulik, *in press*, a, b) ; eastern and southern Peninsula ; Lakshadweep (*vide* Mandal, 1991). *Elsewhere* : Sri Lanka ; Myanmar ; Malayan.

Remarks : Nandi & Varshney (1988) reported a couple of forms of this butterfly, viz., f. *romulus* (Cramer) and f. *stichius* Huebner, from Tripura, though the said authors did not mention ssp. *romulus* hitherto known from the Indian mainland and also Lakshadweep apart from certain others occurring in the Andaman and Nicobar archipelago.

***7. *Priniceps demoleus demoleus* (Linnaeus)**

1758. *Papilio demoleus* Linnaeus, *Syst. Nat.*, ed. 10 : 464.
 1939. *Papilio demoleus demoleus* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 189, fig. 50.
 1985. *Priniceps demoleus demoleus* : Mandal, *Pap.. Int.*, 1 (4) : 80.

Material examined : XVI, XXI, XXVI.

Distribution : India : Tripura (West district); Arunachal Pradesh ; Meghalaya ; East to North-West Himalaya ; throughout the Peninsula. *Elsewhere* : Sri Lanka ; Myanmar ; East Palaearctic.

Family PIERIDAE

Genus *Delias* Huebner

1819. *Delias* Huebner, *Verz. bek. Schmett.*, p. 91.

Distribution : India ; Tibet ; China ; Taiwan; Hainan ; Australo-Papuan ; Solomons.

8. *Delias pasithoë* (Linnaeus)

1767. *Papilio pasithoë* Linnaeus, *Syst. Nat.*, ed. 12 : 755.
 1939. *Delias aglaia aglaia* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 343, fig. 129.
 1988. *Delias pasithoë* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 123.

Distribution : India : Tripura (West district) ; Assam ; Meghalaya ; Sikkim. *Elsewhere* : Myanmar ; Nepal ; South West China ; Yunnan (*vide* Ghosh & Chaudhury, *in press*, b).

9. *Delias descombesi descombesi* (Boisduval)

1836. *Pieris descombesi* Boisduval, *Spec. Gen. Lép.*, 1 : 465.

1939. *Delias descombesi descombesi* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 348, fig. 131 a, b.

1988. *Delias descombesi descombesi* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 123.

Material examined : I, IV, V, XIII, XXX, XXXIX, XLI, XLII, XLIII, XLVI.

Distribution : India : Tripura (North, West and South districts) ; Meghalaya ; West Bengal; Sikkim. *Elsewhere* : Nepal to Myanmar and Thailand ; also, Annam ; Saigon ; Cochin-China.

***10. *Delias agostina agostina* (Hewitson)**

1852. *Pieris agostina* Hewitson, *Exot. Butt.*, 1 : pl. 1, figs. 1, 2.
 1939. *Delias agostina agostina* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 351, fig. 132. 132 a, b.
 1993. *Delias agostina agostina* : Varshney, *Oriental Ins.*, 27 : 359.

Material examined : XL, XLII.

Distribution : India : Tripura (South district); Meghalaya; Assam to Sikkim. *Elsewhere* : Myanmar ; Thailand ; also, Vietnam and Nepal.

11. *Delias eucharis* (Drury)

1773. *Papilio eucharis* Drury, *Ill. nat. Hist.*, 2 : pl. X, figs., 5, 6.
 1939. *Delias eucharis* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 352, fig. 133, a, b ; pl.
 1988. *Delias eucharis* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 124.

Distribution : India : Tripura (West district) ; Meghalaya ; throughout the Peninsula up to lower slopes of the Himalaya. *Elsewhere* : Sri Lanka.

***12. *Delias hyparete indica* (Wallace)**

1867. *Thyca indica* Wallace, *Trans. ent. Soc. Lond.*, (3) 4 : 351.
 1939. *Delias hyparete indica* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 357, fig. 134 a, b.
 1989. *Delias hyparete indica* : Smith, *Butt. Nepal*, (O. S. unseen).

Material examined : I, XLIV.

Distribution : India : Tripura (North and South districts) ; East to West Himalaya. *Elsewhere* : Myanmar ; Thailand ; Nepal ; Cochin-China.

Genus *Pieris* Schrank

1801. *Pieris* Schrank, *Fauna Boica*, 2 : 152.

Distribution : India; Myanmar to Malay Peninsula ; entire Holarctic.

13. *Pieris canidia indica* Evans

1926. *Pieris canidia indica* Evans, *J. Bombay nat. Hist. Soc.*, 31 : 712.

1939. *Pieris canidia indica* : Talbot, *Fauna Brit. India, Butterflies*, 1 : 426.

1988. *Pieris canidia indica* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 124.

Material examined : III, IV, V, IX, XIII, XV, XVII, XXXI, XLVII.

Distribution : India : Tripura (North, West and South districts) ; West Bengal (*vide* Mandal, 1992) ; widespread elsewhere in the Indian subregion (from Baluchistan and Chitral of Pakistan to the Dawna Range of Myanmar).

Remarks : The correct authority for *canidia* is Linnaeus and not "Sparman" as cited by Bingham (1907), Talbot (1939), Wynter-Blyth (1957) and Varshney (1993) [*vide* Mandal, 1992].

Genus *Catopsilia* Huebner

1819. *Catopsilia* Huebner, *Verz. bek. Schmett.*, p. 98.

Distribution : Indo-Australia to Africa ; Neotropical.

14. *Catopsilia pomona pomona* (Fabricius)

1775. *Papilio pomona* Fabricius, *Syst. Ent.*, p. 479.

1939. *Catopsilia pomona* : Talbot, *Fauna Brit. India, Butterflies*, 1 : 493.

1992. *Catopsilia pomona pomona* : Mandal, *Rec. zool. Surv. India*, 92 (1-4) : 31 (= *C. crocale*, Nandi & Varshney, 1988).

Material examined : XIX, XXI, XXXV.

Distribution : India : Tripura (North, West and South districts) ; Meghalaya ; West Bengal ; Andaman Is. *Elsewhere* : Sri Lanka ; Myanmar ; South China ; also Austro-Malayan (*vide* Nandi & Varshney, 1988; Mandal, 1992 ; Ghosh & Chaudhury, *in press*, a, b).

Remarks : The species *crocale*, Talbot, is now considered as a form of *C. pomona* (*vide* Mandal, 1992 ; Varshney, 1993), which is known to occur at Tripura.

15. *Catopsilia pyranthe pyranthe* (Linnaeus)

1758. *Papilio pyranthe* Linnaeus, *Syst. Nat.*, ed. 10 : 469.

1939. *Catopsilia pyranthe pyranthe* : Talbot, *Fauna Brit. India, Butterflies*, 1 : 497, fig. 168 b ; pl.

1988. *Catopsilia pyranthe pyranthe* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 123.

Distribution : India : Tripura (North and West districts) ; almost throughout the rest of mainland; Andaman Is. *Elsewhere* : Extending to Sri Lanka, Myanmar, Sino-Malayan as well as far East.

16. *Catopsilia florella gnoma* (Fabricius)

1776. *Papilio gnoma* Fabricius, *Syst. Ent.*, Append., : 828.

1939. *Catopsilia florella gnoma* : Talbot, *Fauna Brit. India, Butterflies*, 1 : 500, fig. 168 a.

1988. *Catopsilia florella gnoma* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 123.

Material examined : II, XV, XVI, XXXVIII.

Distribution : India : Tripura (North, West and South districts) ; West Bengal ; North West Himalaya ; Maharashtra ; Eastern Ghats ; Tamil Nadu ; Andaman Is. *Elsewhere* : Sri Lanka ; Myanmar.

Genus *Terias* Swainson

1821. *Terias* Swainson, *Zool. Illustr.*, 3 : 22.

Distribution : Indo-Australian ; Sino-Japanese; Ethiopian.

17. *Terias hecabe contubernalis* Moore

1886. *Terias contubernalis* Moore, *J. Linn. Soc. Lond., Zool.*, 21 : 46.

1939. *Eurema hecabe contubernalis* : Talbot, *Fauna Brit. India*, Butterflies, 1 : 527, fig. 177 a-c.

1993. *Terias hecabe contubernalis* : Varshney, *Oriental Ins.*, 27 : 364 (*Eurema*, Nandi & Varshney, 1988).

Material examined : II, IV, XVI, XVII, XIX, XX, XXII, XXVII, XLIII.

Distribution : India : Tripura (North, West and South districts) ; Meghalaya ; Assam ; West Bengal ; Sikkim ; Gujarat ; North West Himalaya (*vide* Mandal, 1984) ; Lakshadweep (Mandal, 1991). *Elsewhere* : Myanmar ; Singapore ; Malay Peninsula.

Family NYMPHALIDAE

(Including danaines and satyrines)

Genus *Tirumala* Moore

1880. *Tirumala* Moore, *Lep. Ceylon*, 1 (1) : 4.

Distribution : Australo-Oriental ; Afro-Tropical (*vide* Ackery & Vane-Wright, 1984).

18. *Tirumala limniace leopardus* (Butler)

1866. *Danais limniace*, var. *leopardus* Butler, *Proc. zool. Soc. Lond.*, 1866 : 52.

1947. *Danaus limniace leopardus* : Talbot, *Fauna Brit. India*, Butterflies, 2 : 31, fig. 10.

1993. *Tirumala limniace leopardus* : Varshney, *Oriental Ins.*, 27 : 366 (*Danaus*, Nandi & Varshney, 1988).

Distribution : India : Tripura (West district); throughout the rest of mainland ; Andaman and Nicobar Is., Lakshadweep (Mandal, 1991). *Elsewhere* : Pakistan ; Sri Lanka ; Myanmar ; Thailand ; Western Malaysia ; China ; Indo-China ; Vietnam.

Remarks : This and the following four species, earlier treated under the family Danaidae by Nandi & Varshney (1988), are considered here under the danaine Nymphalidae (*cf.* Mandal & Maulik, *in press*, a, b).

Genus *Danaus* Kluk

1802. *Danaus* Kluk, *Zwierzot. Hist. nat. pocz. gospod.*, 4 : 84.

Distribution : Essentially Austro-Oriental ; American (*vide* Ackery & Vane-Wright, 1984).

19. *Danaus genutia genutia* (Cramer)

1779. *Papilio genutia* Cramer, *Pap. Exot.*, 3 : 23.

1947. *Danaus plexippus plexippus* : Talbot, *Fauna Brit. India*, Butterflies, 2 : 25, fig. 8.

1988. *Danaus genutia genutia* : Nandi & Varshney, *Rec. zool. Surv. India.*, 85(1) : 124.

Material examined : III, XIX, XXII.

Distribution : India : Tripura (North and West districts) ; throughout the rest of mainland ; Andaman and Nicobar Islands. *Elsewhere* : China, Taiwan, Philippines and southward to Indo-china, Malaysia, Indonesia and North Western Australia.

20. *Danaus chrysippus chrysippus* (Linnaeus)

1758. *Papilio chrysippus* Linnaeus, *Syst. Nat.*, ed. 10 : 471.

1947. *Danaus chrysippus chrysippus* : Talbot, *Fauna Brit. India*, Butterflies, 2 : 20.

1988. *Danaus chrysippus chrysippus* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 124.

Material examined : I, III, XVII, XXXIII, XLI, XLV.

Distribution : India : Tripura (North, West and South districts) ; throughout the rest of mainland. *Elsewhere* : Different belts of the Oriental Region, extending to Asia Minor [*vide* Nandi & Varshney, 1988 ; Mandal & Maulik (1991 ; *in press*, a, b)].

Genus *Euploea* Fabricius

1807. *Euploea* Fabricius, *Illig. Mag.*, 6 : 280.

Distribution : Oriental and Afro-Tropical (*vide* Ackery & Vane-Wright, 1984).

21. *Euploea mulciber mulciber* (Cramer)

1777. *Papilio mulciber* Cramer, *Pap. Exot.*, 2 : 45, pl. 127, figs. C, D.

1947. *Euploea mulciber mulciber* : Talbot, *Fauna Brit. India*, Butterflies, 2 : 83, figs. 30-31.

1988. *Euploea multiciber multiciber* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 125.

Distribution : India : Tripura (North district); Arunachal Pradesh ; Nagaland ; Meghalaya ; Assam ; West Bengal ; Sikkim ; Himachal Pradesh; Andaman and Nicobar Is. *Elsewhere* : Myanmar ; Malaya ; Nepal ; China ; Vietnam.

22. *Euploea core core* (Cramer)

1780. *Papilio core* Cramer, *Pap. Exot.*, **3** : 133, pl. 267, figs. E, F.
1947. *Euploea core core* : Talbot, *Fauna Brit. India, Butterflies*, **2** : 67, fig. 25.
1988. *Euploea core core* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 125.

Material examined : III, XI, XVI, XVII, XVIII, XIX, XXII, XXIII, XXV, XXXVII, XXXVIII.

Distribution : India : Tripura (North, West and South districts) ; throughout the rest of mainland ; Lakshadweep (*vide* Mandal, 1991). *Elsewhere* : Pakistan ; Myanmar ; Nepal.

Genus *Mycalesis* Huebner

1818. *Mycalesis* Huebner, *Zutr. z. Samml. exot. Schmett.*, **1** : 17.

Distribution : Indo-Australian : Sino-Japanese (*cf.* Varshney, 1994).

* 23. *Mycalesis visala visala* Moore

1857. *Mycalesis visala* Moore, *Cat. Lep. Ins. E. I. C.*, **1** : 230.
1939. *Mycalesis visala visala* : Talbot, *Fauna Brit. India, Butterflies*, **2** : 140, fig. 51.
1988. *Mycalesis visala visala* : Gupta & Shukla, *Rec. zool. Surv. India, Occ. Paper No. 109* : 5, pl. I, figs. 5-6.

Material examined : XVII, XVIII.

Distribution : India : Tripura (West district); Arunachal Pradesh (*vide* Gupta & Shukla, 1988); Nagaland ; Meghalaya ; Assam ; West Bengal ; Sikkim ; Himachal Pradesh (*vide* Wynter-Blyth, 1957) Kumaon of Uttar Pradesh ; Madhya Pradesh. *Elsewhere* : Myanmar.

Remarks : The occurrence of the subspecies in "South India" after Gupta & Shukla (1988) seems to be doubtful.

Genus *Ypthima* Huebner

1818. *Ypthima* Huebner, *Zutr. z. Samml. exot. Schmett.*, **1** : 17.

Distribution : India and chiefly in subtropical China, being less frequent eastward, but reaching Australia ; also Africa.

24. *Ypthima inica* Hewitson

1865. *Ypthima inica* Hewitson, *Trans. ent. Soc. Lond.*, (3) **2** : 284, pl. 17, fig. 5.
1947. *Ypthima inica* : Talbot, *Fauna Brit. India, Butterflies*, **2** : 319.
1988. *Ypthima inica* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 126.

Distribution : India : Tripura (North district); West Bengal to Punjab (*vide* Bhattacharya, *in press*, a).

Remarks : This and the following six butterflies, earlier treated under the family Satyridae by Nandi & Varshney (1988), are now considered under the satyrine Nymphalidae which also includes the preceding member, i.e., *Mycalesis visala* (*cf.* Bingham, 1905). Most of these species have been dealt with from Eastern and North-East India by Bhattacharya (*in press*, a, b).

25. *Ypthima ceylonica huebneri* Kirby

1871. *Ypthima huebneri* Kirby, *Syn. Cat. Diurn. Lep.*, p. 95.
1947. *Ypthima ceylonica huebneri* : Talbot, *Fauna Brit. India, Butterflies*, **2** : 329.
1988. *Ypthima ceylonica huebneri* : Nandi & Varshney, *Rec. zool. Surv. India*, **85** (1) : 126.

Distribution : India : Tripura (North district); Assam ; Sikkim ; throughout the Peninsula. *Elsewhere* : Myanmar ; Malaya ; also Nepal.

26. *Ypthima baldus baldus* (Fabricius)

1775. *Papilio baldus* Fabricius, *Syst. Ent.*, (3) **1** : 829.

1947. *Ypthima baldus baldus* : Talbot, *Fauna Brit. India, Butterflies*, 2 : 337.

1988. *Ypthima baldus baldus* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 126.

Material examined : I, II, III, XI, XVII, XXIV.

Distribution : India : Tripura (North, West and South districts) ; Arunachal Pradesh ; Assam ; Nagaland ; West Bengal ; Sikkim ; South Bihar (Varshney, et. al, 1981) ; up to North-West Himalaya. *Elsewhere* : Myanmar.

Genus *Orsotrioena* Wallengren

1859. *Orsotrioena* Wallengren, *Ofv. Kongl. Vet. Akad. Förh.*, 15 : 79.

Distribution : Indo-Australian.

27. *Orsotrioena medus medus* (Fabricius)

1775. *Papilio medus* Fabricius, *Syst. Ent.*, (3) 1 : 488.

1947. *Orsotrioena medus medus* : Talbot, *Fauna Brit. India, Butterflies*, 2 : 349, fig. 93.

1988. *Orsotrioena medus medus* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 126.

Material examined : VIII, XI, XVIII, XXVI.

Distribution : India : Tripura (North, West and South districts) ; Nagaland ; Meghalaya ; Assam ; West Bengal ; Sikkim ; Uttar Pradesh ; Haryana ; Orissa ; Andaman Is. *Elsewhere* : Myanmar ; Nepal ; Hainan ; Vietnam ; Australo-Papuan.

Genus *Melanitis* Fabricius

1807. *Melanitis* Fabricius, *Illig. Mag.*, 4 : 282.

Distribution : Indo-Australian ; Afro-Malagassic.

28. *Melanitis leda ismene* (Cramer)

1775. *Papilio ismene* Cramer, *Pap. Exot.*, 1 : 40, pl. 26, figs. A, B.

1947. *Melanitis leda ismene* : Talbot, *Fauna Brit. India, Butterflies*, 2 : 366.

1988. *Melanitis leda ismene* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 125.

Material examined : III, XVII, XXV, XXVII, XLIII, XLIV, L.

Distribution : India : Tripura (North, West and South districts) ; Nagaland ; Meghalaya ; Assam ; Sikkim ; West Bengal ; Orissa ; Western and Southern Peninsula ; Madhya Pradesh ; Uttar Pradesh ; Himachal Pradesh ; Andaman and Nicobar Is. ; Lakshadweep (Mandal, 1991). *Elsewhere* : Pakistan ; Sri Lanka ; Myanmar ; Malayan ; Nepal ; Taiwan ; Japan.

Genus *Elymnias* Huebner

1818. *Elymnias* Huebner, *Zutr. z. Samml. Exot. Schmett.*, 1 : 12.

Distribution : Oriental, Australo-Papuan, extending northward.

29. *Elymnias hypermnestra undularis* (Drury)

1773. *Papilio undularis* Drury, *Ill. Exot. Ins.*, 2 : pl. 10, figs. 1-2.

1947. *Elymnias hypermnestra undularis* : Talbot, *Fauna Brit. India, Butterflies*, 2 : 386.

1988. *Elymnias hypermnestra undularis* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 125.

Material examined : VII, XVI, XX.

Distribution : India : Tripura (North and West districts) ; Nagaland ; Meghalaya ; Assam ; Sikkim ; West Bengal ; Orissa ; Uttar Pradesh. *Elsewhere* : Myanmar.

30. *Elymnias malelas malelas* (Hewitson)

1863. *Melanitis malelas* Hewitson, *Exot. Butt.*, 3 : pl. 1, figs. 6-7.

1947. *Elymnias malelas malelas* : Talbot, *Fauna Brit. India, Butterflies*, 2 : 395.

1988. *Elymnias malelas malelas* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 125.

Distribution : India : Tripura (North, West and South districts) ; Nagaland ; Meghalaya ; Assam ; Sikkim. *Elsewhere* : Bangladesh ; Myanmar.

Genus *Polyura* Billberg

1820. *Polyura* Billberg, *Enun. Ins. Mus. Billberg*, p. 79.

Distribution : Indo-Australian including Fiji Is.

31. *Polyura arja* (Felder)

1867. *Charaxes arja* Felder, *Nov. Reise Lep. Rhopal.*, p. 438.
 1905. *Eulepis arja* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 222.
 1988. *Polyura arja* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 127.

Distribution : India : Tripura (North district); Assam to Sikkim. *Elsewhere* : Myanmar ; Thailand ; Vietnam (*vide* Fruhstorfer, 1914).

Genus *Tanaecia* Butler

1869. *Tanaecia* Butler, *Proc. zool. Soc. Lond.*, (3) : 610.

Distribution : South India to North-East India; Andaman and Nicobar Is. Extended to Nepal, Bhutan, Bangladesh, Myanmar, as far as up to Thailand and Langkawi Is.

*32. *Tanaecia lepidea* (Butler)

1868. *Adolias lepidea* Butler, *Ann. Mag. nat. Hist.*, (4) 1 : 71.
 1905. *Euthalia lepidea* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 272.
 1994. *Tanaecia lepidea* : Varshney, *Oriental Ins.*, 28 : 183.

Material examined : VI, XVI, XVII, XXII.

Distribution : India : Tripura (North and West districts) ; low hot valleys of the Himalaya eastward from Almorah ; also Madhya Pradesh, West Bengal, Orissa and southward in the Nilgiris, Karnataka and Kerala. Extending farther east of Bay of Bengal from Assam to Malay Peninsula through Myanmar.

Genus *Moduza* Moore

1881. *Moduza* Moore, *Lep. Ceylon*, 1 (2) : 47.

Distribution : Throughout the Oriental Region; also Moluccas.

33. *Moduza procris procris* (Cramer)

1777. *Papilio procris* Cramer, *Pap. Exot.*, 2 : pl. 106, figs. E, F.
 1905. *Moduza procris* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 291.

1988. *Moduza procris procris* : Gupta & Shukla, *Rec. zool. Surv. India, Occ. Paper No. 109* : 36 (*Limenitis*, Nandi & Varshney, 1988).

Material examined : XLVII.

Distribution : India : Tripura (South district); Arunachal Pradesh ; West Bengal (*vide* Gupta, *in press*, a); Sikkim ; northern Peninsula as far as up to the Kumaon Himalaya. *Elsewhere* : Myanmar; Thailand ; South China ; Vietnam.

Genus *Lebadea* Felder

1861. *Lebadea* Felder, *Ein Neues Lep.*, : 28.

Distribution : Indo-Malayan.

*34. *Lebadea martha* (Fabricius)

1787. *Papilio martha* Fabricius, *Mant. Ins.*, 2 : 56.
 1905. *Lebadea martha* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 299, pl. X, fig. 73.
 1994. *Lebadea martha* : Varshney, *Oriental Ins.*, 28 : 182.

Material examined : XXXV.

Distribution : India : Tripura (South district); Assam to Sikkim. *Elsewhere* : Myanmar ; Nepal; Bhutan.

Genus *Athyma* Westwood

1850. *Athyma* Westwood, *Gen. diurn. Lép.*, (2) : 272.

Distribution : North East India ; Andaman Is. Extending to China through Nepal and Bhutan in the north and Malay Archipelago and Solomon Is. through Myanmar in the east.

*35. *Athyma nefte* (Cramer)

1782. *Papilio nefte* Cramer, *Pap. Exot.*, 3 : pl. 256, figs. E, F.
 1905. *Pantoporia nefte* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 304.
 1994. *Athyma nefte* : Varshney, *Oriental Ins.*, 28 : 180.

Material examined : XI.

Distribution : India : Tripura (North district); Assam to Sikkim ; Eastern and Southern Peninsula. *Elsewhere* : Myanmar ; Malayan ; Nepal ; Bhutan.

Genus *Neptis* Fabricius

1807. *Neptis* Fabricius, *Illig. Mag.*, 6 : 282.

Distribution : Australo-Oriental ; Afro-Malagassic ; Europe.

36. *Neptis hylas* (Linnaeus)

1758. *Papilio hylas* Linnaeus, *Syst. Nat.*, ed. 10 : 486.

1905. *Neptis eurynome* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 323, fig. 59, pl.

1988. *Neptis hylas* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 128.

Material examined : XVI, XVII, XXV, XXXV, XLI.

Distribution : India : Tripura (North, West and South districts); throughout the rest of mainland ; Andaman and Nicobar Is. *Elsewhere* : Weedy in the Palaearctic-Asiatic and Malayan; Europe (*vide* Fruhstorfer, 1912).

*37. *Neptis yerburii* Butler

1886. *Neptis yerburii* Butler, *Proc. zool. Soc. Lond.*, 1886 : 360.

1905. *Neptis yerburii* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 330 (= *nandina*, pt., Moore).

1994. *Neptis yerburii* : Varshney, *Oriental Ins.*, 28 : 178.

Material examined : XXVI.

Distribution : India : Tripura (West district) ; Arunachal Pradesh ; Assam ; Sikkim ; Himalaya up to Campbellpur. *Elsewhere* : Myanmar.

Genus *Precis* Huebner

1819. *Precis* Huebner, *Verz. bek. Schmett.*, (3) : 33.

Distribution : Oriental ; Africa ; Australia.

38. *Precis iphita* (Cramer)

1779. *Papilio iphita* Cramer, *Pap. Exot.*, 3 : pl. 209, figs. C, D.

1905. *Junonia iphita* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 356.

1988. *Precis iphita* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 128.

Material examined : III, XV.

Distribution : India : Tripura (North and West districts). Widespread elsewhere in the Oriental Region.

Genus *Junonia* Huebner

1816. *Junonia* Huebner, *Verz. bek. Schmett.*, p. 34.

Distribution : Indo-Australian ; African ; American.

39. *Junonia lemonias* (Linnaeus)

1758. *Papilio lemonias* Linnaeus, *Syst. Nat.*, ed. 10 : 473.

1905. *Junonia lemonias* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 357.

1994. *Junonia lemonias* : Varshney, *Oriental Ins.*, 28 : 176 (*Precis*, Nandi & Varshney, 1988).

Material examined : XIX, XXIV, XXXIX.

Distribution : India : Tripura (West and South districts). Widespread in the Oriental Region.

40. *Junonia atlites* (Linnaeus)

1763. *Papilio atlites* Linnaeus, *Centur. Ins.*, p. 24.

1905. *Junonia atlites* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 359.

1994. *Junonia atlites* : Varshney, *Oriental Ins.*, 28 : 176 (*Precis*, Nandi & Varshney, 1988).

Material examined : III, IV, V, VIII, XV, XXXIV, XXXVI.

Distribution : India : Tripura (North, West and South districts); throughout the rest of Indian mainland; Nicobar Island. *Elsewhere* : Rest of the Indian subregion; Sino-Malayan.

41. *Junonia hierta* (Fabricius)

1798. *Papilio hierta* Fabricius, *Ent. Syst. Suppl.*, p. 424.

1905. *Junonia hierta* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 360, pl. 6, fig. 41.

1994. *Junonia hierta* : Varshney, *Oriental Ins.*, 28 : 176 (*Precis*, Nandi & Varshney, 1988).

Material examined : XXXVII.

Distribution : India : Tripura (North and South districts); throughout the rest of Indian mainland;

Andaman Island. *Elsewhere* : Rest of the Indian subregion; China.

42. *Junonia almana* (Linnaeus)

1758. *Papilio almana* Linnaeus, *Syst. Nat.*, ed. 10 : 472.
 1905. *Junonia almana* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 361.
 1994. *Junonia almana* : Varshney, *Oriental Ins.*, 28 : 176 (Precis, Nandi & Varshney, 1988).

Material examined : XVII, XL.

Distribution : India : Tripura (North, West and South districts); throughout the rest of mainland; Nicobar Island. *Elsewhere* : Rest of the Indian subregion; Sino-Malayan; Japan.

Genus *Cethosia* Fabricius

1807. *Cethosia* Fabricius, *Illing. Mag.*, 6 : 280.

Distribution : India (including Andaman & Nicobar Island); Bangladesh; Sri Lanka; Myanmar; Nepal; Bhutan. Extended to the east up to Thailand and Malayan Archipelago; Australo-Papuan; also South West China.

*43. *Cethosia cyane* (Drury)

1770. *Papilio cyane* Drury, *III, Exot. Ent.*, 1 : pl. 4, fig. 1.
 1905. *Cethosia cyane* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 400, fig. 71.
 1994. *Cethosia cyane* : Varshney, *Oriental Ins.*, 28 : 171.

Material examined : XV.

Distribution : India : Tripura (West district); Arunachal Pradesh; Assam; West Bengal; Sikkim to Mussoorie; Orissa. *Elsewhere* : Myanmar.

Genus *Ariadne* Horsfield

1829. *Ariadne* Horsfield, *Descr. Cat. Lep. Ins. Mus. E. I. C.*, (2) : 3.

Distribution : Oriental; Ethiopian.

44. *Ariadne ariadne* (Linnaeus)

1764. *Papilio ariadne* Linnaeus, *Amoen. Acad.*, 6 : 407.
 1905. *Ergolis ariadne* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 461, pl. 10, fig. 78.
 1988. *Ariadne ariadne* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 126.

Material examined : XVII.

Distribution : India : Tripura (North, West and South districts); widely distributed in the rest of mainland. *Elsewhere* : Extending to Taiwan in the north and from the Macromalayan to as far as Flores and Sulawesi in the south.

45. *Ariadne merione* (Cramer)

1777. *Papilio merione* Cramer, *Pap. Exot.*, 2 : 76, pl. 144, figs. G, H.
 1905. *Ergolis merione* : Bingham, *Fauna Brit. India*, Butterflies, 1 : 462.
 1988. *Ariadne merione* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 127.

Distribution : India : Tripura (West district); throughout the rest of mainland. *Elsewhere* : Sri Lanka; Myanmar; Malayan.

Family RIODINIDAE

Genus *Zemeros* Boisduval

1836. *Zemeros* Boisduval, *Hist. nat. Ins. Spec. Gen. Lep.*, 1 : pl. 21, fig. 5.

Distribution : From North West Himalaya of India across South China as far as Hainan, Indo-China and then from Sumatra to Sulawesi.

46. *Zemeros flegyas indicus* Fruhstorfer

1903. *Zemeros indicus* Fruhstorfer, *Berl. Ent. Zschr.*, p. 282.
 1932. *Zemeros flegyas indicus* : Evans, *Ident. Indian Butts.*, p. 194.
 1988. *Zemeros flegyas indicus* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 128.

Distribution : India : Tripura (North and South districts); Arunachal Pradesh; Meghalaya (*vide* Gupta, *in press*, b); Assam; West Bengal; Sikkim; West Himalaya. *Elsewhere* : Myanmar; Tonkin.

Family LYCAENIDAE

Genus *Catapaecilma* Butler

1879. *Catapaecilma* Butler, *Trans. Linn. Soc. Lond.*, (2) 1 (Zool.) : 547.

Distribution : Oriental (*vide* Eliot, 1973).

***47. *Catapaecilma major anais* Fruhstorfer**

1879. *Catapaecilma anais* Fruhstorfer, *Trans. Linn. Soc. Lond.*, (2) 1 (Zool.) : 547.

1962. *Catapaecilma major anais* : Cantlie, *Lycaen. port. Brig. Evans' Ident. Indian Butts.*, 1932, p. 139.

In press. *Catapaecilma major anais* : Nandi, *State Fauna Series, Meghalaya*.

Material examined : III.

Distribution : India : Tripura (North district); Assam; Meghalaya; Nagaland; Manipur (*vide* Cantlie, 1962; Nandi, *in press*).

Remarks : This subspecies is endemic in North-East India.

Genus *Rapala* Moore

1881. *Rapala* Moore, *Lep. Ceylon*, 1 (3) : 105.

Distribution : Indo-Malayan and Australo-Papuan (*vide* Gupta & Shukla, 1988).

***48. *Rapala varuna orseis* (Hewitson)**

1862. *Deudorix orseis* Hewitson, *III. Diurn. Lep.*, 1 : 23.

1962. *Rapala varuna orseis* : Cantlie, *Lycaen. port. Brig. Evans' Ident. Indian Butts.*, 1932, p. 149.

1988. *Rapala varuna orseis* : Gupta & Shukla, *Rec. zool. Surv. India, Occ. Paper No. 109* : p. 99, pl. 23, figs. 187-188.

Material examined : XIX.

Distribution : India : Tripura (West district); Arunachal Pradesh; Sikkim; Andaman Island. *Elsewhere* : Myanmar; Nepal.

Genus *Castalius* Huebner

1816. *Castalius* Huebner, *Verz. bek. Schmett.*, p. 70.

Distribution : Indo-Malayan and Ethiopian.

***49. *Castalius rosimon rosimon* (Fabricius)**

1775. *Papilio rosimon* Fabricius, *Syst. Ent.*, p. 523.

1907. *Castalius rosimon* : Bingham, *Fauna Brit. India, Butterflies*, 2 : 424, fig. 90.

1988. *Castalius rosimon rosimon* : Gupta & Shukla, *Rec. zool. Surv. India, Occ. Paper No. 109* : p. 77, pl. 20, figs. 153-154.

Material examined : XVI, XLIX.

Distribution : India : Tripura (West and South districts); Arunachal Pradesh (*vide* Gupta & Shukla, 1988); Meghalaya (*vide* Nandi, *in press*); whole of the Peninsula from the Himalayan foothills; absent in deserts. *Elsewhere* : Pakistan; Sri Lanka; Tonkin; Annam; Thailand; Malayan Peninsula.

Superfamily HESPERIOIDEA

Family HESPERIIDAE

Genus *Coladenia* Moore

1881. *Coladenia* Moore, *Lep. Ceylon*, 1 : 180.

Distribution : India and China to Sulawesi and Philippines.

50. *Coladenia agni agni* (de Nicéville)

1883. *Plesioneura agni* de Nicéville, *J. Asiat. Soc. Bengal*, 52 (2) : 87, pl. 10, fig. 4.

1949. *Coladenia agni agni* : Evans, *Cat. Hesp. Europe, Asia & Australia B. M. (N. H.)*, p. 116.

1988. *Coladenia agni agni* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 120.

Distribution : India : Tripura (West district); Assam; Meghalaya (*vide* Ghosh & Chaudhury, *in press*, d); Sikkim. *Elsewhere* : Myanmar; Thailand; Hainan.

Genus *Tagiades* Huebner

1819. *Tagiades* Huebner, *Verz. bek. Schmett.*, p. 108.

Distribution : India and China to Australia and Solomons; also Africa and Malagasy.

51. *Tagiades japetus ravi* (Moore)

1865. *Goniloba ravi* Moore, *Cat. Lep. Mus. E. I. C.*, 1 : 246.

1949. *Tagiades japetus ravi* : Evans, *Cat. Hesp. Europe, Asia & Australia B. M. (N. H.)*, p. 135.

1988. *Tagiades japetus ravi* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 121.

Material examined : XXVI.

Distribution : India : Tripura (North, West and South districts); Assam; Meghalaya and West

Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Sikkim; Orissa; Uttar Pradesh; Andaman and Nicobar Island (*vide* Watson, 1891). *Elsewhere* : Myanmar; Thailand; Indo-China.

Genus *Notocrypta* de Nicéville

1889. *Notocrypta* de Nicéville, *J. Bombay nat. Hist. Soc.*, 4 : 188.

Distribution : Indo-Australian; Japan.

52. *Notocrypta curvifascia curvifascia* (Felder)

1862. *Plesioneura curvifascia* Felder, *Wien, ent. Monat.*, 6 : 29.
1949. *Notocrypta curvifascia curvifascia* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 286.
1988. *Notocrypta curvifascia curvifascia* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 121.

Distribution : India : Tripura (North district); Assam; Meghalaya and West Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Southern Peninsula; Andaman Island. *Elsewhere* : Sri Lanka; Myanmar; Thailand; Nepal; Indo-China; Taiwan; Hongkong; Yunnan; West Szechwan; Riu Kiu Island; Japan (*vide* Evans, 1949).

Genus *Matapa* Moore

1881. *Matapa* Moore, *Lep. Ceylon*, 1 : 163.

Distribution : India to Sulawesi.

53. *Matapa aria* (Moore)

1865. *Ismene aria* Moore, *Proc. zool. Soc. Lond.*, 1865 : 784.
1949. *Matapa aria* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 330.
1988. *Matapa aria* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 120.

Distribution : India : Tripura (North district); Assam; Meghalaya and West Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Sikkim; West Himalaya; Madhya Pradesh; Orissa; Southern Peninsula; Andaman Island. *Elsewhere* : Sri Lanka; Myanmar; Thailand; Sino-Malayan.

54. *Matapa druna* (Moore)

1865. *Ismene druna* Moore, *Proc. zool. Soc. Lond.*, 1865 : 784.
1949. *Matapa druna* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 330.
1988. *Matapa druna* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 121.

Distribution : India : Tripura (North district); Assam; Meghalaya and West Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Sikkim; Andaman Island. *Elsewhere* : Myanmar; Indo-China; Malayan.

Genus *Telicota* Moore

1881. *Telicota* Moore, *Lep. Ceylon*, 1 : 169.

Distribution : India and China to Papua; Australia and Solomons.

55. *Telicota ancilla bambusae* (Moore)

1878. *Pamphila bambusae* Moore, *Proc. zool. Soc. Lond.*, 1878 : 691, pl. 45, Figs. 11-12.
1949. *Telicota ancilla bambusae* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 397.
1988. *Telicota ancilla bambusae* : Nandi & Varshney, *Rec. zool. Surv. India*, 85(1) : 121.

Distribution : India : Tripura (West district); Assam; West Bengal (*vide* Ghosh & Chaudhury, *in press*, c); Sikkim; West Himalaya; Madhya Pradesh; Orissa; Southern Peninsula. *Elsewhere* : Sri Lanka; Myanmar; Thailand; Annam; Malayan.

Genus *Parnara* Moore

1881. *Parnara* Moore, *Lep. Ceylon*, 1 : 166.

Distribution : Indo-Australian; Afro-Malagassic; Reunion; Europe.

56. *Parnara naso bada* (Moore)

1878. *Hesperia bada* Moore, *Proc. zool. Soc. Lond.*, 1878 : 685.
1949. *Parnara naso bada* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 435.
1988. *Parnara naso bada* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 121.

Distribution : India : Tripura (North, West and South districts); Assam; West Bengal (*vide*

Ghosh & Chaudhury, *in press*, c); Sikkim; Kashmir; Madhya Pradesh; Southern Peninsula. *Elsewhere* : Sri Lanka; Myanmar; Sino-Malayan; Eastern and Western Palaearctic.

Genus *Pelopidas* Walker

1870. *Pelopidas* Walker, *Ent.*, 5 : 56.

Distribution : Indo-Australia to Turkey; Africa.

57. *Pelopidas mathias mathias* (Fabricius)

1798. *Hesperia mathias* Fabricius, *Ent. Syst.*, Suppl., p. 433.

1949. *Pelopidas mathias mathias* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 441.

1988. *Pelopidas mathias mathias* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 121.

Material examined : V, XVII.

Distribution : India : Tripura (North, West and South districts); Assam; Meghalaya and West Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Sikkim; Orissa; Madhya Pradesh; Punjab; Uttar Pradesh; Himachal Pradesh; Kashmir; Rajasthan; Maharashtra; Southern Peninsula; Andaman and Nicobar Island. *Elsewhere* : Pakistan; Sri Lanka; Myanmar; Malayan; Australo-Papuan.

Genus *Baoris* Moore

1881. *Baoris* Moore, *Lep. Ceylon*, 1 : 165.

Distribution : India to Java and Philippines.

58. *Baoris farri farri* (Moore)

1878. *Hesperia farri* Moore, *Proc. zool. Soc. Lond.*, 1878 : 688.

1949. *Baoris farri farri* : Evans, *Cat. Hesp. Europe, Asia & Australia B.M. (N.H.)*, p. 448.

1988. *Baoris farri farri* : Nandi & Varshney, *Rec. zool. Surv. India*, 85 (1) : 120.

Distribution : India : Tripura (North district); Assam; Meghalaya and West Bengal (*vide* Ghosh & Chaudhury, *in press*, c, d); Sikkim; Madhya Pradesh; Uttar Pradesh; Southern Peninsula. *Elsewhere* : Myanmar; Thailand; Sino-Malayan.

Superfamily BOMBYCOIDEA

Family SATURNIIDAE

Genus *Cricula* Walker

1855. *Cricula* Walker, *Cat. Lep. Het. Brit. Mus.*, 5 : 1186.

Distribution : Oriental Region (*vide* Arora & Gupta, 1979).

*59. *Cricula trifenestrata* (Helfer)

1837. *Saturnia* (?) *trifenestrata* Helfer, *J. Asiat. Soc. Beng.*, 6 : 45, fig. 10.

1892. *Cricula trifenestrata* : Hampson, *Fauna Brit. India, Moths*, 1 : 28, fig. 14.

1979. *Cricula trifenestrata* : Arora & Gupta, *Mem. zool. Surv. India*, 16 (1) : 41, fig. 14 A-G; pl.

Material examined : VI, XLVIII.

Distribution : India : Tripura (North and South districts); Meghalaya (*vide* Gupta, *in press*, c); Assam; Sikkim; West Bengal; Bihar; Tamil Nadu; Kerala; Andaman Island. *Elsewhere* : Bangladesh; Sri Lanka; Myanmar; Indonesia.

Remarks : The moth exhibits variation in that the fore wing in male has the antemedial dark waved line not prominent.

Family EUPTEROTIDAE

Genus *Eupterote* Huebner

1818?. *Eupterote* Huebner, *Verz. bek. Schmett.*, p. 187.

Distribution : India; Sri Lanka; Myanmar; also Malayan.

60. *Eupterote fabia* (Cramer)

1779. *Phalaena fabia* Cramer, *Pap. Exot.*, 3 : pl. 250, fig. B.

1892. *Eupterote fabia* : *Fauna Brit. India, Moths*, 1 : 56, fig. 35.

1991. *Eupterote fabia* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 304.

Distribution : India : Tripura (West district); Assam; Sikkim; West Bengal; Southern Peninsula. *Elsewhere* : Sri Lanka.

Remarks : Mandal & Ghosh (1991) referred to one morph, i.e., *discordans* Butler, of this species from Teliamura F.R.H. compound. The date of publication of the genus is dubious, as commented upon by Hampson (1894). The authors, however, had no access to the original literature.

Family SPHINGIDAE

Genus *Sphingonaepiopsis* Wallengren

1858. *Sphingonaepiopsis* Wallengren, *Oefv. Vet. Ac. Förh.*, **15** : 138.

Distribution : India; Malay Peninsula and Malagasy to South Russia (*vide* Bell & Scott, 1937).

61. *Sphingonaepiopsis pumilio* (Boisduval)

1875. *Lophura pumilio* Boisduval, *Spec. Gen. Lep. Het.*, **1** : 311.
1937. *Sphingonaepiopsis pumilio* : Bell & Scott, *Fauna Brit. India*, Moths, **5** : 339, fig. 87.
1991. *Sphingonaepiopsis pumilio* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** (3-4) : 304.

Distribution : India : Tripura (North district); Assam; Meghalaya (*cf.* Mandal & Ghosh, *in press*, b). *Elsewhere* : Bangladesh; China; Western Malaysia.

Genus *Macroglossum* Scopoli

1777. *Macroglossum* Scopoli, *Intr. Hist. Nat.*, p. 414.

Distribution : Old World.

62. *Macroglossum insipida insipida* Butler

1875. *Macroglossum insipida* Butler, *Proc. zool. Soc. Lond.*, **1875** : 242.
1937. *Macroglossum insipida insipida* : Bell & Scott, *Fauna Brit. India*, Moths, **5** : 373, figs. 90 Q, R, 97; pl.
1991. *Macroglossum insipida insipida* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** b(3-4) : 305.

Distribution : India : Tripura (West district); Sikkim; Southern Peninsula; Andaman Island. *Elsewhere* : Sri Lanka; Bhutan; Malaya.

Genus *Hippotion* Huebner

1822. *Hippotion* Huebner, *Verz. bek. Schmett.*, p. 134.

Distribution : Old World.

*63. *Hippotion boerhaviae* (Fabricius)

1775. *Sphinx boerhaviae* Fabricius, *Syst. Ent.*, p. 542.
1937. *Hippotion boerhaviae* : Bell & Scott, *Fauna Brit. India*, Moths, **5** : 424, figs. 105, J, K, 109; pl. (= *Chaerocampa theylia*, Hampson, 1892).
1991. *Hippotion boerhaviae* : Mandal & Maulik, *State Fauna Series I : Fauna of Orissa*, (3) : 229.

Material examined : XXIX.

Distribution : India : Tripura (West district); West Himalaya; Sikkim; West Bengal (*vide* Mandal & Maulik, *in press*, c); Orissa (*vide* Mandal & Maulik, 1991 b); Madhya Pradesh; Gujarat; Rajasthan (Gupta & Thakur, 1986); Maharashtra; Southern Peninsula. *Elsewhere* : Pakistan; Sri Lanka; Bhutan; South China; Malaya; Philippines.

Genus *Theretra* Huebner

1822. *Theretra* Huebner, *Verz. bek. Schmett.*, p. 135 (year of publication nec 1818, as cited by Hampson, 1892).

Distribution : Oriental and Ethiopian; also, Caspian Sea belt and Constantinople.

*64. *Theretra nessus* (Drury)

1773. *Sphinx nessus* Drury, *Ill. Exot. Ins.*, **2** : 46, pl. 76, fig. 1.
1937. *Theretra nessus* : Bell & Scott, *Fauna Brit. India*, Moths, **5** : 430, figs. 110, A, B, III; pl.
- In press. Theretra nessus* : Mandal & Ghosh, *State Fauna Series, Meghalaya*.

Material examined : XVI, XVII.

Distribution : India : Tripura (West district); Meghalaya (*vide* Mandal & Ghosh, *in press*, b); East to West Himalaya (*vide* Mandal & Maulik, *in press* c); Western and Southern Peninsula; Andaman Island. *Elsewhere* : Pakistan; Bangladesh; Bhutan; Sri Lanka; Myanmar; Hong Kong; Japan; Aden; Malay; Papuasia; Australia.

***65. *Theretra suffusa* (Walker)**

1856. *Chaerocampa suffusa* Walker, *Cat. Lep. Het. Brit. Mus.*, 8 : 146.
1937. *Theretra suffusa* : Bell & Scott, *Fauna Brit. India, Moths*, 5 : 444.
1982. *Theretra suffusa* : Barlow, *Intr. Moths S.E. Asia*, ed. 1 : 57, pl.

Material examined : XVII.

Distribution : India : Tripura (West district); Assam. *Elsewhere* : Up to Sino-Malayan.

Remarks : This olive-brown species has pale to dark heavy lines on fore wing, black basal area on hind wing not dilated distad before abdominal margin and a greyish mesial band from mesonotum to the end of abdomen. Foodplant is *Melastoma sanguineum* (Melastomaceae). The moth, not yet reported from West Bengal nor from any other state but Assam of N.E. India, is nocturnal in habit and may be bred in open country.

Family LASIOCAMPIDAE

Genus *Arguda* Moore

1879. *Arguda* Moore, *Descr. new Indian Lep. Ins. coll. Atk. Het.*, p. 79.

Distribution : Throughout the Himalaya, Nilgiris; Sri Lanka; Myanmar; Philippines; Avoy; Singapore; Australia; Tasmania.

66. *Arguda* sp.

Distribution : India : Tripura (North district).

Remarks : Affinities and status of this moth have been noted by Mandal & Ghosh (1991 : p. 310).

Superfamily PSYCHOIDEA

Family ZYGAENIDAE

Genus *Trypanophora* Kollar

1844. *Trypanophora* Kollar, in *Hügel's Kasch. Reich Seik*, 4 (2) : 457.

Distribution : India; Sri Lanka; Myanmar; China.

67. *Trypanophora semihyalina* Kollar

1844. *Trypanophora semihyalina* Kollar, in *Hügel's Kasch. Reich Seik*, 4(2) : 457, pl. 19, figs. 1-4.
1892. *Trypanophora semihyalina* : Hampson, *Fauna Brit. India, Moths*, 1 : 249, fig. 166.
1991. *Trypanophora semihyalina* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 307.

Distribution : India : Tripura (North district); Meghalaya (*vide* Bhattacharya, *in press*, d); Assam; West Bengal; Sikkim; Himachal Pradesh; Jammu & Kashmir; Orissa; Southern Peninsula. *Elsewhere* : Bangladesh; Myanmar; South China.

Genus *Eterusia* Hope

1840. *Eterusia* Hope, *Trans. Linn. Soc. Lond.*, 18 : 445.

Distribution : Oriental Region.

***68. *Eterusia aedea edocla* (Doubleday)**

1847. *Heterusia edocla* Doubleday, *Zoologist*, 3 : 469.
1892. *Heterusia edocla* : Hampson, *Fauna Brit. India, Moths*, 1 : 261.
1925. *Eterusia aedea edocla* : Fletcher, *Cat. Indian Ins.*, (9) : 58.

Material examined : XVII.

Distribution : India : Tripura (West district); Nagaland; Meghalaya (*vide* Bhattacharya, *in press*, d); Assam; West Bengal (*vide* Bhattacharya, *in press*, c); Sikkim. *Elsewhere* : Bangladesh; Myanmar; Nepal; West China.

Remarks : This moth infests tea-plantations (*vide* Bhattacharya, *in press*, c).

Family LIMACODIDAE

Genus *Susica* Walker

1855. *Susica* Walker, *Cat. Lep. Het. Brit. Mus.*, 5 : 1113.

Distribution : India (Sikkim; Tripura); Myanmar; Nepal; China; Japan.

69. *Susica pallida* Walker

1855. *Susica pallida* Walker, *Cat. Lep. Hat. Brit. Mus.*, **5** : 1114.
1892. *Susica pallida* : Hampson, *Fauna Brit. India*, Moths, **1** : 377, fig. 257.
1991. *Susica pallida* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** (3-4) : 308.

Distribution : India : Tripura (South district); Sikkim. *Elsewhere* : Myanmar; Nepal; Japan.

Genus *Phocoderma* Butler

1866. *Phocoderma* Butler, *Ill. Typ. Spec. Lep. Het. Brit. Mus.*, **6** : 4.

Distribution : Sino-Indian belts of the Oriental Region.

70. *Phocoderma velutinum* (Kollar)

1844. *Gastropacha velutina* Kollar, in *Hugel's Kasch. Reich Seik*, **4**(2) : 473.
1892. *Natada velutina* : Hampson, *Fauna Brit. India*, Moths, **1** : 382.
1991. *Phocoderma velutinum* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** (3-4) : 308.

Distribution : India : Tripura (West district); Assam; West Bengal; Sikkim; Maharashtra; Uttar Pradesh; Jammu and Kashmir. *Elsewhere* : Pakistan; Myanmar; Borneo.

Genus *Altha* Walker

1862. *Altha* Walker, *J. Linn. Soc. Lond.*, **6** : 173.

Distribution : Indo-Malayan.

71. *Altha nivea* Walker

1862. *Altha nivea* Walker, *J. Linn. Soc. Lond.*, **6** : 173.
1892. *Altha nivea* : Hampson, *Fauna Brit. India*, Moths, **1** : 397, fig. 273.
1991. *Altha nivea* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** (3-4) : 309.

Distribution : India : Tripura (West district); Assam; Sikkim; Madhya Pradesh; Punjab;

Himachal Pradesh; Jammu and Kashmir; Maharashtra; Bihar; Orissa; Southern Peninsula. *Elsewhere* : Sri Lanka.

Superfamily COSSOIDEA

Family COSSIDAE

Genus *Xyleutes* Huebner

1822. *Xyleutes* Huebner, *Verz. bek. Schmett.*, p. 195.

Distribution : Universal except the Palaearctic (vide Arora, 1976).

***72. *Xyleutes mineus* (Cramer)**

1779. *Phalaena mineus* Cramer, *Pap. Exot.*, **2** : 5, pl. 131, fig. D.
1892. *Duomitus mineus* : Hampson, *Fauna Brit. India*, Moths, **1** : 309.
1976. *Xyleutes mineus* : Arora, *Rec. zool. Surv. India*, **69** : 109, fig. 27, pl.

Material examined : III.

Distribution : India : Tripura (North district); Arunachal Pradesh; Assam; West Bengal; Sikkim; Bihar; Orissa. *Elsewhere* : Bangladesh; Thailand; Indonesia; Indo-China; Philippines; Australo-Papuan (vide Arora, 1976).

Superfamily NOCTUOIDEA

Family CTENUCHIDAE

Genus *Ceryx* Wallengren

1863. *Ceryx* Wallengren, *Wien. ent. Monat.*, **7** : 140.

Distribution : Indo-Australian and African (vide Arora, et al, 1992).

73. *Ceryx imaon sargania* (Butler)

1879. *Syntomis sargania* Butler, *Trans. ent. Soc. Lond.*, **4**.
1892. *Syntomoides imaon* : Hampson, *Fauna Brit. India*, Moths, **1** : 210, fig. 137.
1991. *Ceryx imaon sargania* : Mandal & Ghosh, *Rec. zool. Surv. India*, **88** (3-4) : 305.

Material examined : XII, XIV, XXVII, XL.

Distribution : India : Tripura (North, West and South districts); Assam (For distribution of the species, *C. imaon*, (vide Ghosh & Chaudhury, in press, e, f).

Remarks : This subsp. is endemic in N.E. India. Barlow (1982) placed the genus *Ceryx* with the family Arctiidae.

***74. *Ceryx godartii* (Boisduval)**

1829. *Syntomis godartii* Boisduval, *Mon. Zyg.*, : 115, pl. 7, fig. 3.
 1892. *Syntomoides godartii* : Hampson, *Fauna Brit. India*, Moths, 1 : 210.
 1992. *Ceryx godartii* : Arora, et. al. *Rec. zool. Surv. India*, 92(1-4) : 10.

Material examined : XLI, XLIX.

Distribution : India : Tripura (South district); Meghalaya (vide Ghosh & Chaudhury, in press, f); Arunachal Pradesh (vide Arora, et. al., 1992); Assam; West Bengal (vide Ghosh & Chaudhury, in press, e); Sikkim; Southern Peninsula. *Elsewhere* : Myanmar; Malayan.

Genus *Amata* Fabricius

1808. *Amata* Fabricius, *III. Mag.*, 6 : 289.

Distribution : Oriental; Australian; Africa; Europe (vide Arora, et. al., 1992).

***75. *Amata atkinsoni* (Moore)**

1871. *Syntomis atkinsoni* Moore, *Proc. zool. Soc. Lond.*, 1877 : 245, pl. 18, figs. 2.
 1892. *Syntomis atkinsoni* : Hampson, *Fauna Brit. India*, Moths, 1 : 212.
 1925. *Amata atkinsoni* : Fletcher, *Cat. Indian Ins.*, (8) [o.s. unseen.]

Material examined : III, XII, XX, XXV, XXXII, XXXIX.

Distribution : India : Tripura (North, West and South districts); Assam; Sikkim. *Elsewhere* : Myanmar; Yunnan.

Remarks : This locally restricted species, not yet known from West Bengal nor Meghalaya in N.E. India, has hyaline-spotted fore wing, a large basal hyaline spot on hind wing bearing yellow inner margin, a yellow metathoracic patch, black collar and fore-tarsal joint and antennal tip white. Hampson (1898) included this species in the synonymy list of *Syntomis sperbius* (vide infra).

76. *Amata sperbius* (Fabricius)

1787. *Zyganea sperbius* Fabricius, *Mant. Ins.*, 2 : 103.
 1898. *Syntomis sperbius* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 1 : 106.
 1991. *Amata sperbius* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 306.

Distribution : India : Tripura (South district); Assam; Meghalaya; West Bengal; Sikkim. *Elsewhere* : Myanmar; Vietnam; South China.

77. *Amata cyssea* (Cramer)

1782. *Sphinx cysseus* Cramer, *Pap. Exot.*, 4 : 124, pl. 355, fig. B.
 1892. *Syntomis cyssea* : Hampson, *Fauna Brit. India*, Moths, 1 : 213, fig. 138.
 1991. *Amata cyssea* : Mandal & Ghosh, *Rec. zool. Surv. India*, Moths, 88 (3-4) : 306.

Material examined : III, XV, XXVI, XLI.

Distribution : India : Tripura (North, West and South districts); Nagaland; Meghalaya; West Bengal; Sikkim; Madhya Pradesh; Maharashtra; Andhra Pradesh; Himachal Pradesh; Jammu and Kashmir. *Elsewhere* : Pakistan; Sri Lanka; Nepal; Palaearctic.

***78. *Amata georgina* (Butler)**

1876. *Syntomis georgina* Butler, *J. Linn. Soc. Lond., Zool.*, 12 : 345.
 1892. *Syntomis georgina* : Hampson, *Fauna Brit. India*, Moths, 1 : 213.
 1925. *Amata georgina* : Fletcher, *Cat. Indian Ins.*, (8) [O.S. unseen].

Material examined : XXVI.

Distribution : India : Tripura (West district); N. W. Himalaya and other belts of mainland. *Elsewhere* : Sri Lanka.

Remarks : This species, which is similar to *A. cyssea* except for the black frons and spots varying considerably in size, is yet to be recorded from West Bengal and Meghalaya. It was treated as a synonym of *A. cyssea* by Hampson (1898).

Genus *Eressa* Walker

1854. *Eressa* Walker, *Cat. Lep. Het. Brit. Mus.*, 1 : 149.

Distribution : Indo-Australian.

79. *Eressa confinis catoria* Swinhoe

1900. *Eressa catoria* Swinhoe, *Ann. Mag. nat. Hist.*, (7) 6 : 305.

1933. *Eressa confinis catoria* : Seitz, *Macrolep. World*, 10 : 83.

1991. *Eressa confinis catoria* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 307.

Distribution : India : Tripura (North district); Assam. *Elsewhere* : Bhutan.

Genus *Psichotoë* Boisduval

1829. *Psichotoë* Boisduval, *Mon. Zyg.*, p. 129.

Distribution : India (West Bengal; Assam; Tripura; Arunachal Pradesh) ; Myanmar; Pakistan [*vide* Arora, et. al., 1992].

*80. *Psichotoë duvauceli* Boisduval

1829. *Psichotoë duvauceli* Boisduval, *Mon. Zyg.*, p. 129.

1892. *Psichotoë duvauceli* : Hampson, *Fauna Brit. India*, Moths, 1 : 226, fig. 141.

1992. *Psichotoë duvauceli* : Arora, Ghosh & Chaudhury, *Rec. zool. Surv. India*, 92 (1-4) : 12.

Material examined : XXVI.

Distribution : India : Tripura (West district); Arunachal Pradesh; Assam; West Bengal. *Elsewhere* : Pakistan; Myanmar.

Genus *Euchromia* Huebner

1820. *Euchromia* Huebner, *Verz. bek. Schmett.*, : 121.

Distribution : Oriental; Austro-Malayan; African (*vide* Arora, 1980).

*81. *Euchromia polymena* (Linn.)

1758. *Sphinx polymens* Linnaeus, *Syst. Nat.*, ed. 10 : 494.

1892. *Euchromia polymena* : Hampson, *Fauna Brit. India*, Moths, 1 : 227, fig. 143.

1980. *Euchromia polymena* : Arora, *Rec. zool. Surv. India*, 77 : 8, fig. 1 A-G.

Material examined : XLIII.

Distribution : India : Tripura (South district); Nagaland; West Bengal; Maharashtra; Tamil Nadu; Kerala; Andaman Island. *Elsewhere* : Bangladesh; Myanmar; Sri Lanka; Indonesia; Philippines.

Family LYMANTRIIDAE

Genus *Dasychira* Stephens

1829. *Dasychira* Stephens, *III. Brit. Ent. Haust.*, 2 : 58.

Distribution : Oriental; African; Malagassic; Australian; Palaearctic.

82. *Dasychira lineata* (Walker)

1855. *Lymantria lineata* Walker (pt.), *Cat. Lep. Het. Brit. Mus.*, 4 : 875.

1892. *Dasychira lineata* : Hampson, *Fauna Brit. India*, Moths, 1 : 448.

1991. *Dasychira lineata* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 310.

Distribution : India : Tripura (West district); Nagaland; Meghalaya (*vide* Mandal & Maulik, in press, d); Assam; Sikkim; Madhya Pradesh. *Elsewhere* : Bangladesh; Myanmar; Bhutan; Sumatra (*vide* Bryk, 1934).

Genus *Leucoma* Stephens

1829. *Leucoma*, Stephens, *III. Brit. Ent. Haust.*, 2 : 64.

Distribution : Oriental; Ethiopian; Palaearctic; also, New Britain and New Ireland.

83. *Leucoma submarginata hipparia*

(Swinhoe)

1893. *Redoa hipparia* Swinhoe, *Ann. Mag. nat. Hist.*, (6) 12 : 213.
 1933. *Leucoma submarginata hipparia* : Strand, *Macrolep. World*, 10 : 310.
 1991. *Leucoma submarginata hipparia* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 310.

Material examined : VII, XXIX.*Distribution* : India : Tripura (North, West and South districts). *Elsewhere* : Singapore.**Genus *Pendria* Swinhoe**

1906. *Pendria* Swinhoe, *Ann. Mag. nat. Hist.*, (7) 17 : 540 (Caviria, pt., Hampson, 1892).

Distribution : India (Tripura; Meghalaya); Malayan; Holl. N. Guinea.**84. *Pendria* sp.***Distribution* : India : Tripura (West district).*Remarks* : Affinities for this and the following couple of unidentified species have been briefed by Mandal & Ghosh (1991).**Genus *Lymantria* Huebner**

1818. *Lymantria* Huebner, *Verz. bek. Schmett.*, p. 160.

Distribution : Old World (*vide* Bryk, 1934).**85. *Lymantria* sp.***Distribution* : India : Tripura (West district).**Genus *Euproctis* Huebner**

1816. *Euproctis* Huebner, *Verz. bek. Schmett.*, p. 159.

Distribution : Old World.**86. *Euproctis* sp.***Distribution* : India : Tripura (North district).**Genus *Perina* Walker**

1855. *Perina* Walker, *Cat. Lep. Het. Brit. Mus.*, 4 : 966.

Distribution : India; Nepal; Sri Lanka; China; Hongkong; Taiwan; Japan.**87. *Perina pura* Walker**

1869. *Perina pura* Walker, *Char. undescr. Het.*, p. 17.
 1892. *Perina pura* : Hampson, *Fauna Brit. India*, Moths, 1 : 486.
 1991. *Perina pura* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 312.

Distribution : India : Tripura (West district); Assam; West Bengal.**Family ARCTIIDAE****Genus *Asota* Huebner**

1827. *Asota* Huebner, *Verz. bek. Schmett.* (o. s. unseen).

Distribution : Oriental; Australo-Papuan.**88. *Asota caricae caricae* (Fabr.)**

1794. *Noctua caricae* Fabricius, *Ent. Syst.*, 3 (2) : 27.
 1892. *Hypsa alciphron* : Hampson, *Fauna Brit. India*, Moths, 1 : 502.
 1991. *Asota caricae caricae* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 312.

Distribution : India : Tripura (West district); Assam; West Bengal (*vide* Ghosh & Chaudhury, *in press*, g); Sikkim; Himachal Pradesh; Maharashtra; Andaman Island. *Elsewhere* : Myanmar; Sri Lanka; Sino-Malayan.*Remarks* : This moth, earlier known under Hypsiidae after the Hampsonian system, has been considered under the subfamily Aganainae of Arctiidae by Barlow (1982). It feeds on *Ficus* species.**Genus *Asura* Walker**

1854. *Asura* Walker, *Cat. Lep. Het. Brit. Mus.*, 2 : 484.

Distribution : Oriental Region; also Australo-Papuan and African (*vide* Hampson, 1900).***89. *Asura semifascia* (Walker)**

1854. *Setina semifascia* Walker, *Cat. Lep. Het. Brit. Mus.*, 2 : 521.
 1894. *Mitochrista semifascia* : Hampson, *Fauna Brit. India*, Moths, 2 : 109.
 1900. *Asura semifascia* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 2 : 449.

Material examined : XVII.

Distribution : India : Tripura (West district); Assam; Sikkim; Southern Peninsula. *Elsewhere* : Sri Lanka; Myanmar.

Genus *Miltochrista* Huebner

1876. *Miltochrista* Huebner, *Verz. bek. Schmett.*, p. 166.

Distribution : Universal (*vide* Arora, 1983).

*90. *Miltochrista cuneonotata* (Walker)

1855. *Ammatho cuneonotata* Walker, *Cat. Lep. Het. Brit. Mus.*, 3 : 759.

1894. *Miltochrista cuneonotata* : Hampson, *Fauna Brit. India*, Moths, 2 : 117.

1982. *Miltochrista cuneonotata* : Arora & Chaudhury, *Zool. Surv. India Tech. Monogr.*, No. 6 : 55, pl. IV, fig. 27.

Material examined : XXXII.

Distribution : India : Tripura (West district); Arunachal Pradesh (Arora & Chaudhury, 1982); Assam; Nagaland; Meghalaya; West Bengal; Sikkim. *Elsewhere* : Sri Lanka; Malaysia; Indonesia; Philippines.

Remarks : This and certain other species of Arctiidae dealt with in this article were earlier reported from West Bengal and Meghalaya by Ghosh & Chaudhury (*in press*, g, h).

Genus *Spilarctia* Butler

1875. *Spilarctia* Butler, *Cist. Ent.*, 2 : 39.

Distribution : Old World.

91. *Spilarctia casigneta* (Kollar)

1844. *Euprepia casigneta* Kollar, *Hügel's Kasch. Reich. Siek*, 4(2) : 469.

1894. *Spilosoma casignetum* : Hampson, *Fauna Brit. India*, Moths, 2 : 9.

1991. *Spilarctia casigneta* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 313.

Distribution : India : Tripura (North district); Arunachal Pradesh; Nagaland; Manipur;

Meghalaya; Assam; West Bengal; Sikkim; Jammu and Kashmir; Himachal Pradesh; Uttar Pradesh; Maharashtra; Tamil Nadu. *Elsewhere* : Bhutan; Myanmar; Korea; Japan; China; Siberia.

Genus *Cretonotus* Huebner

1816. *Cretonotus* Huebner, *Verz. bek. Schmett.*, p. 169.

Distribution : Australo-Oriental; Middle-East; Africa.

92. *Cretonotus gangis* (Linn.)

1764. *Phalaena gangis* Linnaeus, *Amoen. Acad.*, 6 : 410.

1894. *Cretonotus interruptus* : Hampson, *Fauna Brit. India*, Moths, 2 : 26.

1991. *Cretonotus gangis* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 313.

Distribution : India : Tripura (North district); Assam; Meghalaya; Arunachal Pradesh; West Bengal; Madhya Pradesh; Rajasthan (*vide* Varshney & Gupta, 1996); Gujarat (*vide* Gupta & Thakur, 1990); Maharashtra; Andhra Pradesh; Tamil Nadu; Kerala. *Elsewhere* : Pakistan; Myanmar; Sri Lanka; Nepal; China; Malaysia; Java; Australia.

Remarks : The form *gangis* of this species was earlier recorded from Ambassa by Mandal & Ghosh (1991).

93. *Cretonotus transiens* (Walker)

1855. *Spilosoma transiens* Walker, *Cat. Lep. Het. Brit. Mus.*, 3 : 675.

1894. *Phissama transiens* : Hampson, *Fauna Brit. India*, Moths, 2 : 29, fig. 10.

1991. *Cretonotus transiens* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 314.

Material examined : III, XXXIX.

Distribution : India : Tripura (North, West and South districts); Arunachal Pradesh; Meghalaya; Assam; West Bengal; Sikkim; Jammu & Kashmir; Himachal Pradesh; Uttar Pradesh; Punjab; Karnataka; Tamil Nadu. *Elsewhere* : Bangladesh; Myanmar; China; Bhutan; Malayan.

Remarks : A couple of morphs, viz. f. *transiens* and f. *vacillans* (Walker), of this species were earlier reported from Tripura by Mandal & Ghosh (1991).

Genus *Eligma* Huebner

1818. *Eligma* Huebner, *Verz. bek. Schm.*, p. 164.

Distribution : India; Sri Lanka; Malayan; Africa; China.

*94. *Eligma narcissus* (Cramer)

1775. *Phalaena narcissus* Cramer, *Pap. Exot.*, 1 : pl. 73, figs. E, F.

1894. *Eligma narcissus* : Hampson, *Fauna Brit. India*, Moths, 2 : 43, fig. 19.

Material examined : XIII.

Distribution : India : Tripura (North district); Orissa; Southern India. *Elsewhere* : Sri Lanka; Sino-Malayan.

Remarks : With the present discovery, this species is apparently recorded new for N. E. India.

Genus *Tigrioides* Butler (= *Lexis*, Hampson, 1900)

1877. *Tigrioides* Butler, *Trans. ent. Soc. Lond.*, p. 369.

Distribution : Sino-Indo-Australia; Africa; America.

*95. *Tigrioides leucanioides* (Walker)

1862. *Lithosia leucanioides* Walker, *J. Proc. Linn. Soc. Zool.*, 6 : 103.

1894. *Adisura atkinsoni* : Hampson, *Fauna Brit. India*, Moths, 2 : 173, fig. 113.

1982. *Tigrioides leucanioides* : Arora & Chaudhury, *Zool. Surv. India Tech. Monogr.*, No. 6 : 25, pl. II, figs. 15, 15a.

Material examined : XIII.

Distribution : India : Tripura (North district); Arunachal Pradesh. *Elsewhere* : Myanmar; Malaysia; Indonesia; Philippines.

Genus *Eilema* Huebner

1827. *Eilema* Huebner, *Verz. bek. Schm.*, p. 165.

Distribution : Old World.

*96. *Eilema vicaria* (Walker)

1854. *Lithosia vicaria* Walker, *Cat. Lep. Het. Brit. Mus.*, 2 : 505.

1894. *Lithosia antica* : Hampson, *Fauna Brit. India*, Moths, 2 : 79, fig. 46.

1983. *Eilema vicaria* : Arora, *Rec. zool. Surv. India, Occ. Paper No. 60* : 24.

Material examined : XIII.

Distribution : India : Tripura (North district); Arunachal Pradesh; Meghalaya; Assam; West Bengal; Sikkim; Maharashtra; Andaman Island. *Elsewhere* : Bhutan; Sri Lanka; Indonesia; Malaysia; China.

Remarks : This species bears fuscial similarity with *E. griseadisca* Barlow from W. Malaysia, but it differs by the detailed shape of fore wing.

Genus *Oeonistis* Huebner

1827. *Oeonistis* Huebner, *Verz. bek. Schm.*, p. 165.

Distribution : India; Sri Lanka; China; Austro-Malayan; Solomons; probably also Japan and Europe.

*97. *Oeonistis entella* (Cramer)

1779. *Phalaena entella* Cramer, *Pap. Exot.*, 3 : 27, pl. 208, fig. D.

1894. *Philagria entella* : Hampson, *Fauna Brit. India*, Moths, 2 : 71, fig. 38.

1982. *Oeonistis entella* : Arora & Chaudhury, *Zool. Surv. India, Tech. Monogr.*, No. 6 : 58, pl. IV, figs. 30, 30a.

Material examined : XIII, XXIX.

Distribution : India : Tripura (North and West Districts); Arunachal Pradesh; Meghalaya; Maharashtra; Tamil Nadu. *Elsewhere* : Sri Lanka; China; Indonesia; Australia.

Remarks : The species is known to feed on lichens.

Genus *Cyana* Walker

- 1854.
- Cyana*
- Walker,
- Cat. Lep. Het. Brit. Mus.*
- , 2 : 528.

Distribution : Oriental; Afro-Malagassic.*98. *Cyana puella* (Drury) [*Chionaema javanica* Hampson, 1990]

- 1773.
- Phalaena puella*
- Drury,
- Ill. Exot. Ins.*
- , 2 : 3, pl. 2, fig. 2.

- 1894.
- Cyana puella*
- : Hampson,
- Fauna Brit. India*
- , Moths, 2 : 57.

Material examined : XVII, XXIX.*Distribution* : India : Tripura (West district); Himachal Pradesh; Maharashtra; Southern Peninsula. *Elsewhere* : Nepal; Sri Lanka; Malayan.*Remarks* : Present finding reveals this species establishing new record for entire N. E. India.*99. *Cyana bianca* (Walker)

- 1856.
- Bizone bianca*
- Walker,
- Cat. Het. Lep. Brit. Mus.*
- , 7 : 1684.

- 1894.
- Cyana bianca*
- : Hampson,
- Fauna Brit. India*
- , Moths, 2 : 58.

- 1983.
- Cyana bianca*
- : Arora,
- Rec. zool. Surv. India Occ. Paper No. 60*
- : 35, pl. II, fig. 12.

Material examined : XIII.*Distribution* : India : Tripura (North district); Arunachal Pradesh; Meghalaya; Assam; Sikkim; Andaman Island. *Elsewhere* : Myanmar; Malaysia; Bhutan.

Family AGARISTIDAE

Genus *Episteme* Huebner

- 1818.
- Episteme*
- Huebner,
- Verz. bek. Schmett.*
- , p. 179.

Distribution : Oriental Region.100. *Episteme adulatrix* (Kollar)

- 1848.
- Eusemia adulatrix*
- Kollar,
- Hügel's Kasch. Reich Seik*
- , 4 : 464, pl. 20, fig. 1.

- 1894.
- Eusemia adulatrix*
- : Hampson,
- Fauna Brit. India*
- , Moths, 2 : 152, fig. 99.

- 1991.
- Episteme adulatrix*
- : Mandal & Ghosh,
- Rec. zool. Surv. India*
- , 88 (3-4) : 315.

Distribution : India : Tripura (West district); almost throughout the mainland. *Elsewhere* : Myanmar; Sri Lanka; Bhutan; Nepal; China; Vietnam.*Remarks* : The f. *afflicta* (Butler) of this moth was earlier reported from Agartala by Mandal & Ghosh (1991).

Family NOCTUIDAE

Genus *Pseudaletia* Franclemont

- 1951.
- Pseudaletia*
- Franclemont,
- Proc. ent. Soc. Wash.*
- , 53(1) : 57.

Distribution : Widespread both in the Old and New World.101. *Pseudaletia separata* (Walker)

- 1865.
- Leucania separata*
- Walker,
- Cat. Lep. Het. Brit. Mus.*
- , 32 : 626.

- 1894.
- Leucania unipuncta*
- : Hampson,
- Fauna Brit. India*
- , Moths, 2 : 275.

- 1991.
- Pseudaletia separata*
- : Mandal & Ghosh,
- Rec. zool. Surv. India*
- , 88 (3-4) : 315.

Distribution : India : Tripura (South district); Manipur; Meghalaya; Assam; West Bengal; Orissa (*vide* Mandal & Maulik, 1991a); Sikkim; Jammu and Kashmir; Himachal Pradesh; Punjab; Madhya Pradesh; Rajasthan; Maharashtra; Tamil Nadu. *Elsewhere* : Widespread in Southern Palearctic and Indo-Australian area (*vide* Holloway, 1976); also U.S.S.R., Ethiopian, China, Pakistan, Papuan, Korea; Japan; Nearctic and Neotropical (*vide* Hampson, 1905; Warren, 1914).*Remarks* : Mandal & Ghosh (1991) reported ab. *punctulata* (Blanchard) of this moth from Abhoya.Genus *Cirphis* Walker

- 1865.
- Cirphis*
- Walker,
- Cat. Lep. Het. Brit. Mus.*
- , 32 : 622.

Distribution : Universal.

102. *Cirphis yu* (Guenée)

1852. *Leucania yu* Guenée, *Hist. nat. Ins. Lep. Noct.*, 1 : 78.
1894. *Leucania exempta* : Hampson, *Fauna Brit. India*, Moths, 2 : 273.
1991. *Cirphis yu* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 316.

Distribution : India : Tripura (North district); Assam; Sikkim; Maharashtra; Karnataka; Kerala; Andaman and Nicobar Island. *Elsewhere* : Myanmar; Sri Lanka; Taiwan; Singapore; Borneo; Philippines; Loochoo Island; Papua; New Hebrides; Fiji; Tonga.

Remarks : The sp. *yu* was earlier treated under *Leucania* Ochsenheimer by Holloway (1976).

Genus *Prodenia* Guenée

1852. *Prodenia* Guenée, *Hist. nat. Ins. Lep. Noct.*, 1 : 159.

Distribution : Throughout the global tropics and subtropics; also the temperate Mediterranean and cold Nearctic.

103. *Prodenia litura* (Fabricius)

1775. *Noctua litura* Fabricius, *Syst. Ent.*, p. 601.
1894. *Prodenia littoralis* : Hampson, *Fauna Brit. India*, Moths, 2 : 247, fig. 139.
1991. *Prodenia litura* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 316.

Distribution : India : Tripura (West district); Meghalaya; Manipur; Sikkim; Himachal Pradesh; Uttar Pradesh; Punjab; Rajasthan; Maharashtra; Orissa; Karnataka; Tamil Nadu; Kerala. *Elsewhere* : Sri Lanka; Myanmar; Nepal; Sino-Austro-Malayan; Papuan; West Asia; Africa; Hawaiian.

Remarks : Holloway (1976) and Barlow (1982) placed the species in *Spodoptera* Guenée. The food plants, as mentioned by Barlow (*loc. cit.*), comprise a wide range of crops including oil palms, lantana, etc.

Genus *Laphygma* Guenée

1852. *Laphygma* Guenée, *Hist. nat. Ins. Lep. Noct.*, 1 : 156.

Distribution : Universal.

104. *Laphygma exigua* (Huebner)

1808. *Noctus exigua* Huebner, *Samml. Eur. Schmitt.*, Noct.: fig. 362.
1894. *Caradrina exigua* : Hampson, *Fauna Brit. India*, Moths, 2 : 259.
1991. *Laphygma exigua* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 317.

Distribution : India : Tripura (South district); Manipur; Sikkim; Himachal Pradesh; Uttar Pradesh; Punjab; Rajasthan; Orissa (*vide* Mandal & Maulik, 1991a); Tamil Nadu. *Elsewhere* : Sri Lanka; Myanmar; China; Vietnam; Japan; Australia; U. S. S. R.; Western Asia; Africa; Europe; Hawaii.

Remarks : *Ab. pygmaea* (Rambur) was earlier reported from Belonia by Mandal & Ghosh (1991).

Genus *Parallelia* Huebner

1818. *Parallelia* Huebner, *Zutr. Exot. Schmett.*, 1 : 15.

Distribution : Oriental, Australo-Papuan, Ethiopian, Palearctic and Neotropical.

105. *Parallelia fulvotaenia* (Guenée)

1852. *Ophiusa fulvotaenia* Guenée, *Hist. nat. Ins. Noct.*, 3 : 272.
1894. *Ophiusa fulvotaenia* : Hampson, *Fauna Brit. India*, Moths, 2 : 504.
1991. *Parallelia fulvotaenia* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 317.

Distribution : India : Tripura (South district); Assam. *Elsewhere* : Bangladesh; Myanmar; Sri Lanka; Japan; Taiwan; up to Lombok and Buru. Also Nepal.

Genus *Chalciope* Huebner

1818. *Chalciope* Huebner, *Verz. bek. Schmett.*, : 268.

Distribution : Old World.

106. *Chalciope hyppasia* (Cramer)

1779. *Noctua hyppasia* Cramer, *Pap. Exot.*, 3 : 99, pl. 250, fig. E.
 1894. *Trigonodes hyppasia* : Hampson, *Fauna Brit. India*, Moths, 2 : 527.
 1991. *Chalciope hyppasia* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 317.

Distribution : India : Tripura (North district); almost throughout the rest of mainland; also Nicobar Island. **Elsewhere** : Widespread in the Old World (*vide* Mandal & Maulik, 1991a; Mandal & Ghosh, 1991).

Remarks : *Ab. inacuta* (Guenée) of this moth was earlier reported from Kumarghat by Mandal & Ghosh (1991).

Genus *Mocis* Huebner

1827. *Mocis* Huebner, *Verz. bek. Schmett.*, : 267.

Distribution : Universal.

107. *Mocis undata* (Fabricius)

1775. *Noctua undata* Fabricius, *Syst. Ent.*, : 600.
 1894. *Remigia archesia* : Hampson, *Fauna Brit. India*, Moths, 2 : 526, fig. 293.
 1991. *Mocis undata* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 318.

Distribution : India : Tripura (North district); almost throughout the rest of mainland; also Andaman and Nicobar Island. **Elsewhere** : Widespread in the Oriental and Ethiopio-Malagassic Regions.

Remarks : Barlow (1982) mentioned *Desmodium* and *Pueraria* (Leguminosae) as food plants on which the species was recorded as a pest.

Genus *Pericyma* Herrich-Schäffer

- 1850-51. *Pericyma* Herrich-Schäffer, *Syst. Bearb. Schmett. Eur.*, 2 : 429.

Distribution : Oriental, Australian, Ethiopian and American.

108. *Pericyma umbrina* (Guenée)

1852. *Alamis umbrina* Guenée, *Hist. nat. Ins. Noct.*, 3 : 4.
 1894. *Homoptera umbrina* : Hampson, *Fauna Brit. India*, Moths, 2 : 474.
 1991. *Pericyma umbrina* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 319.

Distribution : India : Tripura (South district); Manipur; Assam; Sikkim; Jammu and Kashmir; Himachal Pradesh; Uttar Pradesh; Punjab; Madhya Pradesh; Maharashtra. **Elsewhere** : Bangladesh.

Remarks : *Ab. perfusa* (Warren) of this moth was earlier reported from Udaipur by Mandal & Ghosh (1991).

Genus *Fodina* Guenée

1852. *Fodina* Guenée, *Hist. nat. Ins. Noct.*, 3 : 274.

Distribution : Australo-Oriental and Ethiopian.

109. *Fodina oriolus* Guenée

1852. *Fodina oriolus* Guenée, *Hist. nat. Ins. Lep. Noct.*, 3 : 274.
 1894. *Fodina oriolus* : Hampson, *Fauna Brit. India*, Moths, 2 : 529.
 1991. *Fodina oriolus* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 319.

Distribution : India : Tripura (West district); Sikkim. **Elsewhere** : Bangladesh; Bhutan; also Campuchia and Thailand (*vide* Swinhoe, 1900).

Genus *Hypocala* Guenée

1852. *Hypocala* Guenée, *Hist. nat. Ins. Lep. Noct.*, 3 : 73.

Distribution : Throughout the tropical and subtropical zones of the globe.

110. *Hypocala moorei* Butler

1892. *Hypocala moorei* Butler, *Ann. Mag. nat. Hist.*, (6) 10 : 21.
 1894. *Hypocala moorei* : Hampson, *Fauna Brit. India*, Moths, 2 : 454.
 1991. *Hypocala moorei* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 319.

Distribution : India : Tripura (North district); West Bengal; Sikkim; N. W Himalaya; Karnataka. *Elsewhere* : Sri Lanka; West Africa.

Genus *Erebus* Latreille

1810. *Erebus* Latreille, *Ord. Nat. Crust. & Ins.*, : 365.

Distribution : Australo-Oriental; Ethiopian.

*111. *Erebus ephesperis ephesperis* (Huebner)

1827. *Nyctipao ephesperis* Huebner, *Verz. bek. Schmett.*, : 272.

1894. *Nyctipao crepuscularis* : Hampson, *Fauna Brit. India*, Moths, 2 : 461.

1982. *Erebus ephesperis ephesperis* : Barlow, *Intr. Moths S. E. Asia*, : 102.

Material examined : XVII

Distribution : India : Tripura (West district). *Elsewhere* : Thailand; Malaya; Sumatra; Borneo.

Remarks : Barlow (1982) mentioned only "India" as one of the habitats of this moth, without referring to any specific state of locality within the Indian limit; but in any case, *ephesperis* (nec *ephesphoris*, Swinhoe, 1900) is recorded new for Tripura, if not for the whole of N.E. India.

Genus *Ischyja* Huebner

1818. *Ischyja* Huebner, *Verz. bek. Schmett.*, : 265.

Distribution : Oriental.

*112. *Ischyja manlia* Cramer)

1779. *Phalena-Noctua manlia* Cramer, *Pap. Exot.*, 1 : pl. 92, fig. A.

1894. *Ischyja manlia* : Hampson, *Fauna Brit. India*, Moths, 2 : 537, fig. 299.

1982. *Ischyja manlia* : Barlow, *Intr. Moths S.E. Asia*, : 238.

Material examined : XVII.

Distribution : India : Tripura (West district); Meghalaya (*vide* Mandal & Ghosh, *in press*, b); Sikkim; Himachal Pradesh; Uttar Pradesh; Gujarat; Maharashtra; Andaman Island. *Elsewhere*

: Bhutan; Bangladesh; Sri Lanka; Myanmar; Sino-Malayan.

Genus *Adris* Moore

1881. *Adris* Moore, *Trans. zool. Soc. Lond.*, 11 : 69.

Distribution : Global Tropics; also Eastern Palaearctic.

113. *Adris tyrannus* (Guenée)

1852. *Ophideres tyrannus* Guenée, *Hist. nat. Ins. Noct.*, 3 : 110.

1894. *Ophideres tyrannus* : Hampson, *Fauna Brit. India*, Moths, 2 : 562.

1991. *Adris tyrannus* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 320.

Distribution : India : Tripura (South district); Meghalaya; West Bengal; Sikkim; Himachal Pradesh; Maharashtra. *Elsewhere* : Sino-Malayan; Japan.

Genus *Ophideres* Boisduval

1833. *Ophideres* Boisduval, *Fauna Ent. Madag. Lép.*, : 99.

Distribution : Circum-Tropical Zone of the globe.

114. *Ophideres hypermnestra* (Cramer)

1780. *Phalaena (Noctua) hypermnestra* Cramer, *Pap. Exot.*, 4 : pl. 323, figs. A, B.

1894. *Ophideres hypermnestra* : Hampson, *Fauna Brit. India*, Moths, 2 : 562.

1991. *Ophideres hypermnestra* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 320.

Distribution : India : Tripura (South district); Meghalaya; Sikkim; Maharashtra; Karnataka; Tamil Nadu; Kerala; Andaman Island. *Elsewhere* : Bangladesh; Sri Lanka; Myanmar.

Genus *Raparna* Moore

1882. *Raparna* Moore, *Descr. Indian Lep. Atk.*, : 177.

Distribution : Oriental (mainly Indo-Malayan); also Africa.

115. *Raparna* sp.

Distribution : India : Tripura (West district).

Remarks : Affinities of this indetermined species have been mentioned by Mandal & Ghosh (1991). The genus *Raparna* was included in the synonymy list of *Rhesala* Walker by Swinhoe (1900).

Superfamily GEOMETROIDEA

Family DREPANIDAE

Genus *Euchera* Huebner

1825. *Euchera* Huebner, *Zutr. Samml. Exot. Schmett.*, 3 : 29.

Distribution : India (Himalaya and adjacent belts); Myanmar; Sino-Malayan; Japan.

116. *Euchera nigralbata superstigmata*
(Prout)

1918. *Cyclidia substigmata superstigmata* Prout, *Ann. Mag. nat. Hist.*, (9) 2 : 416.
1892. *Euchera substigmata* : Hampson, *Fauna Brit. India*, Moths, 1 : 327, fig. 225.
1991. *Euchera nigralbata superstigmata* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 308.

Material examined : III.

Distribution : India : Tripura (North, West and South districts); Meghalaya; Assam; West Bengal; Sikkim; Jammu & Kashmir; Himachal Pradesh; Uttar Pradesh. *Elsewhere* : Nepal; Bhutan; Bangladesh; Myanmar.

Family URANIIDAE

Genus *Micronia* Guenée

1857. *Micronia* Guenée, *Hist. nat. Ins. Lep. Uran. Phal.*, 2 : 22.

Distribution : Australo-Oriental.

117. *Micronia aculeata* Guenée

1857. *Micronia aculeata* Guenée, *Hist. nat. Ins. Lep. Uran. Phal.*, 2 : 26, pl. 13, fig. 8.
1895. *Micronia aculeata* : Hampson, *Fauna Brit. India*, Moths, 3 : 117, fig. 62.

1991. *Micronia aculeata* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 321.

Distribution : India : Tripura (West district); Assam; West Bengal; Sikkim; Himachal Pradesh; Uttar Pradesh; Maharashtra; Tamil Nadu; Andaman Island. *Elsewhere* : Sri Lanka; Myanmar; Sundaland; Philippines; also South China; Bhutan.

Remarks : While Barlow (1982) placed the species with *Pseudomicronia* Moore, Holloway (1976) treated it under the family Geometridae : Larentiinae, with the name of the genus misspelt as "*Micromia*"

Family GEOMETRIDAE

Genus *Zamarada* Moore

1887. *Zamarada* Moore, *Lep. Ceylon*, 3 : 432.

Distribution : Old World (vide Fletcher, 1974).

118. *Zamarada translucida* Moore

1887. *Zamarada translucida* Moore, *Lep. Ceylon*, 3 : 432, pl. 197, fig. 2.
1895. *Zamarada translucida* : Hampson, *Fauna Brit. India*, Moths, 3 : 198, fig. 111.
1991. *Zamarada translucida* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 322.

Distribution : India : Tripura (North district); Nagaland; Meghalaya; Orissa; Tamil Nadu. *Elsewhere* : Sri Lanka; Western Malaysia; Borneo.

Genus *Hyposidra* Guenée

1857. *Hyposidra* Guenée, *Hist. nat. Ins. Lep. Phal.*, 2 : 150.

Distribution : Australo-Oriental.

119. *Hyposidra talaca* (Walker)

1860. *Lagyrta talaca* Walker, *Cat. Lep. Het. Brit. Mus.*, 20 : 59.
1895. *Hyposidra talaca* : Hampson, *Fauna Brit. India*, Moths, 3 : 213, fig. 117.
1991. *Hyposidra talaca* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 322.

Distribution : India : Tripura (West district); Meghalaya; Assam; West Bengal (*vide* Mandal & Ghosh, *in press*, a); Sikkim, Maharashtra; Karnataka; Andaman Island. *Elsewhere* : Bhutan; Myanmar; Sri Lanka; Java; Borneo; Sulawesi; Philippines; upto Solomons and Queensland.

Remarks : The species feeds on many plants of Combretaceae, Moraceae, etc. (*vide* Barlow, 1982).

Genus *Boarmia* Treitschke

1825. *Boarmia* Treitschke, *Eur. Schmett.*, 5 (2) : 433.

Distribution : Universal.

*120. *Boarmia boarmiaria* (Guenée)

1857. *Hypochroma boarmiaria* Guenée, *Hist. nat. Ins. Lep. Phal.*, 1 : 282.

1895. *Boarmia boarmiaria* : Hampson, *Fauna Brit. India, Moths*, 3 : 261.

1991. *Boarmia boarmiaria* : Mandal, *State Fauna Series 2 : Fauna of Lakshadweep, Ins. Lep.*, : 236.

Material examined : XVII.

Distribution : India : Tripura (West district); Nagaland; Meghalaya; Assam; West Bengal; Sikkim; Lakshadweep. *Elsewhere* : Bangladesh; Sri Lanka; Taiwan.

*121. *Boarmia alienaria* Walker

1860. *Boarmia alienaria* Walker, *Cat. Lep. het. Brit. Mus.*, 21 : 370.

1895. *Boarmia acaciaria* : Hampson, *Fauna Brit. India, Moths*, 3 : 264, fig. 137.

In press. Boarmia alienaria : Mandal & Ghosh, *in State Fauna Series, Meghalaya*.

Material examined : XVII

Distribution : India : Tripura (West district); Meghalaya; Assam; West Bengal; Sikkim; Maharashtra; Andaman Island. *Elsewhere* : Bangladesh; Sri Lanka; Australia.

Genus *Medasina* Moore

1887. *Medasina* Moore, *Lep. Ceylon*, 3 : 409.

Distribution : Indo-Malayan.

*122. *Medasina strixaria* (Guenée)

1857. *Hemerophila strixaria* Guenée, *Hist. nat. Ins. Lep. Phal.*, 1 : 217.

1895. *Medasina strixaria* : Hampson, *Fauna Brit. India, Moths*, 3 : 286.

In press. Medasina strixaria : Mandal & Ghosh, *in State Fauna Series, West Bengal*.

Material examined : XVII.

Distribution : India : Tripura (West district); Assam; West Bengal; Sikkim; Nilgiri; *Elsewhere* : Sri Lanka; Myanmar.

Remarks : This and the preceding three genera, earlier treated under Geometrinae (= Boarminae), have been placed with the subfamily Ennominae by Inoue (1987).

Genus *Eumelea* Westwood

1841. *Eumelea* Westwood, *in Duncan's Nat. Hist. Libr.*, 32 : 215.

Distribution : Oriental and Australian.

123. *Eumelea rosalia* (Cramer)

1782. *Phalaena (Geometra) rosalia* Cramer, *Pap. Exot.*, 4 : 152, pl. 368, fig. f.

1895. *Eumelia rosalia* : Hampson, *Fauna Brit. India, Moths*, 3 : 320, fig. 155.

1991. *Eumelia rosalia* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 323.

Distribution : India : Tripura (North district); Assam; Sikkim; Tamil Nadu; Andaman & Nicobar Island. *Elsewhere* : China; Bhutan; Bangladesh; Myanmar; Sri Lanka; Java; Philippines; Australian Region.

Remarks : Mandal & Ghosh (1991) reported *ludovicata* Guenée as a morph of this species from Ganganagar, but now it is confirmed on the basis of recent literature review (*vide* Barlow, 1982) that *ludovicata* is a valid species from the Indo-Australian tropics.

Genus *Agathia* Guenée

1857. *Agathia* Guenée, *Hist. nat. Ins. Lep. Phal.*, 1 : 380.

Distribution : Australo-Oriental; Siberia; Ethiopian.

*124. *Agathia lycaenaria* (Kollar)

1844. *Geometra lycaenaria* Kollar, in Hügel, *Kasch. Reich Seik*, 4 : 486.
1895. *Agathia lycaenaria* : Hampson, *Fauna Brit. India*, Moths, 3 : 485, fig. 215.
1900. *Agathia lycaenaria* : Swinhoe, *Cat. East & Austr. Lep. Het.*, (2) : 390.

Material examined : X.

Distribution : India : Tripura (North district); throughout rest of the mainland (*vide* Hampson, 1895). *Elsewhere* : Bangladesh; Sri Lanka; Sino-Malayan.

Superfamily PYRALOIDEA

Family PYRALIDAE

Genus *Tryporyza* Common

1960. *Tryporyza* Common, *Austr. J. Zool.*, 8 (2) : 339.

Distribution : Widespread in the Oriental Region.

125. *Tryporyza incertulas* (Walker)

1863. *Chilo incertulas* Walker, *Cat. Lep. Het. Brit. Mus.*, 27 : 143.
1896. *Schoenobius incertelus (incertulas)* : Hampson, *Fauna Brit. India*, Moths, 4 : 48.
1991. *Tryporyza incertulas* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 323.

Material examined : XIX.

Distribution : India : Tripura (West and South districts); Nagaland; West Bengal (Bhattacharya, *in press*, e); Maharashtra. *Elsewhere* : Sri Lanka; Myanmar; Sino-Malayan.

Remarks : The species is a serious pest of rice (*vide* Kapur, 1964). Barlow (1982) mentioned control measures of this species.

Genus *Pycnarmon* Lederer

1863. *Pycnarmon* Lederer, *Wien. Ent. Monat.*, 7 : 441.

Distribution : Universal (*cf.* Mandal & Bhattacharya, 1980).

126. *Pycnarmon cribrata* (Fabr.)

1794. *Phalaena cribrata* Fabricius, *Ent. Syst.*, 3 (2) : 215.
1896. *Pycnarmon caberalis* : Hampson, *Fauna Brit. India*, Moths, 4 : 258.
1991. *Pycnarmon cribrata* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88(3-4) : 324.

Distribution : India : Tripura (South district); Maharashtra; Tamil Nadu. *Elsewhere* : Widespread in Indo-Australian Region; up to Japan and Hawaii.

Genus *Dichocrocis* Lederer

1863. *Dichocrocis* Lederer, *Wien. Ent. Monat.*, 7 : 447.

Distribution : Universal except Nearctic.

*127. *Dichocrocis punctiferalis* (Guenée)

1854. *Astura punctiferalis* Guenée, *Delt. & Pyral.*, p. 320.
1896. *Dichocrocis punctiferalis* : Hampson, *Fauna Brit. India*, Moths, 4 : 307, fig. 181.
1939. *Dichocrocis punctiferalis* : Klima, *Lep. Cat.*, 89 : 141.

Material examined : XXXIX.

Distribution : India : Tripura (South district); Meghalaya (*vide* Bhattacharya, *in press*, f); also almost whole of rest of the mainland. *Elsewhere* : Sri Lanka; Myanmar; Austro-Malayan; China; Japan.

Genus *Botyodes* Guenée

1854. *Botyodes* Guenée, *Delt. & Pyral.*, : 320.

Distribution : Oriental; Papuan.

*128. *Botyodes asialis* Guenée

1854. *Botyodes asialis* Guenée, *Delt. & Pyral.*, : 321.
1896. *Botyodes asialis* : Hampson, *Fauna Brit. India*, Moths, 4 : 325, fig. 186.
1939. *Botyodes asialis* : Klima, *Lep. Cat.*, 89 : 183.

Material examined : XXVII.

Distribution : India : Tripura (West district); almost throughout the rest of mainland. *Elsewhere* : Pakistan; Sri Lanka; Myanmar; Malayan.

Genus *Diaphania* Huebner

- ? 1818. *Diaphania* Huebner, *Zutr. Samml. Exot. Schmett.*,
1 : 51.

Distribution : Universal.

129. *Diaphania laticostalis* (Guenée)

1854. *Margarodes laticostalis* Guenée, *Hist. nat. Ins. Lep. Delt. & Pyral.*, : 303.
1896. *Glyphodes laticostalis* : Hampson, *Fauna Brit. India*,
Moths, 4 : 346.
1991. *Diaphania laticostalis* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 324.

Distribution : India : Tripura (South district); Assam; West Bengal; Sikkim; Rajasthan; Andaman Island. *Elsewhere* : Pakistan; Bhutan; Bangladesh; Sri Lanka; Myanmar; Austro-Malayan.

130. *Diaphania unionalis* Huebner

1824. *Diaphania unionalis* Huebner, *Samml. eur. Schmett. Pyr* : fig. 132.
1896. *Glyphodes unionalis* : Hampson, *Fauna Brit. India*,
Moths, 4 : 351.
1939. *Diaphania unionalis* : Klima, *Lep. Cat.*, 94 : (o. s. unseen).

Distribution : India : Tripura (South district); throughout the rest of mainland. *Elsewhere* : Sri Lanka; Australia; Ethiopio-Malagassic; South Europe.

131. *Diaphania indica* (Saunders)

1851. *Eudiptes indica* Saunders, *Trans. ent. Soc. Lond.*,
(2) 1 : 163, pl. 12, figs. 5-7.
1896. *Glyphodes indica* : Hampson, *Fauna Brit. India*,
Moths, 4 : 360.
1991. *Diaphania indica* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 325.

Distribution : India : Tripura (West district); throughout the rest of mainland; Great Nicobar Island, Lakshadweep (*vide* Mandal, 1991). *Elsewhere* : Pakistan; Sri Lanka; Myanmar; China; Austro-Malayan; Ethiopian.

Genus *Glyphodes* Guenée

1854. *Glyphodes* Guenée, *Delt. & Pyral.*, p. 292.

Distribution : Universal.

*132. *Glyphodes caesalis* Walker

1859. *Glyphodes caesalis* Walker, *Cat. Lep. Het. Brit. Mus.*, 17 : 499.
1896. *Glyphodes caesalis* : Hampson, *Fauna Brit. India*,
Moths, 4 : 356.
1939. *Glyphodes caesalis* : Klima, *Lep. Cat.*, 94 : (o. s. unseen).

Material examined : XXXIX.

Distribution : India : Tripura (South district); West Bengal; Sikkim; Andaman Island. *Elsewhere* : Sri Lanka; Myanmar.

Remarks : Gupta (1994) placed this species with *Diaphania* Huebner.

Genus *Heortia* Lederer

1863. *Heortia* Lederer, *Wien. Ent. Monat.*, : 402.

Distribution : N. E. India; Sri Lanka; Sino-Malayan.

*133. *Heortia vitessoides* (Moore)

1885. *Tyspana vitessoides* Moore, *Lep. Ceylon*, 3 : 256, pl. 178, figs. 3, 3a.
1896. *Heortia vitessoides* : Hampson, *Fauna Brit. India*,
Moths, 4 : 363, fig. 193.
1994. *Heortia vitessoides* : Gupta, *Mem. ent. Soc. India*,
No. 14 : 27.

Material examined : XVII.

Distribution : India : Tripura (West district); Assam; Sikkim. *Elsewhere* : Sri Lanka; Hong Kong.

Remarks : In one of specimens examined, the tip of abdomen is black and not orange (*cf.* Hampson, 1896).

Genus *Leucinodes* Guenée

1854. *Leucinodes* Guenée, *Delt. & Pyral.*, : 221.

Distribution : India; Sri Lanka; Myanmar; Austro-Malayan; Ethiopian; Neotropical.

134. *Leucinodes orbonalis* Guenée

1854. *Leucinodes orbonalis* Guenée, *Delt. & Pyral.*, : 223.
 1896. *Leucinodes orbonalis* : Hampson, *Fauna Brit. India*, Moths, 4 : 370, fig. 198.
 1991. *Leucinodes orbonalis* : Roy & Pande, *Indian Biol.*, 23 : 21.

Distribution : India : Tripura (West district); throughout the rest of mainland; also Andaman Island (*vide* Mandal & Bhattacharya, 1980); Lakshadweep (*vide* Mandal, 1991). *Elsewhere* : Pakistan; Bangladesh; Sri Lanka; Myanmar; Malayan; Ethiopian.

Remarks : This species, a brinjal shoot *cum* fruit-borer, was earlier reported from Agartala by Roy & Pande (1991).

Genus *Psara* Snellen

1875. *Psara* Snellen, *Tijdschr. Ent.*, 18 : 239.

Distribution : Universal.

135. *Psara phaeopteralis* (Guenée)

1854. *Botys phaeopteralis* Guenée, *Delt. & Pyral.*, : 349.
 1896. *Pachyzancla phaeopteralis* : Hampson, *Fauna Brit. India*, Moths, 4 : 402.
 1991. *Psara phaeopteralis* : Mandal & Ghosh, *Rec. zool. Surv. India*, 88 (3-4) : 325.

Distribution : India : Tripura (South district); throughout the rest of mainland; Andaman Island. *Elsewhere* : Pakistan; Sri Lanka; Myanmar; Austro-Malayan; Middle-East; Ethiopian; Neotropical.

SUMMARY

Certain aspects on the Tripura fauna of Lepidoptera may be of interest. These are concerned with new additions, endemism, status, sex ratio and other items, as noted hereunder.

As many as 42 species and subspecies of both the butterflies and moths constitute new locality records for the state of Tripura (*vide* Table I; figs. 1-4). Of these, two moths, viz. *Eligma*

narcissus and *Cyana puella*, are new additions to the fauna of whole of North-east India.

Almost all the elements exhibit moderately to highly widespread range of geographical distribution. Of these, the most notable exceptions are *Ceryx imacon sargania* and *Catapaecilma major anais* that hitherto remain endemic in North-East India covering only certain belts of the "Seven-Sisters Land" including Tripura; these subspecies are also amongst the elements that establish new locality records for the state concerned.

Assessment of status and frequency for the Tripura moths is rather uncertain, since the quantitative number of samples (in all, about 70 exs.) of majority of the species examined is quite impoverished. Nevertheless, at least one moth is definitely known to be very rare, while some of the butterflies, as now examined, are very common, such as, 2 in the North, 3 each in the West and South, 1 in both the North and South and 3 others in all the three districts of the state (*vide* Fig. 5). Qualitatively, the maximum number of species and subspecies occur in the West district, apparently diminishing, in turn, in the North and South (*vide* Table II). Furthermore, the mode of attraction of moths to light was hardly pronounced throughout the state during the period of survey under report (*vide* Appendix).

As per the given material data, the approximate sex ratio relates to butterflies : moths :: M : F :: 1 : 2 :: 3 : 1, while that of the overall fauna relates to M : F :: 1 : 1.5. But this observation may not be true in "*senso stricto*" since the number of specimens, particularly of the moths, is too scanty, as already stated above. With a view to upkeeping the threshold of conservation status through the maintenance of sustainable development of the fauna and flora, habitats and niches of the state require strict monitoring.

Attempts have been made to update the distributional ranges of species and subspecies, particularly of the butterflies and also certain moths, along with the mention of a few of their known economic importance as well as the follow-

up of recent taxonomical classification, as cited under the Systematic Account in the text. Contrarily, quite a few butterflies and moths, earlier reported by Nandi & Varshney (1988), Mandal & Ghosh (1991) and Roy & Pande (1991), could not presently be confirmed due to lack of material for study (*c.f.* Table I).

Finally, certain inadvertent technical errors, committed in the earlier works on Tripura fauna including both the butterflies (*vide* Nandi & Varshney, *loc. cit.*) and moths (*vide* Mandal & Ghosh, *loc. cit.*), are corrected in this article.

Thus, the actual number of species and subspecies of butterflies should be 45 (forty-five) and not 48 (the excess of three due to counting of a couple of forms of "*Papilio polytes*" and of one repeated for "*Catopsilia florella*" of which there is so far but one known Indian subspecies, i.e., subsp. "*gnoma*"). For the moth fauna of the state, the "Central" district, mentioned in Table I and text of the earlier work, should be read as the West district and also certain localities like Teliamura, Khowai and a few others be considered to belong to the West district and not "South" of the state.

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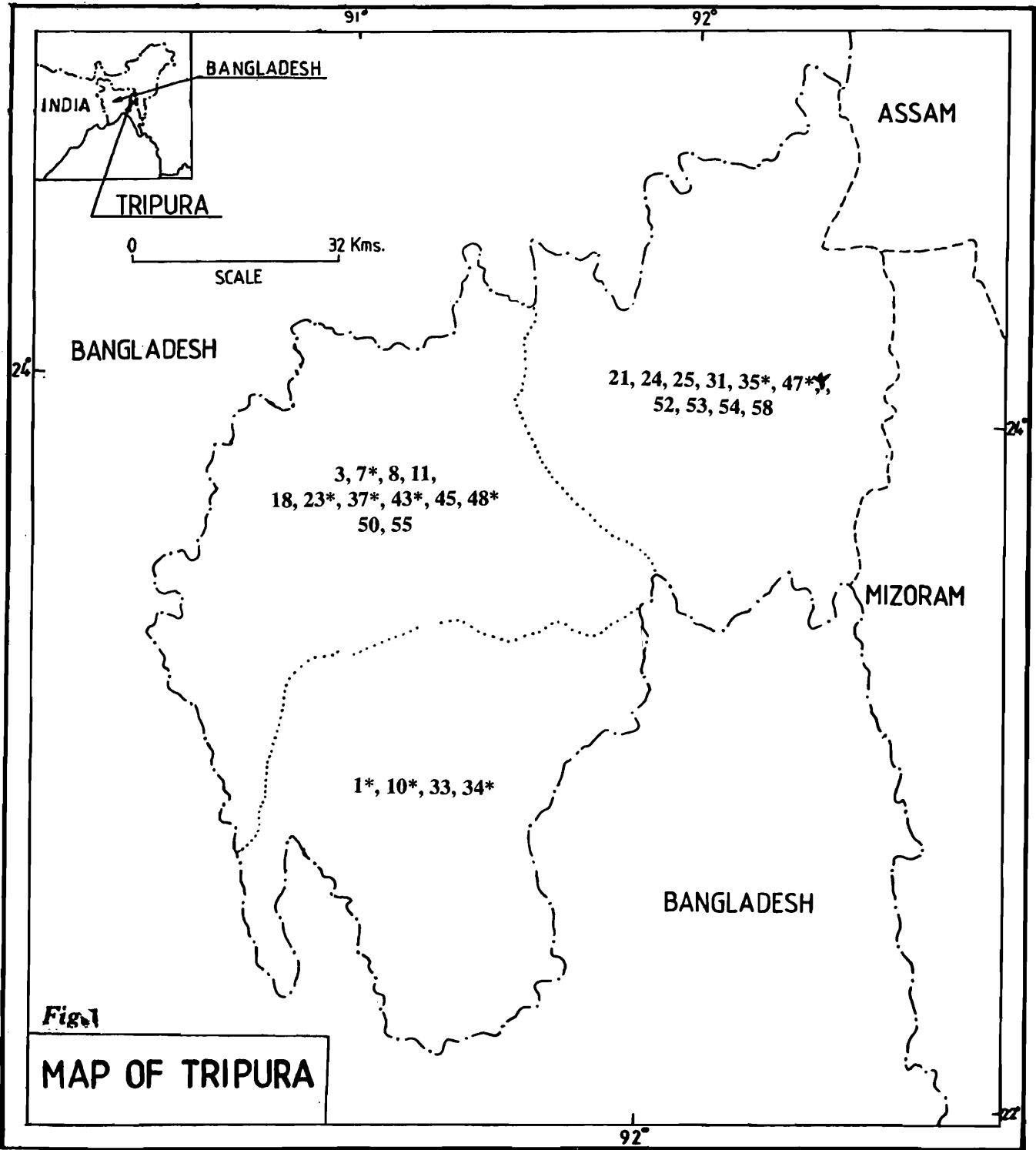


Fig. 1. Heterospecific line of Interdistrict faunal distribution : Butterflies.

[Plotted digitals denote serial number of species and sub-species, as in the text based on up-to-date record of the state fauna established. *, new record for Tripura; †, endemic in N. E. India.]

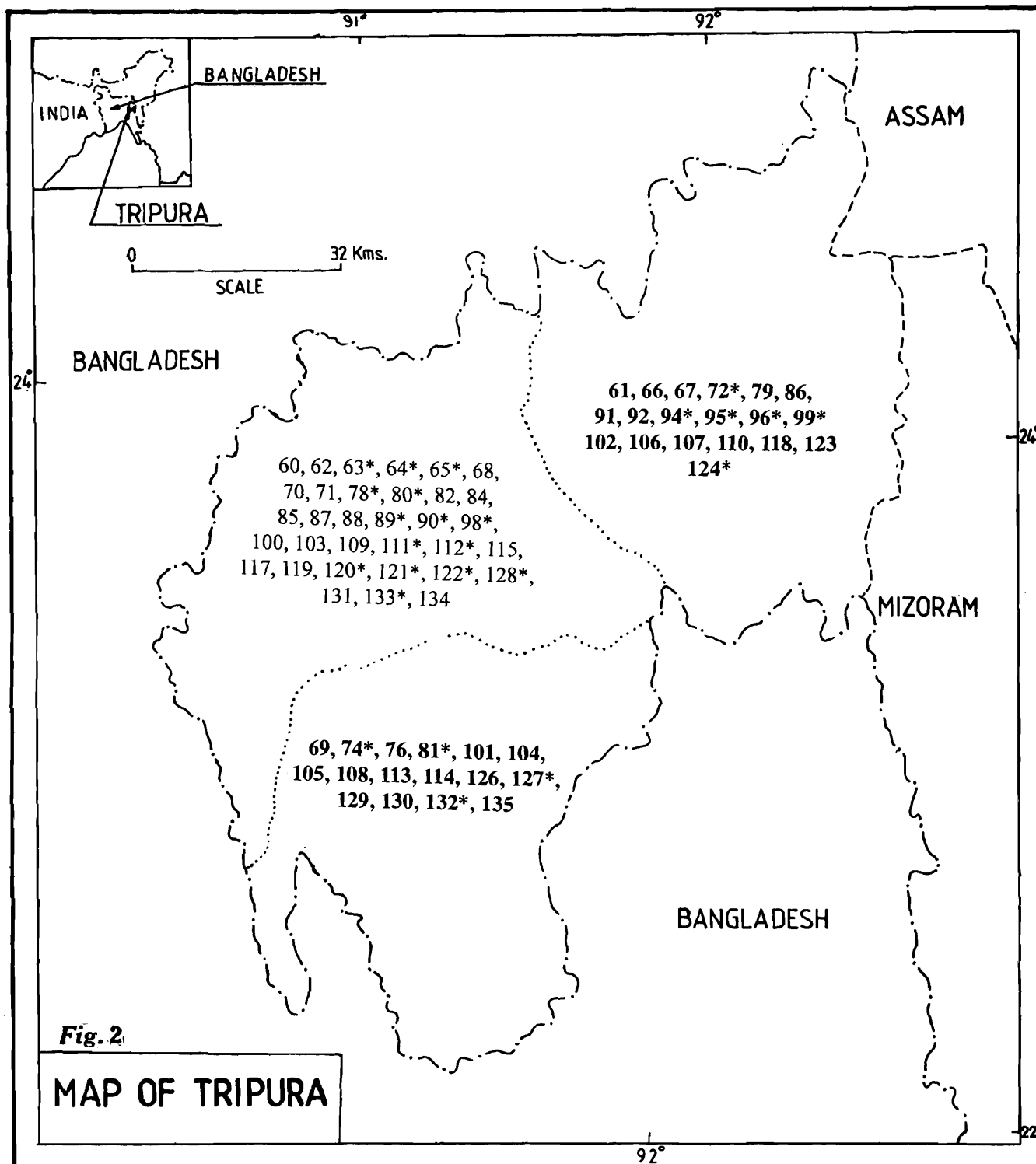
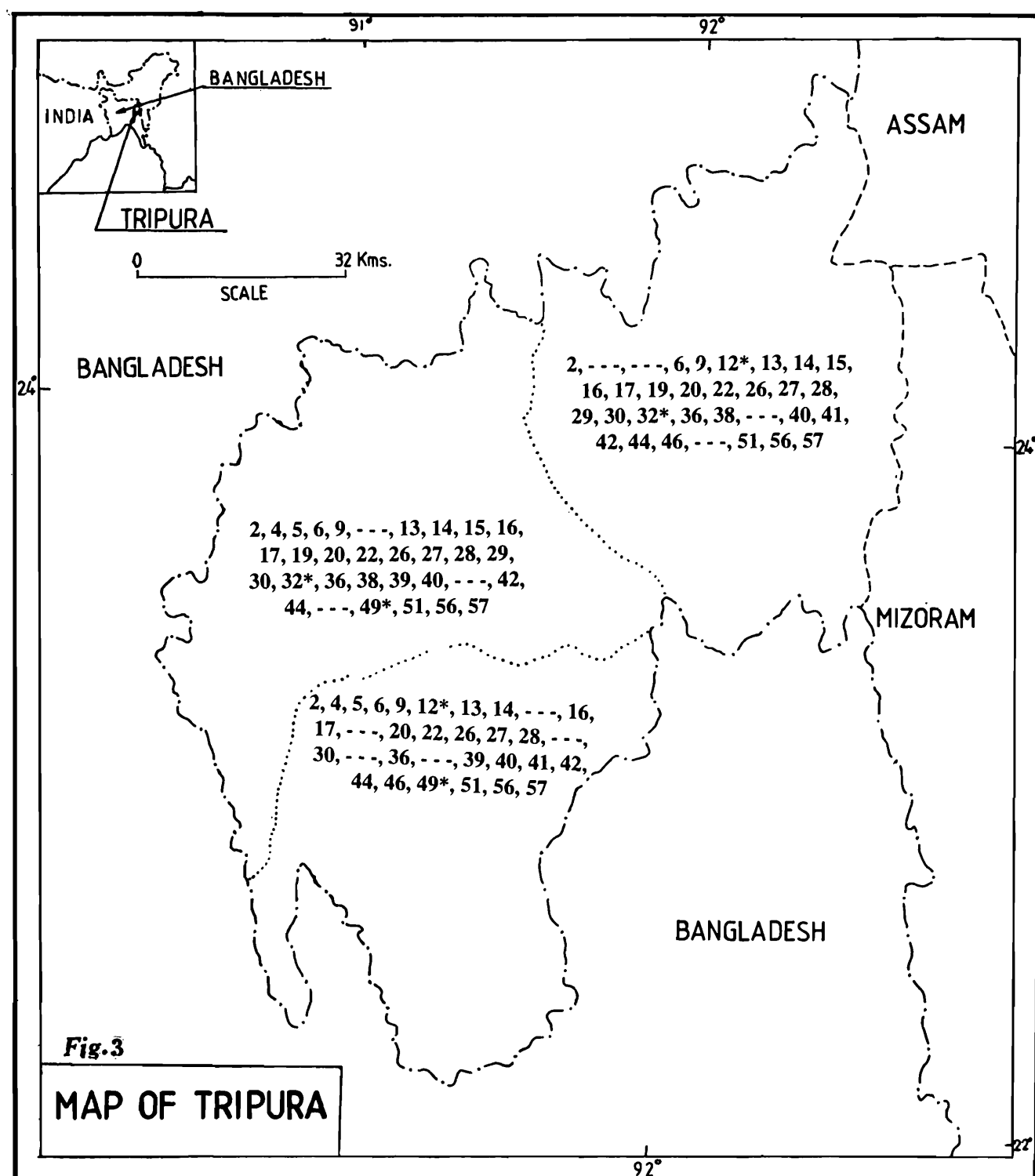
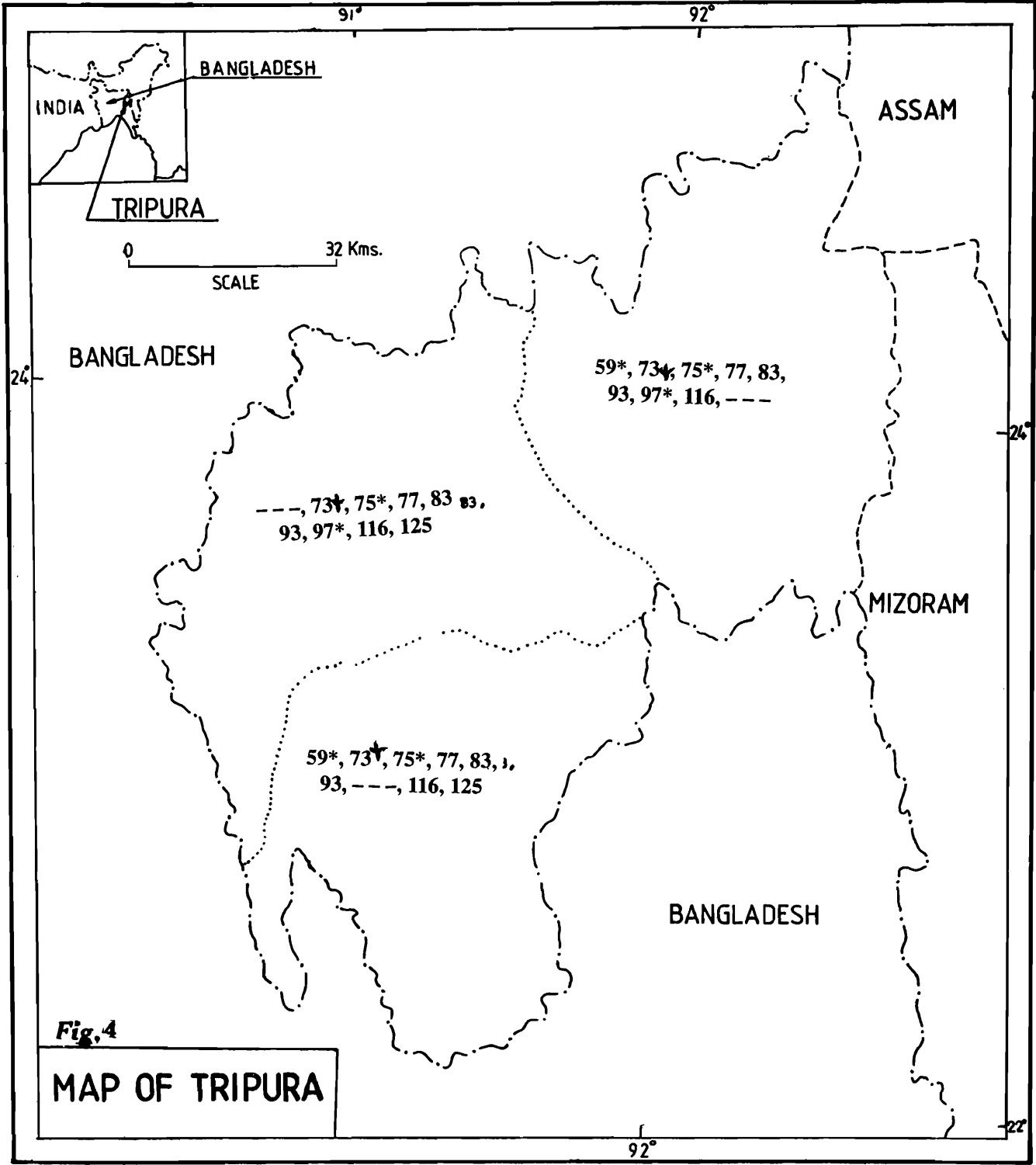


Fig. 2. Isospecific line of Interdistrict faunal distribution : Butterflies.

[Plotted digitals denote serial number of species and sub-species, as in the text based on up-to-date record of the state fauna established. *, new record for Tripura; †, endemic in N. E. India.]



Figs. 3. Heterospecific line of intradistrict distribution of the state fauna : Moths.



Figs. 4. Isospecific line of interdistrict distribution of the state fauna : Moths.

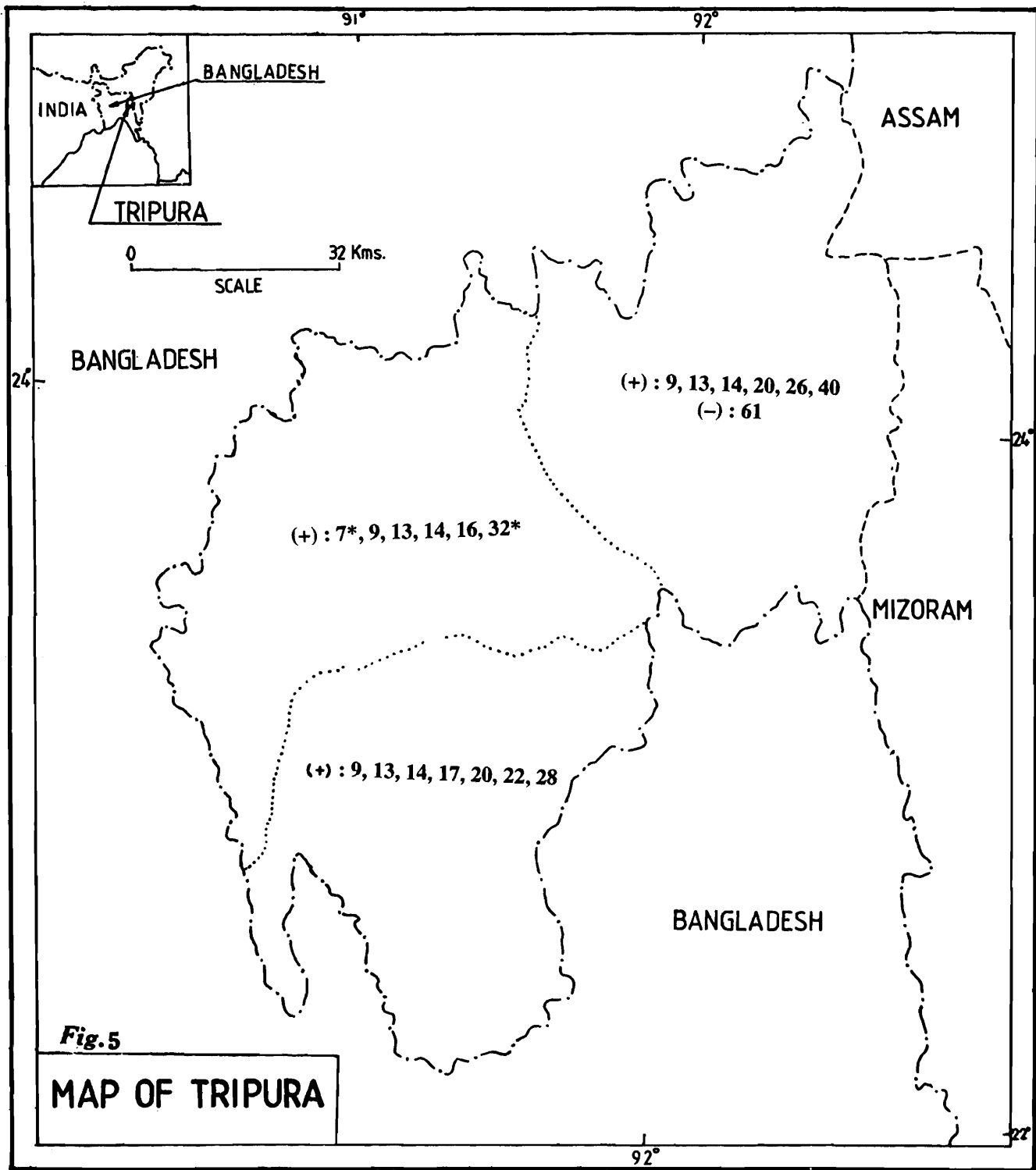


Fig. 5. Frequency status of some of the members of Lepidoptera under report : (+), very common; (-) : very rare.

Table-I. District-Wise Distribution of Lepidoptera from Tripura

[*, new record for Tripura; **new record for whole of N.E. India;+, known distribution in the state; ++, district-wise confirmation of earlier records of state fauna.]

Sl. No.	Name of species/subspecies	Districts		
		North	West	South
A	B	C	D	E
1.	<i>Graphium doson axion</i>	—	—	*
2.	<i>Atrophaneura aristolochiae aristolochiae</i>	++	++	+
3.	<i>Troides helena cerberus</i>	—	++	—
4.	<i>Chilasa clytia clytia</i>	—	++	+
5.	<i>Princeps memnon agenor</i>	—	+	+
6.	<i>P. polytes romulus</i>	+	++	+
7.	<i>P. demoleus demoleus</i>	—	*	—
8.	<i>Delias pasithoë</i>	—	+	
9.	<i>D. descombesi descombesi</i>	++	++	++
10.	<i>D. agostina agostina</i>	—	—	*
11.	<i>D. eucharis</i>	—	+	—
12.	<i>D. hyparete indica</i>	*	—	*
13.	<i>Pieris canidia indica</i>	++	++	++
14.	<i>Catopsilia pomona pomona</i>	+	++	++
15.	<i>C. pyranthe pyranthe</i>	+	+	—
16.	<i>C. florella gnoma</i>	++	++	++
17.	<i>Terias hecabe contubernalis</i>	++	++	++
18.	<i>Tirumala limniace leopardus</i>	—	+	—
19.	<i>Danaus genutia genutia</i>	++	++	—
20.	<i>D. chrysippus chrysippus</i>	++	++	++
21.	<i>Euploea mulciber muleiber</i>	+	—	—
22.	<i>E. core core</i>	++	++	++
23.	<i>Mycalesis visala visala</i>	—	*	—
24.	<i>Ypthima inica</i>	+	—	—
25.	<i>Y. ceylonica huebneri</i>	+	—	—
26.	<i>Y. baldus baldus</i>	++	++	+
27.	<i>Orsotrioena medus medus</i>	++	++	+
28.	<i>Melanitis leda ismene</i>	++	++	++
29.	<i>Elymnias hypermnestra undularis</i>	++	++	—
30.	<i>E. malelas malelas</i>	+	+	+
31.	<i>Polyura arja</i>	+	—	—

Sl. No.	Name of species/subspecies	Districts		
		North	West	South
A	B	C	D	E
32.	<i>Tanaecia lepidea</i>	*	*	—
33.	<i>Moduza procris procris</i>	—	—	++
34.	<i>Lebadea martha</i>	—	—	*
35.	<i>Athyma nefte</i>	*	—	—
36.	<i>Neptis hylas</i>	+	++	++
37.	<i>N. yerburii</i>	—	*	—
38.	<i>Precis iphita</i>	++	++	—
39.	<i>Junonia lemonias</i>	—	++	++
40.	<i>J. atlites</i>	++	++	++
41.	<i>J. hierta</i>	+	—	++
42.	<i>J. almana</i>	+	++	++
43.	<i>Cethesia cyane</i>	—	*	—
44.	<i>Ariadne ariadne</i>	+	++	+
45.	<i>A. merione</i>	—	+	—
46.	<i>Zemeros flegyas indicus</i>	+	—	+
47.	<i>Catapaecilma major anais</i>	*	—	—
48.	<i>Rapala varuna orseis</i>	—	*	
49.	<i>Castalius rosimon rosimon</i>	—	*	*
50.	<i>Coladenia agni agni</i>	—	+	—
51.	<i>Tagiades japetus ravi</i>	+	++	+
52.	<i>Notocrypta curvifascia curvifascia</i>	+	—	—
53.	<i>Matapa aria</i>	+	—	—
54.	<i>M. druna</i>	+	—	—
55.	<i>Telicota ancilla bambusae</i>	—	+	—
56.	<i>Parnara naso bada</i>	+	+	+
57.	<i>Pelopidas mathias mathias</i>	++	++	+
58.	<i>Baoris farri farri</i>	+	—	—
59.	<i>Cricula trifenestrata</i>	*	—	*
60.	<i>Eupterote fabia</i>	—	+	—
61.	<i>Sphingonaepiopsis pumilio</i>	+	—	—
62.	<i>Macroglossum insipida insipida</i>	—	+	—
63.	<i>Hippotion boerhaviae</i>	—	*	—
64.	<i>Theretra nessus</i>	—	*	—
65.	<i>T. suffusa</i>	—	*	—
66.	<i>Arguda sp.</i>	+	—	—

Sl. No.	Name of species/subspecies	Districts		
		North	West	South
A	B	C	D	E
67.	<i>Trypanophora semihyalina</i>	+	—	—
68.	<i>Eterusia aedea edocla</i>	—	*	—
69.	<i>Susica pallida</i>	—	—	+
70.	<i>Phocoderma velutinum</i>	—	+	—
71.	<i>Altha nivea</i>	—	+	—
72.	<i>Xyleutes mineus</i>	*	—	—
73.	<i>Ceryx imaon sargania</i>	++	++	++
74.	<i>C. godartii</i>	—	—	*
75.	<i>Amata atkinsoni</i>	*	*	*
76.	<i>A. sperbius</i>	—	—	+
77.	<i>A. cyssea</i>	++	++	++
78.	<i>A. georgina</i>	—	*	—
79.	<i>Eressa confinis catoria</i>	+	—	—
80.	<i>Psichotoe duvauceli</i>	—	*	—
81.	<i>Euchromia polymena</i>	—	—	*
82.	<i>Dasychira lineata</i>	—	+	—
83.	<i>Leucoma submarginata hipparia</i>	++	++	+
84.	<i>Pendria</i> sp.	—	+	—
85.	<i>Lymantria</i> sp.	—	+	—
86.	<i>Euproctis</i> sp.	+	—	—
87.	<i>Perina pura</i>	—	+	—
88.	<i>Asota caricae caricae</i>	—	+	—
89.	<i>Asura semifascia</i>	—	*	—
90.	<i>Miltochrista cuneonotata</i>	—	*	—
91.	<i>Spilarctia casigneta</i>	+	—	—
92.	<i>Cretonotus gangis</i>	+	—	—
93.	<i>C. transiens</i>	++	+	++
94.	<i>Eligma narcissus</i>	**	—	—
95.	<i>Tigrioides leucanoides</i>	*	—	—
96.	<i>Eilema vicaria</i>	*	—	—
97.	<i>Oeonistis entella</i>	*	*	—
98.	<i>Cyana puella</i>	—	**	—
99.	<i>C. bianca</i>	*	—	—
100.	<i>Episteme adalatrix</i>	—	+	—
101.	<i>Pseudaletia separata</i>	—	—	+

Sl. No.	Name of species/subspecies	Districts		
		North	West	South
A	B	C	D	E
102.	<i>Cirphis yu</i>	+	-	-
103.	<i>Prodenia litura</i>	-	+	-
104.	<i>Laphygma exigua</i>	-	-	+
105.	<i>Parallelia fulvotaenia</i>	-	-	+
106.	<i>Chalciope hyppasia</i>	+	-	-
107.	<i>Mocis undata</i>	+	-	-
108.	<i>Pericyma umbrina</i>	-	-	+
109.	<i>Fodina oriolus</i>	-	+	-
110.	<i>Hypocala moorei</i>	+	-	-
111.	<i>Erebus ephesperis</i>	-	*	-
112.	<i>Ischyja manlia</i>	-	*	-
113.	<i>Adris tyrannus</i>	-	-	+
114.	<i>Ophideres hypermnestra</i>	-	-	+
115.	<i>Raparna</i> sp.	-	+	-
116.	<i>Euchera nigralbata superstigmata</i>	++	+	+
117.	<i>Micronia aculeata</i>	-	+	-
118.	<i>Zamarada translucida</i>	+	-	-
119.	<i>Hyposidra talaca</i>	-	+	-
120.	<i>Boarmia boarmiaria</i>	-	*	-
121.	<i>B. alienaria</i>	-	*	-
122.	<i>Medasina strixaria</i>	-	*	-
123.	<i>Eumelea rosalia</i>	+	-	-
124.	<i>Agathia lycaenaria</i>	*	-	-
125.	<i>Tryporyza incertulas</i>	-	++	+
126.	<i>Pycnarmon cribrata</i>	-	-	+
127.	<i>Dichocrosis punctiferalis</i>	-	-	*
128.	<i>Botyodes asialis</i>	-	*	-
129.	<i>Diaphania laticostalis</i>	-	-	+
130.	<i>D. unionalis</i>	-	-	+
131.	<i>D. indica</i>	-	+	-
132.	<i>Glyphodes caesalis</i>	-	-	*
133.	<i>Heortia vitessoides</i>	-	*	-
134.	<i>Leucinodes orbonalis</i>	-	+	-
135.	<i>Psara phaeopteralis</i>	-	-	+

APPENDIX

[Material data of Lepidoptera examined from Tripura]

Code entry to the 'Material examined' under each element in the text referable to its serial number given.**, material collected "at light"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
I	Kailasahar	North	2, 7.xii. 1988	9	2		36-40	<i>R. C. Basu</i>
				12		1	38	"
				20	1		28	"
				26		2	15-18	"
II	Baramura	"	4.xii. 1988	16		2	25-30	"
				17		2	18-25	"
				26		1	15	"
III	Ambassa (alt. c 200 m)	"	5, 10.xii. 1988	20		1	38	"
				22	1	1	40-45	"
				28	1		38	"
				40	1		26	"
			22.ii.,	2	1	1	42-45	<i>G. K. Srivastava</i>
			2, 5, 6.iii.	75	1		13	"
			1991	77	1		14	"
			2, 6.iii. 1991	13		1	25	<i>R. C. Basu</i>
				19		1	42	"
				26		1	16	"
				38		2	30	"
				47		1	14	"
			25.v.	72	1		44	<i>B. C. Das</i>
			1992	93	1		19	"
				116		1	36	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
IV	Manu	North	8.xii.1988	9		1	40	<i>R. C. Basu</i>
				13		1	25	"
				17	1		20	"
				40		1	28	"
V	Unakoti	"	9.xii.1988	9	2	1	35-40	"
				13		1	25	"
				17	1		20	"
				40		1	26	"
				57		1	16	"
VI	Pacharthol, Dharmanagar	"	11.xii.1988	32	1	1	30-35	"
				59	1		35	"
VII	Panisagar, Dharmanagar	"	12.xii.1988	29		1	32	"
				83	1		15	"
VIII	Jirania	"	16.xii.1988	27		1	26	"
				40	2	1	26-30	"
IX	Kurti, Dharmanagar	"	18.xii.1988	13		1	30	"
X	Salema	"	28.ii.1991	124 **	1		17	<i>G. K. Srivastava</i>
XI	Jadurambari Beat, Abhoya	"	1.iii.1991	22	1		40	"
				26		1	15	"
				27	1		22	"
				35		1	27	"
XII	Kamalpur	"	12.ii.1992	73	1		13	<i>R. S. Barman</i>
				75	1		13	"
XIII	Kumarghat	"	27, 29.ii. 1992	9	1		38	"
				13		1	30	"
				94	1		35	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
				95		1	21	<i>R. S. Barman</i>
				96 **	1		14	"
				97 **	2		18	"
				99 **	1		13	"
XIV	Sikaribatri	North	24.v.1992	73		1	14	<i>B. C. Das</i>
XV	Teliamura	West	3.xii.1988	13	1		22	<i>R. C. Basu</i>
				43		1	38	"
			2.xi.1991	40		1	30	<i>B. N. Das</i>
			17.ii.1992	77	1		16	<i>R. S. Barman</i>
			27.ii.1992	16		1	30	"
				38	1	1	24-30	"
XVI	Sonamura	"	6.xii.1988	7		1	46	<i>R. C. Basu</i>
				17	1	2	18-25	"
				22		2	50	"
				36		1	24	"
				49	1		13	"
			16.vi.1990	4	1	1	46	<i>G. N. Saha</i>
				16		1	30	"
				64		1	50	"
			24.ii.1991	22	1		40	<i>K. K. Ray</i>
			6.xi.1991	29	2		32	<i>B. N. Das</i>
				32	1	1	30-35	"
XVII	Sipahijala	"	11, 16-18,	2	1		42	<i>R. C. Basu</i>
			27.xii.1988	13	1		22	"
				17	1	1	18-25	"
				20		4	36-40	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
				22	1	4	40-50	<i>R. C. Basu</i>
				23	1		28	"
				28		1	38	"
				42		2	27	"
				44		2	25	"
				112		1	42	"
			14, 15.vi. 1990	57		1	20	<i>G. N. Saha</i>
				64 **		2	55-56	"
				65 **		2	43-45	"
				68 **	1		30	"
				89 **	1		8	"
				98 **		1	11	"
				111 **	1		45	"
				120 **	1		22	"
				121 **	1		20	"
				133 **	7		15-18	"
			24.ii.1991	22	2		40	<i>G. K. Srivastava</i>
				36	1	1	22-24	"
			5.xi.1991	122	1		40	<i>B. N. Das</i>
			27.xii.1991	17	1	1	18-25	<i>M. Dutta</i>
				64	1		46	"
			17.ii.1992	26	1	1	15-18	<i>R. S. Barman</i>
				32		2	33-35	"
			11.v. 1992	20		1	38	<i>B. C. Das</i>
XVIII	Jegendranagar	West	18.xii.1988	22		1	50	<i>R. C. Basu</i>
				23		1	28	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
XIX	Simna	West	6.vi.1990	27	1		22	<i>R. C. Basu</i>
				14		3	28-32	<i>G. N. Saha</i>
				17	1	2	18-25	"
				19		1	42	"
				48		1	15	"
				125		1	12	"
			29.x.1991	22	1	1	40-45	<i>B. N. Das</i>
				39		1	26	"
			7.vi.1990	17		1	25	<i>G. N. Saha</i>
			28.x.1991	29		1	32	<i>B. N. Das</i>
XXI	Baranagar	"	15.vi.1990	75	1		13	"
				2		1	45	<i>G. N. Saha</i>
				4	1		46	"
				6	1		35	"
				7	1	2	38-46	"
XXII	Bagma	"	17.vi.1990	14		1	30	"
				3		1	80	"
				22	1		50	"
			5.xi.1991	17		1	25	<i>B. N. Das</i>
				19	2		42	"
				22	2		50	"
				32	1		30	"
XXIII	Golaghati	"	20.vi.1990	22		1	50	<i>G. N. Saha</i>
XXIV	Kunjaban, Agartala	"	19,20.ii.1991	26	1	1	15-18	<i>G. K. Srivastava</i>
				39	1		20	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
XXV	Kalabagan, Agartala	West	20, 29.ii.1991	22		3	45-50	<i>G. K. Srivastava</i>
				28	1		38	"
				36		2	24	"
				75	1		13	"
XXVI	Khowai	"	4.iii.1991	7	1	1	40-45	"
				27		1	26	"
				37	1		19	"
				51		1	22	"
				77	1		14	"
				78	1		12	"
				80	1		8	"
XXVII	Amarpur	"	5.iii.1991	6		1	50	"
				28		1	40	"
			2.xi.1991	17		2	20-25	<i>B. N. Das</i>
				73	1		14	"
				128	1		20	"
XXVIII	Champaknagar	"	8.iii.1991	6		1	48	<i>G. K. Srivastava</i>
XXIX	Jhampujhola	"	7.xi.1991	63		1	25	<i>B. N. Das</i>
				83		1	17	"
				97	1		18	"
				98	1		12	"
XXX	Malagarh	"	15.ii.1992	9	1		38	<i>R. S. Barman</i>
XXXI	Atharamura	"	25.ii.1992	13		2	25-28	"
XXXII	Agartala	"	2.iii.1992	90	1		15	<i>R. S. Barman</i>
			28.v.1992	75	1		13	<i>B. C. Das</i>
XXXIII	Abhoynagar, Agartala	"	8.v.1992	20		1	40	"

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
XXXIV	Paratia	South	30.xi.1988	40		1	28	<i>R. C. Basu</i>
XXXV	Trishna	"	?	14		3	28-32	"
			?	34		1	30	"
			?	36		1	24	"
XXXVI	Jatanbari	"	10.vi.1990	40		1	30	<i>G. N. Saha</i>
XXXVII	Nalcharbazar	"	18.vi.1990	1	1		38	"
				22		1	50	"
				41		1	26	"
XXXVIII	Shantibazar	"	22.ii.1991	16		1	30	<i>G. K. Srivastava</i>
				22	1		48	"
XXXIX	Udaipur	"	23, 24, 25.ii 1991	39		1	26	"
				93 **	2		22	"
				127 **	1		11	"
				132		1	15	"
			11.xi.1991	9		1	40	<i>B. N. Das</i>
			19.ii.1992	75	3		12-13	<i>R. S. Barman</i>
XL	Belonia	"	25.ii.1991	73	1		1	<i>G. K. Srivastava</i>
			12.xi.1991	10		1	38	<i>B. N. Das</i>
			13.v.1992	42		2	27	<i>B. C. Das</i>
XLI	Sabrum	"	10.xi.1991	36	1		22	<i>B. N. Das</i>
			3, 5, 6, 12.i 1992	9	1	3	35-40	<i>M. Dutta</i>
				20	1	2	28-40	"
				74	1		15	"
				77	1		13	"
XLII	Chandrapur	South	28.xii.1991	9	1		36	<i>M. Dutta</i>

Code	Collecting station	District	Date coll.	Sl. No. of Sp./ssp.	Number of Ex.		Fore Wing Length (in mm)	Party coll.
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
				10		1	38	"
XLIII	Pulikhet	"	29.xii.1991	9	1		40	"
				17		1	25	"
				28	2		38	"
				81	1		21	"
XLIV	Jalefa	"	4.i.1992	12		1	38	"
				28		2	40	"
XLV	Manughat	"	5.i.1992	20	1	2	28-38	"
XLVI	Kanthalchhari	"	6.i.1992	9	1	4	35-40	"
				10		1	38	<i>M. Dutta</i>
XLVII	Salambari	"	20.ii.1992	13	1		24	<i>R. S. Barman</i>
				33		1	32	"
XLVIII	Lebachusa	"	"	59		1	37	"
XLIX	Narcolbagan	"	21.ii.1992	49	1		15	"
				74		1	14	"
L	Baksnagar	"	2.iii.1992	28	1		38	"

Table-II. Numerical Summary of District-wise Distribution of Tripura Lepidoptera

Districts	No. of exclusive intra-district species/subspp.		Total	No. of common inter-district species/subspp.		Total
	Butterflies	Moths		Butterflies	Moths	
North	10	19	29	28	8	36
West	12	33	45	29	8	37
South	4	16	20	27	8	35
Total :	26	68	94	32	9	41
Grand total :						135

N. B. : Sum total of common inter-district elements i.e. (E mean tally & mean gaps, as in figs. 3-4) + Sum total of exclusive intra-district elements (cf. figs. 1 & 2).
 = Actual number of spp./subspp. dealt with from Tripura (*vide* Table I).

INSECTA : HYMENOPTERA : APOIDEA AND VESPOIDEA

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INTRODUCTION

The families Apidae, Anthophoridae, Megachilidae and Xylocopidae belonging to the superfamily Apoidea, which include the bees and the families Vespidae and Eumenidae which belong to superfamily Vespoidea, which comprise the wasps, for the group Aculeata, of order Hymenoptera, These bees and wasps existed in forests long before man appeared on this planet Earth. Afterwards, with the advancement of human civilisation, these insects approached further, upto their domestic habitations. The nests of these social insects are often, a common sight in jungles and sometimes amidst human huts. Their nests can be seen hanging from tree- branches or twigs, where their polymorphic colony live. The bees and wasps fly over the flower gardens and collect pollen, nectar and produce honey from these to feed their young ones. By frequenting over the flowers, the bees and wasps propagate pollination of flowers. So, these colourful bees and wasps are economically important. They may also be found around the sweet meat shops. The honey derived from beehive is widely prescribed for medical use in various human ailments, whereas, the wasp-larvae are used as bait for angling of fishes. The carpenter bees (*Xylocopa*) do some damage to the trees by making holes, while they build nests there. The sting of bee and wasp is fierce and painful, when they bite some one. Due to predatory habit, the wasps play an important role in controlling the agricultural insect-pests.

There is no particular record of Superfamilies Apoidea and Vespoidea, pertaining to the families cited above from the state of Tripura; but from the literature by Bingham (1897) Maa (1938), Chhotani and Ray (1975), Batra (1977) and Das and Gupta (1983), where some species were noted, as distributed throughout India. Hence, all the 16 species of Apoidea and Vespoidea, (excluding vespidae) mentioned here, are all new locality records, from Tripura.

The morphological characters of the 'Superfamily Apoidea', comprising the families mentioned above are having the following characters : Length of the specimens varies from 3-30 mm. in length; antenna 13-segmented in male, 12-segmented in female, geniculate, stout or filiform; eyes small or moderately large in male Xylocopa; thorax globose or subglobose or ovate in shape; forewing with 1-3 cubital cells, hindwing with anal and other closed cells; abdomen 7-segmented in male, 6-segmented in female; thoracic hairs branched or plumose; wings at rest with or without a longitudinal fold; posterior tarsal joint dilated.

Similarly, the morphological characters of 'Superfamily Vespoidea', comprising the above cited families, are having the following characters : length of the specimens varies from 11-32 mm.; antenna 13-segmented in male, 12-segmented in female, eyes emarginate; forewing with I Discoidal cell elongate and longer than submedian cell, hindwing with anal and other closed cells; legs are of moderate length, without spines, trochanters

undivided, midtibia with 1 or 2 apical spurs, posterior tarsal joint not dilated, tarsal claws toothed; thorax and gaster joined by a long, slender, short petiole; sting without sheath; male genitalia with spiniform paramere; Wings at rest with a longitudinal fold; abdomen 7-segmented in male 6-segmented in female; thoracic hairs not branched or plumose.

SYSTEMATICS

There are 600 species of Family Apidae in India, while 5,000 species are known from the world; 30 species of family Anthophoridae known in India, while 220 species are recorded from the world; 60 species of Megachilidae known in India, while 250 species are found from the world; 30 species of family Xylocopidae recorded in India, while 150 species are reported from the globe.

Similarly, 130 species of family Eumenidae recorded in India, while 300 species are noted from the world.

MATERIAL AND METHOD

An attempt has been made here to provide a consolidated account of the families Apidae, Anthophoridae, Megachilidae and Xylocopidae (Apoidea) and Eumenidae (Vespoidea) from Tripura, based on the collection by Zoological Survey of India parties, during 1974, 1991-1993.

The keys to the families, genera and species for the identification of various taxa, taxonomic terms alongwith Diagrams, Distributional Table and Map, are provided for ready reference.

TAXONOMIC TERMINOLOGY

The terms of morphological characters used in the present work are mainly based on the works by Bingham (1897), Maa (1938) and Batra (1977); morphological terms are illustrated in figures A (1-8).

SYSTEMATIC ACCOUNT

Superfamily APOIDEA

Family I. APIDAE

Genus 1. *Apis* Linnaeus, 1767

1. *Apis* (*Megapis*) *dorsata* Fabricius, 1793
2. *Apis indica* Fabricius, 1793
3. *Apis* (*Micrapis*) *florea* Fabricius, 1787

Genus 2. *Ceratina* Latreille, 1805

4. *Ceratina viridissima* Guerin, 1829
5. *Ceratina propinqua* Cameron, 1897

Genus 3. *Melipona* Illeger, 1806

6. *Melipona canifrons* Smith, 1858
7. *Melipona smithii* (Smith), 1859

Genus 4. *Nomia* Latreille, 1805

8. *Nomia ellioti* Smith, 1875

Family II. ANTHOPHORIDAE

Genus 1. *Anthophora* Latreille, 1802

9. *Anthophora bicincta* Fabricius, 1793
10. *Anthophora confusa* Smith, 1854
11. *Anthophora zonata* (Linnaeus), 1758

Family III. MEGACHILIDAE

Genus 1. *Megachile* Latreille, 1802

12. *Megachile lanata* (Fabricius), 1792

Family IV. XYLOCOPIDAE

Genus 1. *Xylocopa* Latreille, 1802

13. *Xylocopa latipes* Drury, 1770
14. *Xylocopa* (*Zonohirsuta*) *collaris binghami* Maa 1938
15. *Xylocopa leucothorax* (De Geer), 1758

Subfamily VESPOIDEA

Family EUMENIDAE

Genus 1. *Eumenes* Latreille, 1805

16. *Eumenes conica* (Fabricius), 1787

Key to the Superfamilies of APOIDEA and VESPOIDEA

1. Tongue long and acute at apex; wings at rest with or without a longitudinal fold; thoracic hairs branched or plumose and posterior basal tarsal joint dilated APOIDEA
- Tongue moderate, not so long and acute at apex; wings at rest with a longitudinal fold, thoracic hairs not branched or plumose and posterior basal tarsal joint not dilated..... VESPOIDEA

Superfamily APOIDEA

Key to the Families of APOIDEA

1. Bees, attain sizes upto 30 mm. in length XYLOCOPIDAE
- Bees, attain sizes below 30 mm. in length.....2
2. Tongue long and acute APIDAE
- Tongue not so long and acute 3
3. Forewing with 3 cubital cells ANTHOPHORIDAE
- Forewing with 2 cubital cells MEGACHILIDAE

Family I. APIDAE

Tongue short and acute or long, never emarginate; hind tibiae with corbicula, pygidial plate absent; penis of male drone, much enlarged.

Nests are built in various ways by different bees, of this family viz., large nests 3-4 ft. in diameter, by 'true honey bees' [*Apis (Megapis) dorsata* Fabr.] built on a tree- branch; in ground by Anthphora bees'; in hard earth of bank or on

flat ground beneath the pile raised, home by 'Nomia bees'; in hollow of dead shoots by 'Ceratimid bees' and in tree-holes or rock-crevices by Melipone bees'.

Key to the genera of Apidae

1. Forewing with 1 cubital cell*Meliona* Illeger
- Forewing with 3 cubital cells 2
2. Maxillary palpi 1-jointed*Apis* Linnaeus
- Maxillary palpi 6-jointed 3
3. Specimens with metallic-coloured body*Ceratina* Latreille
- Specimens with non-metallic coloured body*Nomia* Latreille

Genus 1. *Apis* Linnseus

Key to the species of Apis

1. Specimens attain 16-18 mm. in length and can produce more honey*dorsata* Fabricius
- Specimens attain 8-12 mm. in length and can produce less honey 2
2. Head and thorax black; the basal 5 abdominal segments are testaceous yellow*indica* Fabricius
- Head and thorax dull, opaque; The basal 2 abdominal segments are more or less red*floreana* Fabricius

1. *Apis (Megapis) dorsata* Fabricius

1793. *Apis dorsata* Fabricius. *Ent. Syst.*, 2 : 328.

1904. *Apis (Megapis) dorsata* Fabricius : Ashmead, *Proc. Ent. Soc. Wash.*, 6 : 120.

1985. *Apis (Megapis) dorsata* Fabricius : Roy and Kundu, *Rec. Zool. Surv. India*, 82 (1-4) : 221.

Material examined : India : Tripura : North Tripura : Pecharthal, 2 Females 20. v. 1992, Coll. M. Sil.

Diagnostic characters : The species can readily be recognised by its big size among the bees and for its humming sound.

Distribution : India : Tripura (North Tripura), Throuthout India.

Elsewhere : Sri Lanka, Myanmar, China, Malayasia, Java.

Remarks : These bees build nest 3-4 feet in diameter.

2. *Apis indica* Fabricius

1798. *Apis indica* Fabricius, *Ent. Syst.* (Suppl.) p. 274.

1985. *Apis indica* Fabricius : Roy and Kundu, *Rec. Zool. Surv. India*, **82** (1-4) : 221.

Material examined : India : Tripura : West Tripura : Sonamura, 2 Males, 20. v. 1992, Coll. M. Sil.

Diagnostic characters : These are medium-sized, among the honey bees and make less humming sound.

Distribution : India : Tripura (West Tripura) : Assam, Throuthout India.

Elsewhere : Sri Lanka, Myanmar, Malayasia, Madagascar.

3. *Apis (Micrapis) florea* Fabricius

1787. *Apis florea* Fabricius, *Mant. Ins.*, **1** : 305.

1904. *Micrapis florea* Fabricius : Ashmead, *Proc. Ent. Soc. Wash.*, **6** : 120.

1985. *Apis (Micrapis) florea* Fabricius : Roy and Kundu, *Rec. Zool. Surv. India*, **82** (1-4) : 222.

Material examined : India : Tripura : North Tripura : Kumarghat, 1 Male, 1 Female, 20. v. 1992, Coll. M. Sil.

Diagnostic characters : This is the smallest species among honey bees and produce very little amount of honey.

Distribution : India : Tripura (North Tripura), Kumaun(U. P.), Central India, Rajasthan, West Bengal, Sikkim, Assam.

Elsewhere : North-west Provinces, Myanmar, Sri Lanka, Malayasia, Java.

Genus 2. *Ceratina* Latreille

Key to the species of *Ceratina*

1. Specimens bright green and blue, metallic in colour; length 8-10 mm. *viridissima* Guerin
- Specimens dark, bluish green in colour; length 4-5 mm. *propinqua* Smith

4. *Ceratina viridissima* Guerin

1845. *Ceratina viridis* Guerin, *Icon. Regn. Anim. Insect*, p. 449.

1975. *Ceratina viridissima* (Guerin) : Chhotani and Ray, *Rec. Zool. Surv. India*, **71** : 31-32.

Material examined : India : Tripura : West Tripura : Hawabari, 2 Females, 11. v. 1992, Coll. S. K. Chakraborty.

Diagnostic characters : Legs with a greenish or bluish tint and covered with hoary white pubescence.

Distribution : India : Tripura (West Tripura), Assam, Punjab, Rajasthan.

Elsewhere : Myanmar, Sri Lanka, China, Malacca.

Remarks : Nests are built in hollow of dead shoots of branching bamboo or tunnelled into the dead stem of common plants.

5. *Ceratina propinqua* Cameron

1897. *Ceratina propinqua* Cameron, *Mem. Manch. Lit. Phil. Soc.*, **41** : 501.

Material examined : India : Tripura : North Tripura : Kumarghat: Pabia Char, 2 Females, 1 Male, 17. v. 1993, Coll. B. Mitra.

Diagnostic characters : An elongate pyramidal spot on the clypeus, is present.

Distribution : India : Tripura (North Tripura) : Uttar Pradesh (Moosouri).

Genus 3. *Melipona* IllegerKey to the species of *Melipona*

1. Abdomen entirely black, in colour.....
*canifrons* Smith
 — Abdomen more or less testaceous, in colour
*smithi* (Smith)

6. *Melipona smithi* (Smith)

1859. *Trigona ruficornis* Smith. *Trans. Zool. Soc.*, 7 : 194.
 1897. *Melipona smithi* (Smith) Bingham, *Fauna Brit. India*, (Hymenoptera), 1 : 563.

Material examined : India : Tripura : West Tripura : Khasia Mangal, 2 Females, 2 Males, 9. v. 1992, Coll. B. Mitra.

Diagnostic characters : Head, thorax and abdomen smooth and shining.

Distribution : India : Tripura (West Tripura).

Elsewhere : North West Provinces (Manipuri), Myanmar.

Remarks : These bees are commonly known as Dammer or stingless bees and build nests in hollows of trees or among rock-crevices.

7. *Melipona canifrons* Smith

1758. *Trigona canifrons* Smith. *J. Linn. Soc.*, 2 : 51.
 1897. *Melipona canifrons* Smith : Bingham, *Fauna Brit. India* Hymenoptera, 1 : 562.

Material examined : India : Tripura : North Tripura : Ananda Bazar, 1 Male, 26. v. 1992, Coll. M. Sil.

Diagnostic characters : Head and thorax thickly pubescent, abdomen highly polished and shining.

Distribution : India : Tripura (North Tripura).

Elsewhere : Myanmar, Indonesia.

Genus 4. *Nomia* Latreille8. *Nomia elliotii* Smith

1875. *Nomia elliotii* Smith. *Trans. Ent. Soc.*, p. 44.

1897. *Nomia elliotii* Smith : Bingham, *Faun. Brit. India*. 1 : 449.

Material examined : India : Tripura : North Tripura, Ambassa (Kulai), 2 Females, 15. v. 1992, Coll. M. Sil.

Diagnostic characters : The basal four abdominal segments with bright emerald green transverse fasciae on their apical margins.

Distribution : India : Tripura (North Tripura).

Elsewhere : Myanmar.

Remarks : Tongue short, trifid and plumed.

Family II. ANTHOPHORIDAE

These are solitary bees. Labrum broader than long; forewing with 3 submarginal cells, hind tibia with a scopa (not corbicula) armed with 2 spurs.

Nest made in soil, sometimes in large colonies.

Key to the species of *Anthophora*

1. Basal abdominal segment without a fascia....
 —*bicincta* (Fabr.)
 — Basal abdominal segment with a fascia.....2
 2. Pubescence on thorax dull rufo-fulvous
*zonata* (Linn.)
 — Pubescence on thorax fulvous or cinereous or mixed with black hairs*confusa* (Sm.)

Family ANTHOPHORIDAE

Genus 1. *Anthophora* Latreille9. *Anthophora confusa* Smith

1854. *Anthophora confusa* Smith. *Cat. Hym. Brit. Mus.*, 2 : 337.
 1975. *Anthophora confusa* Smith : Chhotani and Ray, *Rec. Zool. Surv. India*, 71 : 32.

Material examined : India : Tripura : West Tripura : Hawabari, 2 Females 1 Male, 11. v. 1992, Coll. B. Mitra.

Diagnostic characters : Legs covered with black pubescence and on posterior tibiae above these are snowwhite in colour.

Distribution : India : Tripura (West Tripura); Barrackpore, Bombay, Rajasthan, Ladak and Sikkim.

Elsewhere : Myanmar.

10. *Anthophora bicincta* (Fabricius)

1793. *Apis bicincta* Fabricius. *Syst. Ent.*, 2 : 338.

1897. *Anthophora bicincta* Fabricius : Bingham, *Fauna Brit. India* (Hymenoptera) 1 : 525.

Material examined : India : Tripura : North Tripura : Pecharthal, 2 Males, 20. v. 1992, Coll. M. Sil.

Diagnostic characters : Clypeus flat, transverse and margined anteriorly.

Distribution : India : Tripura (North Tripura); Uttar Pradesh, West Bengal, Karnataka, Tamil Nadu.

11. *Anthophora zonata* (Linnaeus)

1758. *Apis zonata* Linnaeus. *Syst. Nat.* (ed. 10), 1 : 576.

1985. *Anthophora zonata* (Linnaeus) : Roy and Kundu, *Rec. Zool. Surv. India*, 82 (1-4) : 222.

Material examined : Tripura : North Tripura : Kumarghat : Pabiachar; 1 Male, 17. v. 1992, Coll. B. Mitra.

Diagnostic characters : Pubescence on thorax dull rufo-fulvous.

Distribution : India : Tripura (North Tripura); throughout India

Elsewhere : Myanmar, Sri Lanka, Malaysia, Australia.

Family III. MEGACHILIDAE

The bees known as densely hairy leafcutter bees. Labrum longer than broad; 2 submarginal

cells in forewing of about equal length; the bees have "ventral scopa" in female; axillae not pointed; abdomen not elongated and eyes not hairy. Nest is domeshaped built with soil particles, small pebbles mixed with salivary secretion or indrawers of key holes of houses. Megachile bees act as host for Chalcids, belonging to the genus *Leucospis*.

Genus 1. *Megachile* Latreille

12. *Megachile lanata* (Fabricius)

1793. *Apis lanata* Fabricius. *Ent. Syst.*, 2 : 335.

1975. *Megachile lanata* (Fabricius) : Chhotani and Ray, *Rec. Zool. Surv. India*, 71 : 30.

Material examined : India : Tripura : North Tripura : Kumarghat (Pabia chara), 1 Male, 17. v. 1992, Coll. B. Mitra.

Diagnostic characters : Clypeus sublunate in shape, anteriorly transverse, legs with fulvous-red pubescence.

Distribution : India : Tripura (North Tripura) : Rajasthan; throughout India.

Elsewhere : Sri Lanka, Myanmar.

Family IV. XYLOCOPIDAE

The bees belonging to this family are known as carpenter bees or large hairy bees. They make loud buzzing sounds and sometimes enter our houses, also. These bees frequent flower gardens, collect pollens from there and help pollination of flowers. They make nests by making holes in trees or bamboos and thus cause damage to them, also.

In 'Xylocopa' clypeus is flat, the forewings are having 3 cubital cells, maxillary palpi 6-jointed, posterior tibiae densely pubescent and ocelli are present in a triangle on vertex; gaster generally bare dorsally; pygidial plate absent or represented by an apical spine; scopa present on legs.

Genus 1. *Xylocopa* Latreille :Key to the species of *Xylocopa*

1. Length of the specimens ranges upto 30 mm. and over; body covered with black and sooty brown pubescence *Latipes* (Drury)
- Length of the specimens ranges from 18-23 mm.; body covered with black pubescence ...
.....2
2. Thorax covered with black or brown pubescence *collaris* Lepel
- Thorax covered with yellow pubescence
..... *leucothorax* (De Geer)

13. *Xylocopa latipes* (Drury)1770. *Apis latipes* Drury, Ill. Exot. Ins., 2.1938. *Xylocopa latipes* (Drury) : Maa, Rec. Indian Mus., 40 : 325-327.

Material examined : India : Tripura : West Tripura : Singerbill, 2 Females, 10. v. 1992, Coll. B. C. Das.

Diagnostic characters : Scape of antenna distinctly flattened and broad at apex.

Distribution : India : Tripura (West Tripura) : Kumaun Terai; Central India; Sikkim; Assam; Barrackpore; Malabar; Coonoor.

Elsewhere : Myanmar, China, Malayasia.

14. *Xylocopa (Zonohirsuta) collaris binghami* (Lepel)1841. *Xylocopa collaris* Lepel. Hist. Nat. Ins. Hym., 2 : 189.1938. *Xylocopa (Zonohirsuta) collaris binghami* Maa. Rec. Ind. Mus., 40 : 301.1985. *Xylocopa (Zonohirsuta) collaris binghami* Roy and Kundu, Rec. Zool. Surv. India, 82 (1-4) : 223-224.

Material examined : India : Tripura : West Tripura : Kamala Sagar, 2 Females, 1 Male, 7. v. 1992, Coll. B. Mitra.

Diagnostic characters : Pronotum and mesonotum both are clothed with dense white pubescence.

Distribution : India : Tripura (West Tripura), Kumaon, Allahabad, Sikkim.

Elsewhere : Myanmar, Sri Lanka, Thailand, Malayasia.

15. *Xylocopa leucothorax* (De Geer)1758. *Apis aestuans* Linnaeus, Syst. Nat., 1 (10) : 79.1938. *Xylocopa leucothorax* (De Geer) : Maa, Rec. Indian Mus., 40 : 307-309.

Material examined : India : Tripura : West Tripura, Pulinpur, 1 Worker, B. Mitra, 10. v. 1992.

Diagnostic characters : Thorax wholly covered with yellow pubescence, a marked character to recognise the species.

Distribution : India : Tripura (West Tripura) : Assam, through India.

Elsewhere : Sri Lanka, Myanmar, Africa, Malayasia.

Superfamily VESPOIDEA

Key to the families of VESPOIDEA

1. Intermediate legs armed with 2 tibial calcar, tarsal claws simple; species social
..... VESPIDAE*
- Intermediate legs armed with 1 tibial calcar, tarsal claws bidentate or bifid; species solitary
..... EUMENIDAE

Family II. EUMENIDAE

This family includes the potter wasps. Forewing with 4 cubital cells. I abdominal segment, long, narrowed into a petiole, and the same is not narrowed at apex; maxillary palpi 6-jointed, labial palpi 4-jointed, antennae arched, stout or filiform (12-jointed in female and 13-

* Discussed in a separate article

jointed in male); legs slender, feebly armed; tongue elongate.

Genus 1. *Eumenes* Latreille

16. *Eumenes conica* (Fabricius)

1787. *Vespa conica* Fabricius. *Mant. Ins.*, 1 : 293.
1926. *Eumenes conica* (Fabricius) : Hingston, *J. Bombay Nat. Hist. Soc.*, 31 : 241.

Material examined : India : Tripura : South Tripura : Udaipur : Gargi, 1 Female, 4. xi. 1974, Coll. M. S. Shishodia.

Diagnostic characters : The base of II abdominal segment, and a short transverse medially interrupted band on its middle above, black.

Distribution : India : Tripura (South Tripura): throughout the plains of India.

Elsewhere : Sri Lanka, Myanmar, China, Malayasia.

Districtwise Distribution of Taxa of Families
Apidae, Anthophoridae, Megachilidae,
Xylocopidae, Vespidae and Eumenidae

Serial No.	Name of taxa	Distribution
1.	<i>Apis (Megapis) dorsata</i> Fabricius	Pecharthal, North Tripura.
2.	<i>Apis indica</i> Fabricius	Pulinpur, West Tripura.
3.	<i>Apis (Micrapis) florea</i> Fabricius	Kumarghat, North Tripura.
4.	<i>Ceratina viridissima</i> Guerin	Hawabari, West Tripura.
5.	<i>Ceratina propinqua</i> Smith	Pabiachar, Kumarghat, North Tripura.
6.	<i>Melipona smithi</i> (Smith)	Khasia Mangal, West Tripura.
7.	<i>Melipona canifrons</i> Smith	Ananda Bazar, North Tripura.

Serial No.	Name of taxa	Distribution
8.	<i>Nomia ellioti</i> Smith	Kulai, Ambassa, North Tripura.
9.	<i>Anthophora confusa</i> Smith	Hawabari, West Tripura.
10.	<i>Anthophora bicincta</i> (Fabricius)	Pecharthal, North Tripura.
11.	<i>Anthophora zonata</i> (Linnaeus)	Pabiachar, Kumar - ghat, North Tripura.
12.	<i>Megachile lanata</i> (Fabricius)	Radhapur, Dharamnagar, North Tripura.
13.	<i>Xylocopa latipes</i> (Drury)	Singerbill, West Tripura.
14.	<i>Xylocopa (Zonohirsuta) collaris binghami</i> (Lepel)	Kamalasagar, West Tripura.
15.	<i>Xylocopa leucothorax</i> (De Geer)	Pulinpur, West Tripura
16.	<i>Polistes (Megapolistes) olivaceous</i> (De Geer)	Ambassa, North Tripura.

SUMMARY

Altogether 21 species, belonging to 12 genera under 6 families, of Aculeate Hymenoptera (Apoidea and Vespoidea), have been discussed in this paper and all of which are new locality records from the state of Tripura; with synonymy, diagnostic characters, Distribution, Remarks and keys.

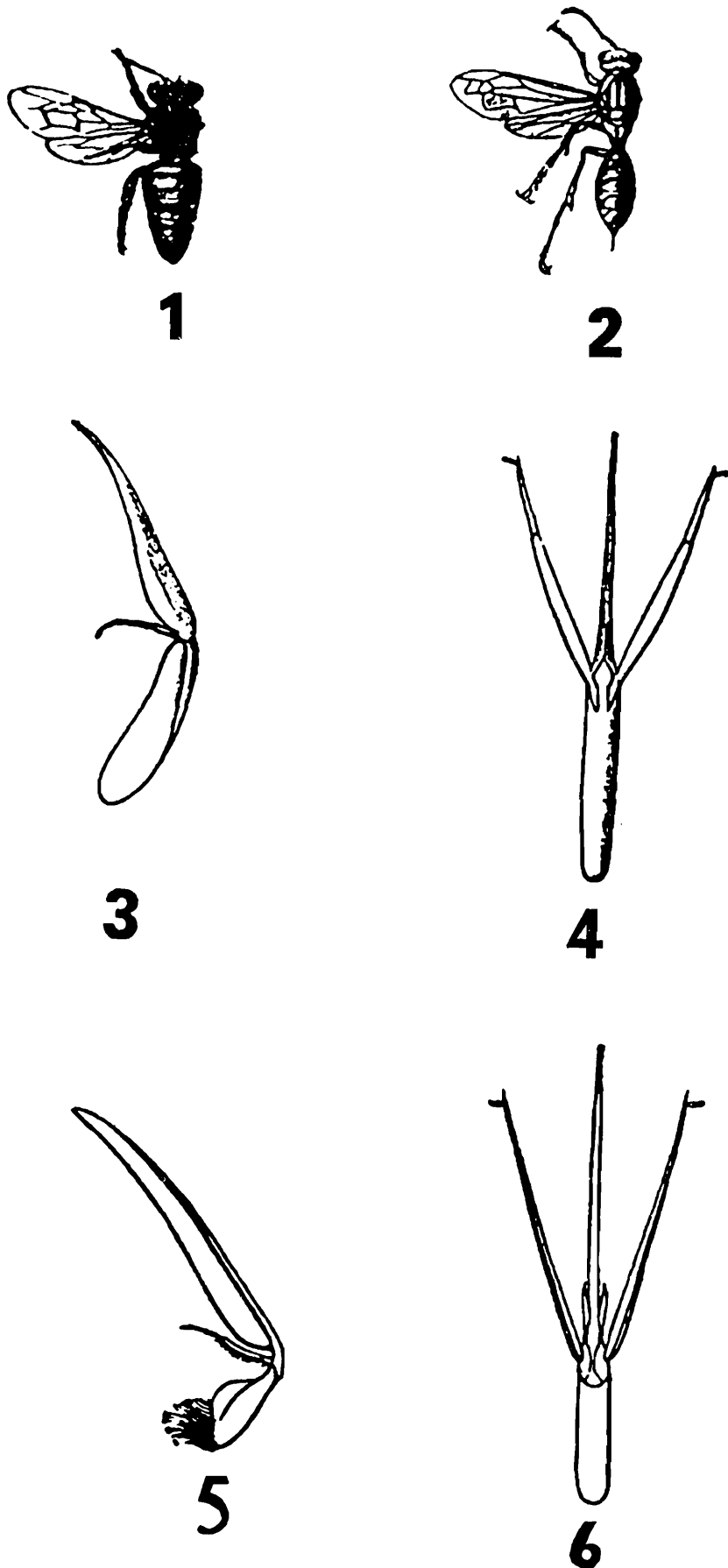
ACKNOWLEDGEMENT

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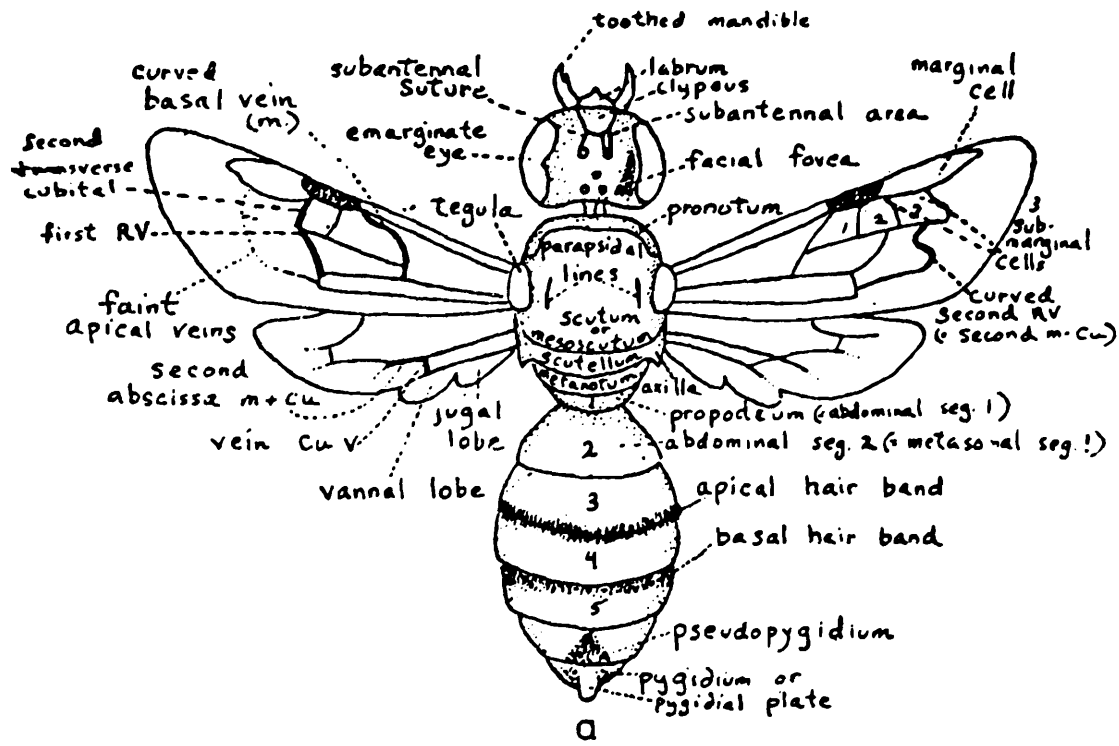
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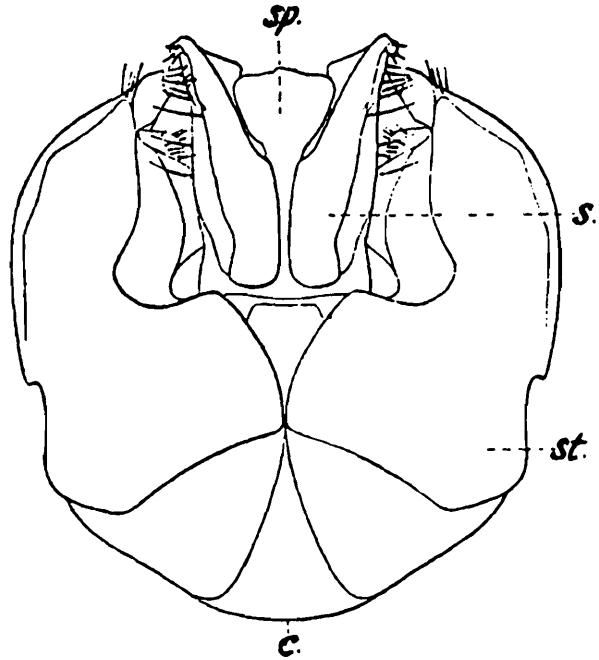


(Based on F. B. I., 1, 1897)

Fig. 1. *Apis (Micrapis) florea* Fabr. " ; **Fig. 2.** *Polistes (Megapolistes) olivaceous* (de Geer) ; **Fig. 3.** *Anthophora* Latr. (Labium) ; **Fig. 4.** *Anthophora* Latr. (Maxilla) ; **Fig. 5.** *Ceratina* Latr. (Labium) ; **Fig. 6.** *Ceratina* Latr. (Maxilla).



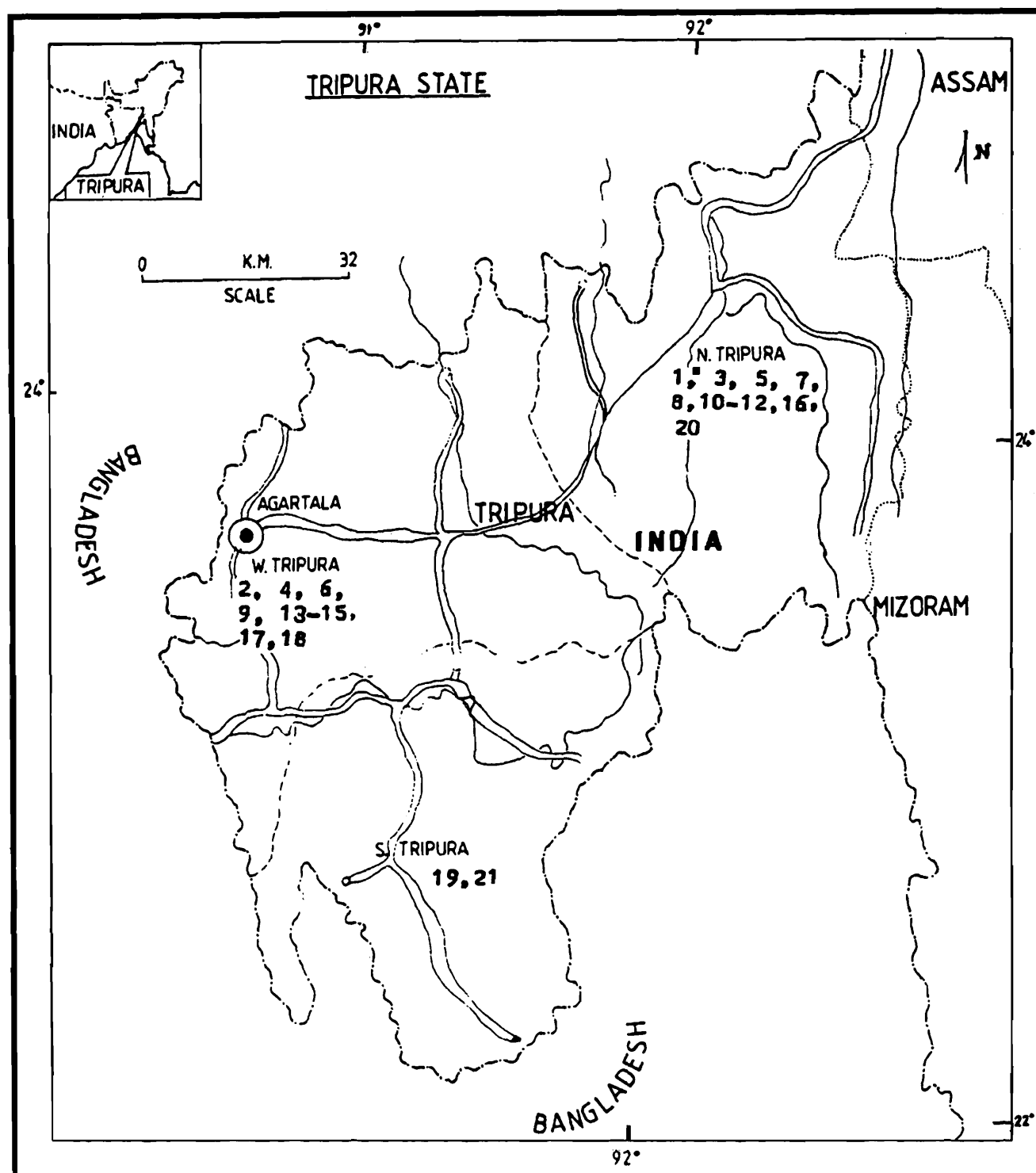
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8

Fig. 7. Morphological characters of a bee (Based on Batra, 1977)

Fig. 8. *Xylocopa latipes* (Drury) ♂ (Genitalia : Based on Ma, 1938 : Dorsal View : C-cardo; S-sagitta; Sp-spatha; St-stipes)



Map : 1. Distribution of taxa of families Apidae, Anthophoridae, Megachilidae, Xylocopidae, Vespidae and Eumenidae. Number indicates the name of the taxa as treated in the text.

INSECTA : HYMENOPTERA : FORMICIDAE

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INTRODUCTION

Tripura, one of the North-Eastern states of India—"the ancient home of the Bodos"—is situated between 20°55' north and 24°32' north and 91°10' east and 92°21' east. It has an international frontier of 1000 km towards the west, south and north-east. Topographically, Tripura is a state of hills, plains, valleys and river basins and possess an ideal habitat for a rich and varied speciation.

The present write up on Formicidae is based on the material collected during surveys conducted by the scientists of Eastern Regional Station, Zoological Survey of India, Shillong and deposited at its National Zoological holdings and is a very poor representation of Tripura's rich faunal wealth.

SYSTEMATIC ACCOUNT

Class INSECTA

Order HYMENOPTERA

Family FORMICIDAE

Subfamily PONERINAE

1. *Diacamma assamense* Forel
2. *Leptogenys kitteli* (Mayr)
3. *Pachycondyla leeuwenhoekii* (Forel)
4. *Pachycondyla rufipes* (Jerdon)
5. *Odontoponera transversa* Fred. Smith

Subfamily PSEUDOMYRMECINAE

6. *Tetraponera rufonigra* (Jerdon)

Subfamily MYRMICINAE

7. *Crematogaster dohrni* Mayr
8. *Meranoplus bicolor* Guerin
9. *Monomorium longi* Forel

Subfamily DOLICHODERINAE

10. *Dolichoderus taprobanae* Smith

Subfamily FORMICINAE

11. *Camponotus camelinus* (Fred. Smith)
12. *Camponotus compressus* (Fabricius)
13. *Anoplolepis longipes* (Jerdon)
14. *Paratrechina longicornis* (Latreille)
15. *Polyrhachis ceylonensis* Emery
16. *Polyrhachis illaudata* Walker
17. *Polyrhachis thompsoni* Bingham.

Genus *Diacamma* Mayr, 1862.

1862. *Diacamma* Mayr, *Verh. zool. bot. Ges. Wien*, 12 : p. 718.

1973. *Diacamma* Mayr, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review*, pp. 161-185.

Diagnostic characters : Antennae 12-jointed; mandibles broad, triangular, masticatory margin strongly toothed; thorax rounded; pedicel one jointed, node of pedicel arched and convex in front, flat or concave posteriorly, armed with a pair of spines.

1. *Diacamma assamense* Forel

1896. *Diacamma assamense* Forel, in Emery Rend. Accad. Sci. Bologna 151.

1951. *Diacamma assamense* Forel, Chapman & Capco, Checklist of the ants of Asia, pp. 327.

Material examined : 1 ex, India, Tripura, Agartala, Subalsingh, 3.viii.79, Coll. K. P. Singh.

Diagnostic characters : Black, mandibles longitudinally striate; head and thorax longitudinally striate; node of pedicel truncate posteriorly; nodal spines stout, pointing backwards, node with concentric striae; abdomen short, basal segment with concentric striae.

Length : 11-12 mm.

Distribution : Tripura; Assam. *Elsewhere :* Myanmar.

Genus *Leptogenys* Roger 1861.

1861. *Leptogenys* Roger, Berl. ent. Zeit., 5, : 41.

1973. *Leptogenys* Roger, Brown, In Tropical forest ecosystems in Africa and South America : A comparative review, pp. 161-185.

Diagnostic characters : Head longer than broad, clypeus narrow, transverse, triangularly produced in the middle; eyes placed above the middle of the head; pedicel with a single joint; node squamiform or cubical; claws pectinate.

2. *Leptogenys kitteli* (Mayr)

1870. *Lobopelta kitteli* Mayr, Verh. zool. bot. Ges. Wien, p. 966.

1984. *Leptogenys kitteli* (Mayr) : Mathew, Bull. zool. Surv. India, 6(1-3), pp. 307-308.

Material examined : 23 ex. 17 ex. India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh; 6 ex. Tripura, North Tripura, Karamcherra bamboo forest, 20. viii. 86, Coll. V. T. Darlong.

Diagnostic characters : Black, head and thorax finely longitudinally striate; mandibles linear, longitudinally striate; clypeus convex; thorax elongate, sutures distinct; node of pedicel rugose;

abdomen smooth, shining and polished; sting exerted.

Length : 7-8.5 mm.

Distribution : Tripura; Assam; Meghalaya; Manipur; West Bengal; along the foot hills of Himalayas from Simla to Sikkim. *Elsewhere :* Myanmar; Tenasserim.

Genus *Pachycondyla* Fred. Smith, 1858.

1858. *Pachycondyla* Smith, Cat., 6 : 107.

1973. *Pachycondyla* Fred. Smith, Brown, In Tropical forest ecosystems in Africa and South America : A comparative review, pp. 161-185.

Diagnostic characters : Head rectangular, depressed; mandibles broad, strongly dentate; antennae 12-jointed; clypeus narrow, produced backwards in the middle to between the base of the antennae; thorax convex and rounded anteriorly, slightly or deeply compressed posteriorly node of pedicel one-jointed; abdomen massive.

3. *Pachycondyla leeuwenhoekii* (Forel)

1886. *Ectomomyrmex leeuwenhoekii* Forel, Jour. Asiat. Soc. Bengal, 55 : 244.

1984. *Pachycondyla leeuwenhoekii* (Forel), Mathew, Bull. zool. Surv. India, 6 (1-3) : 307-308.

Material examined : 6 ex., India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Black, the appendages brownish red; head coarsely longitudinally striate, the emarginate posterior face of the occiput with a few oblique striae. Thorax coarsely striate; node of pedicel coarsely punctured and rugose; basal abdominal segment coarsely punctured, the remaining segments finely punctured and shining.

Length : 7-8 mm.

Distribution : Tripura; Assam; Kerala. *Elsewhere :* Myanmar ; Tenasserim.

4. *Pachycondyla rufipes* (Jerdon)

1851. *Bothroponera rufipes* Jerdon, Madras Jour. Lit. Sc. 17 : 102.

1984. *Pachycondyla rufipes* (Jerdon), Mathew, *Bull. zool. Surv. India*, 6(1-3) : 307-308.

Material examined : 1 ex, India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Black, appendages reddish; head, thorax and node of pedicel coarsely punctured, cribrate; basal abdominal segment with coarse longitudinal ridges; mandibles longitudinally striate and punctured; thorax massive, node of pedicel with irregular spinous processes; posterior face of node concave, smooth and shining.

Length : 13-15 mm.

Distribution : Tripura; Himalayas from the Siwaliks to Assam; Karnataka; Kerala; West Bengal. *Elsewhere* : Borneo; China; Hongkong; Indo-China; Singapore; Sumatra.

Genus *Odontoponera* Mayr, 1862.

1862. *Odontoponera* Mayr, *Verh. zool. bot. Ges. Wien*, 12 : 717.
1973. *Odontoponera* Mayr, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review*, pp.161-185.

Diagnostic characters : Head quadrate, Occiput emarginate, posterior lateral angles round; head, thorax and node of pedicel striate; mandibles strongly dentate; clypeus narrow, transverse anteriorly, posteriorly produced between the antennal carinae; antennae 12-jointed; eyes placed below middle of head; thorax massive, pronotum convex, anteriorly narrowed into a collar, anterior lateral angles dentate, thoracic sutures distinct; apical portion of metanotum broad, flat, denticulate on sides; legs robust; pedicel one-jointed; abdomen short.

5. *Odontoponera transversa* Fred. Smith

1857. *Odontoponera transversa* Smith, *Jour. Proc. Linn. Soc. Lond. zool* 2 : 86.
1984. *Odontoponera transversa* Fred. Smith, Mathew, *Bull. zool. Surv. India* 6(1-3) : 307-308.

Material examined : 2 ex, India, Tripura, Agartala, subalsingh, 3. viii. 79, Coll. K. P. Singh;

1 ex, Tripura, North Tripura, Karamcherra bamboo forest, 20.viii.86, Coll. V. T. Darlong.

Diagnostic characters : Same as that mentioned under the genus.

Length : 9-12mm.

Distribution : Tripura, the whole of India.

Genus *Tetraponera* Fred. Smith, 1852.

1851. *Eciton*, Jerdon, *Madras Jour. L. S.* 17 : p. 111.

Tetraponera Fr. Smith, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Elongate, head more or less rectangular, truncate anteriorly; clypeus narrow, bent vertically downwards; antennae 12-jointed; eyes large, placed a little to the front of the head, thorax elongate, constricted in the middle. Thoracic sutures distinct; pedicel elongate with two nodes, petiolate; abdomen narrow, attenuate at apex; sting exserted.

6 *Tetraponera rufonigra* (Jerdon)

1851. *Tetraponera* (*Tetraponera*) *rufonigra* Jerdon, *Madras Jour. Lit. sc.* 12 : 111.
1984. *Tetraponera rufonigra* (Jerdon), Mathew, *Bull. zool. Surv. India*, 6 (1-3) : 307-308.

Material examined : 1 ex, India, Tripura, Kathal Bazar, 11. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Orange red or orange yellow; head, 2nd joint of pedicel, abdomen and legs black; head, legs, 2nd joint of pedicel and abdomen minutely and closely punctured, not opaque, shining; head rectangular, mandibles coarsely obsoletely striate; ocelli present; pronotum broad, anterior lateral angles dentate; abdomen, oval sting exserted.

Length : 10-13 mm.

Distribution : Tripura; throughout India. *Elsewhere* : Cambodia; China, Java, Sumatra; Singapore; Sri Lanka; Myanmar.

Genus *Crematogaster* Lund, 1831.

1931. *Crematogaster* Lund, *Ann. Sc. Nat.*, 23 : 132.

1973. *Crematogaster* Lund, Brown, *In Tropical forest ecosystems in Africa and South America : A Comparative review* : 161-185.

Diagnostic characters : Head more or less square; mandibles with four teeth; antennae 11-jointed; pedicel with two joints; apex of pedicel attached to the upper basal surface of the 1st abdominal segment; abdomen more or less cordate.

7. *Crematogaster dohrni* Mayr

1878. *Crematogaster (Acrocoelia) dohrni* Mayr, *Verh. zool. bot. Ges. Wien*, 28 : 681.

1984. *Crematogaster dohrni* Mayr, Mathew, *Bull. zool. Surv. India*, 6 (1-3) : 307-308.

Material examined : 17 ex, 10 ex, India, Tripura, Subalsingh; 3. viii. 79, Coll. K. P. Singh; 7 ex, Tripura, North Tripura, Karamcherra bamboo forest, 20. viii. 86, Coll. V. T. Darlong.

Diagnostic characters : Brownish red, abdomen darker; head finely longitudinally striate; eyes lateral, placed about the middle of the head; pronotum finely rugulose-granulate; mesonotum and basal portion of metanotum margined laterally; metanotum armed with two long backward pointing slightly curved spines; apical portion of metanotum highly polished, smooth and shining; 1st node of pedicel broad and flat, 2nd node longitudinally sulcate above; abdomen shining.

Length : 3.5-5mm.

Distribution : Tripura; Manipur. Elsewhere : Myanmar; Sri Lanka.

Genus *Meranoplus* Fred. Smith, 1853.

1854. *Meranoplus*, Smith, *Trans. Ent. Soc.*, (2)2, : 224.

1973. *Meranoplus* Fr. Smith, Brown, *In Tropical forest ecosystems of Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Head trapezoidal; sides of head deeply grooved for the reception of the antennae; mandibles with 4 teeth; antennae 9-jointed; eyes prominent; pedicel with 2 nodes; abdomen cordate.

8. *Meranoplus bicolor* Guérin

1845. *Meranoplus* Guérin, *Inconogr. Regne. Anim. Insect.* 7 : 425.

1987. *Meranoplus bicolor* Guérin, Devi & Singh, *Entomon*, 12(4) : 309-313.

Material examined : 2 ex, India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Ferruginous red, abdomen black; head, thorax and the 2nd node of pedicel coarsely sculptured, cribrate; abdomen closely and finely reticulate; head longer than broad; mandibles narrow, obscurely striate; promesonotal shield about as broad as long with the anterior angles prominent and acute, the sides posteriorly with a small incision, and beyond that produced backwards into a long, somewhat laminate spine, on each side over hanging the metanotum; metanotum vertical, slightly concave, with a carina on each side ending above in an acute spine; 1st node of pedicel smooth with its apex bevelled; 2nd node globose; abdomen cordate.

Length : 4-5mm.

Distribution : Tripura; whole of India.

Genus *Monomorium* Mayr, 1855.

1855. *Monomorium*, Mayr, *Verh. zool. bot. Ges. Wien*, 5 : 452.

1973. *Monomorium* Mayr, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Head rectangular; mandibles narrow with 3 or 4 acute teeth; antennae 11 or 12 jointed; thorax long and narrow; promesonotal suture obsolete, meso-metanotal suture well marked; abdomen oval.

9. *Monomorium longi* Forel

1902. *Monomorium longi* Forel, *Rev. Suisse zool.*, **10** : 211.

1984. *Monomorium longi* Forel, Mathew, *Bull. zool. Surv. India*, **6** (1-3) : 307-308.

Material examined : 35 ex., India, Tripura, Kathal Bazar, 11. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Reddish brown; appendages, a shade lighter; head, thorax and nodes of pedicel finely and densely rugulose; abdomen smooth and shining; 1st node of pedicel petiolate anteriorly; 2nd node globose; abdomen elongate, oval.

Length : 2.5-3 mm.

Distribution : Tripura; Assam.

Genus *Dolichoderus* Lund, 1831.

1831. *Dolichoderus*, Lund, *Ann. Sc. Nat.* **23** : 130.

1973. *Dolichoderus* Lund, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Mandibles broad, with 10-12 small teeth; clypeus convex, anterior margin transverse; antennae 12-jointed; thorax laterally compressed; pronotum convex or flat; thorax emarginate at the meso-metanotal suture; pedicel with a single joint.

10. *Dolichoderus taprobanae* Fred. Smith

1858. *Dolichoderus (Hypoclinea) taprobanae* Fred. Smith, *Cat. Hym. Brit. Mus.* **6** : 13.

1951. *Dolichoderus (Hypoclinea) taprobanae* Fred. Smith, Chapman & Capco, *Checklist of the ants of Asia*, pp. 327.

Material examined : 5 ex., India, Tripura, North Tripura, Karamcherra bamboo forest, 20. viii. 86, Coll. V. T. Darlong.

Diagnostic characters : Brownish red, abdomen black; thorax laterally compressed, pronotum slightly convex, anteriorly margined, mesonotum longitudinally sulcate; meso-

metanotal emargination deep and well-marked; abdomen massive.

Length : 2.5-3.5 mm.

Distribution : Tripura ; Throughout India.

Genus *Camponotus* Mayr, 1861.

1861. *Camponotus*, Mayr, *Eur. Form.*, p. 35.

1973. *Camponotus* Mayr, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Antennae 12-jointed; clypeus trapeziform; eyes large; ocelli absent; pedicel one-jointed; abdomen broadly oval; dimorphic.

11. *Camponotus camelinus* Fred. Smith

1857. *Camponotus camelinus* Fred. Smith, *Jour. Proc. Linn. Soc. Lond. Zool.* **2** : 57.

1984. *Camponotus camelinus* Fred. Smith, Mathew, *Bull. zool. Surv. India*, **6** (1-3) : 307-308.

Material examined : 1 ex., India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Black; pilosity abundant, erect, head, thorax and abdomen minutely reticulate punctate and with minute scattered tubercles; head oval occiput constricted and narrowed into a neck; mandibles with 7 teeth; clypeus with a median vertical carina, median lobe of clypeus brown and slightly produced, its anterior margin waved; node of pedicel rounded; abdomen massive.

Length : 14-15mm.

Distribution : Tripura; Meghalaya; Sikkim. *Elsewhere* : Myanmar; Singapore; Sumatra; Tenasserim.

12. *Camponotus compressus* Fabricius

1787. *Camponotus compressus* Fabricius, *Mant. Insect* **1** 307.

1984. *Camponotus compressus* Fabricius, Mathew, *Bull. zool. Surv. India* **6** (1-3) : 307-308.

Diagnostic characters : Black; opaque, very finely and densely reticulate-punctate; mandibles with 7 teeth; clypeus medially vertically carinate, the middle portion anteriorly rectangularly produced into a lobe; eyes placed above the middle of the head, more to the front; thorax anteriorly produced into a collar; node of pedicel transverse, convex in front, flat posteriorly; abdomen broad and massive.

Length : 11-18 mm.

Distribution : Tripura : Assam; Meghalaya; Southern India. *Elsewhere*: Arabia; Africa; Borneo; Myanmar; Philippines; Russia; Sri Lanka.

Genus *Anoplolepis* Santschi, 1914

1914. *Anoplolepis* Santschi, *Boll. Lab. Zool. Gen. Agrar. R. Sc. Sup. Agric. Portici* 8 : 309-385.

1973. *Anoplolepis* Santschi, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Antennae 11-jointed; mandibles narrow with 5 teeth, apical tooth long and acute; clypeus large, convex, carinate, anterior margin arched and partially covering the mandibles; meso-notum not constricted.

13. *Anoplolepis longipes* (Jerdon)

1851. *Anoplolepis longipes* Jerdon, *Madras Jour. Lit. Sc.* 17 : 122.

1987. *Anoplolepis longipes* (Jerdon), Devi & Singh, *Entomon* 12 (40) : 309-313.

Material examined : 24 ex., 15 ex., India, Tripura, Agartala, Subalsingh, 3. viii. 79, Coll. K. P. Singh; 9 ex., Tripura, North Tripura, Pecharthal, 700 ft., 17. vi. 88, Coll. V. T. Darlong.

Diagnostic characters : Light yellow to orange yellow; abdomen brown; head, thorax and abdomen very minutely and closely reticulate-punctate, shining; metanotum rounded, convex and gibbous; node of pedicel thick, low, rounded above, abdomen oval.

Length : 3.5-4.5 mm.

Distribution : Tripura; throughout India. *Elsewhere* : Myanmar; Sri Lanka.

Genus *Paratrechina* Motschulsky, 1863

1863. *Paratrechina* Motschulsky, *Bull. Soc. Imp. Nat. Moscou* 36 (3) : 1-153.

1973. *Paratrechina* Motschulsky, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Head slightly longer than broad, emarginate posteriorly; eyes large, placed about the middle of the head; antennae 12-jointed; pedicel one-jointed.

14. *Paratrechina longicornis* (Latreille)

1802. *Formica longicornis* Latreille, *Nat. Hist. Fourmis*, 113.

1987. *Paratrechina longicornis* (Latreille) : Devi & Singh, *Entomon*. 12(4) : 309-313.

Material examined : 35 ex., India, Tripura, Monu, 11. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Dull coppery brown; pilosity abundant; eyes large; mandibles small, with 5 or 6 teeth; clypeus convex; thoracic sutures distinct; abdomen anteriorly gibbous.

Length : 2.5 - 3 mm.

Distribution : Tripura : throughout India.

Genus *Polyrhachis* Fred. Smith, 1857

1858. *Polyrhachis* Fred. Smith, *Jour. Linn. Soc.* 2 : 58.

1973. *Polyrhachis* Fr. Smith, Brown, *In Tropical forest ecosystems in Africa and South America : A comparative review* : 161-185.

Diagnostic characters : Head more or less orbicular; thorax and or pedicel armed with spines or teeth.

15. *Polyrhachis ceylonensis* Emery

1893. *Polyrhachis hippomanes ceylonensis* Emery, *Jour. Bomb. Nat. Hist. Soc.*, 8 : 22.

1984. *Polyrhachis hippomanes* sub. sp. *ceylonensis* Emery, Mathew, *Bull. zool. Surv. India*, 6 (1-3) : 307-308.

Material examined : 1 ex., India, Tripura, Subalsingh, 5. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Black; the flagellum of antennae, the femorae, tibiae and tarsi of the legs reddish yellow; the mandibles and scape of the antennae fuscous red; head and thorax finely, abdomen minutely, reticulate punctate; pronotum with a short tooth pointing outward; metanotum with two short erect spines at the posterior lateral angles, node of pedicel with two wide spreading spines.

Length : 5-6 mm.

Distribution : Tripura : Meghalaya; Elsewhere : Sri Lanka.

16. *Polyrhachis illaudata* Walker

1859. *Polyrhachis illaudata* Walker, *Ann. Mag. Nat. Hist.* (3) 4 : 373.

1984. *Polyrhachis illaudata* Walker, Mathew, *Bull. zool. Surv. India* 6 (1-3) : 307-308.

Material examined : 1 ex., India, Tripura, Subalsingh, 3. viii. 79, Coll. K. P. Singh.

Diagnostic characters : Black and stout; covered with dense, golden, recumbent pubescence; erect hairs abundant; thorax short, strongly arched, broader anteriorly; pro-meso and meso-metanotal sutures distinct; pronotal spines broad at base, pointing forward and outward; node of pedicel biconvex with a pair of spines diverging outward on its upper lateral angles and a pair of short, mucronate teeth on its sides; abdomen massive; pilosity abundant; the teeth on the lateral sides of the node broader at base.

Length : 9.5-10.5 mm.

Distribution : Tripura ; Meghalaya ; Karnataka; Kerala; Sikkim; West Bengal. Elsewhere : Borneo;

China; Java; Sumatra; Philippines; Myanmar; Sri Lanka; Tenasserim.

17. *Polyrhachis thompsoni* Bingham

1903. *Polyrhachis (Myrmhopla) thompsoni* Bingham, *Fauna Brit. India Hym.* 2 : 384.

1951. *Polyrhachis (Myrmhopla) thompsoni* Bingham, Chapman & Capco, *Checklist of the ants of Asia* : 327.

Material examined : 1 ex., India, Tripura, March 1985, Coll. B. K. Agarwala.

Diagnostic characters : Black, opaque, head and thorax coarsely, abdomen very finely rugulose-granulate; pilosity and pubescence entirely wanting; pronotal spines short, thick at base; metanotal spines long, acute; node of pedicel armed with two long curved spines shaped so as to encircle the abdomen; abdomen short, globose.

Length : 6 mm.

Distribution : Tripura. Elsewhere : Myanmar.

SUMMARY

This paper deals with Formicidae fauna of the State of Tripura, India. Altogether 17 species under 13 genera and 4 subfamilies are treated in the text.

ACKNOWLEDGEMENT

The author is grateful to Dr. A. K. Ghosh, former Director and Dr. J. R. B. Alfred, Director, Zoological Survey of India for encouragement and guidance. Thanks are due to the officer-in-charge, Eastern Regional Station, Z.S.I., Shillong for providing necessary facilities to carry out this research work.

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INSECTA : HYMENOPTERA : BRACONIDAE

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INTRODUCTION

Taxonomic study of the family Braconidae belonging to superfamily Ichneumonoidea, Hymenoptera, from the state of Tripura, is very little known, though 250 species belonging to 11 subfamilies of this family are known in India from the work of viz., Bingham (1901, 1910), Ashmead (1903, 1957), Kieffer (1905), Cameron (1910), Enderlein (1923), Rao (1967) and Sharma & Chatterjee (1970); 600 species are known from the Oriental region and about 7,000 species are reported from the world. These insects specially the species of genus *Apanteles* play an important role in controlling the agricultural insect pests particularly on Lepidopterous larvae.

This family is characterised by the following characters; antennae long, 16-17 segmented; head, comparatively smaller than thorax and abdomen; eyes, moderate in size; mesonotum and mesopleurae are modified; wings, fusco-hyaline, legs normal as in other insects and female abdominal tip is furnished with an ovipositer.

In the present paper an attempt has been made to deal with 14 species of Braconids, which were collected from Tripura by the Survey parties led by Dr. N. Muralidharan, 1977; Dr. J. K. Jonathan, 1978 and Shri K. K. Ray, 1991 of Zoological Survey of India, Calcutta.

SYSTEMATICS

There are about 7,000 species of this family reported from the world, classified under 23 subfamilies and 520 genera. In India the family is represented by 250 species under 60 genera and 11 subfamilies. In Tripura the family is

represented by 14 species belonging to 6 genera and 4 subfamilies. The keys to the subfamilies, genera and species are provided for identification of various taxa of this region. Illustrations of taxonomic terms used in the present work and Distribution Map are included for ready reference.

MATERIAL AND METHOD

Braconids are endoparasites of Lepidopterous larvae and can be collected by rearing these, or from the leaves, flowers and bushes in the open fields. The collected Braconids then can be transferred into a killing tube (prepared with Chloroform or Benzene or Ethyl Acetate), on top of chemicals in the tube a white round piece of blotting paper can be placed, to avoid damage of the collected specimens. The dead specimens then to be kept in a relaxing or damp box for stretching of bodyparts, then dried and set and pinned with proper labelling of the specimens with name, locality, collector and date. The specimens in this way are made ready for study under binocular.

The methodology applied here, specially for male genitalia is as follows :

Male genitalia : Attached to 9th segment of abdomen in form of genital capsule and can be extracted by putting pressure on 9th segment for the genital organ to pass through the abdominal tip with the help of a forcep. The genitalia then can be put in 10% KOH solution overnight or boiled with distilled water. KOH then can be washed out and after processing of dehydration

with Alcoholic strength can be mounted on slide for study.

The measurement of the specimens were taken in mm.

MORPHOLOGY AND TERMINOLOGY

A. General Morphology

Braconid specimens are small (2-15 mm in length) and have two pairs of membranous wings; the bigger forewings and the smaller hindwings. The cells and venations of the wings may be more or less in number as per subfamily. Generally the antenna is 16-17 segmented. Legs are three-paired, of which hind legs are the biggest. Thorax generally more or less proportionate with the abdomen, which is subglobular or subelongate. Tergites nine-segmented in male and eight-segmented in female, whereas the genital organs lie in their respective sterna.

B. List of terms used in key and text

Pterostigma—The black or opaque spot which lies in subcostal region of forewing.

Cubital Cells—The cells which articulate with the median axillary sclerites or plates and have two median branches.

Discoidal Cells—The central or disc cells which limit cubital cells.

Scutellum—The posterior plate of mesothorax.

Mesopleura—The side areas of mesothorax.

Sulci—The markings present on second abdominal tergite.

R₁—The first radial vein.

SYSTEMATIC ACCOUNT

Class INSECTA
Order HYMENOPTERA
Superfamily ICHNEUMONOIDEA

Family BRACONIDAE

Subfamily BRACONINAE

1. *Meganura famulus* (Bingham)
2. *Stenobracon nicevillei* (Bingham)

Subfamily CHELONINAE

3. *Chelonus heliope* Gupta
4. *Chelonus indicus* Cameron
5. *Phanerotoma buchneri* Fahringer

Subfamily AGATHIDINAE

6. *Disophrys fumipennis* Cameron

Subfamily MICROGASTERINAE

7. *Apanteles aristolochae* Wilkinson
8. *Apanteles bambusae* Wilkinson
9. *Apanteles cirphicola* Bhatnagar
10. *Apanteles flavipes* (Cameron)
11. *Apanteles glomeratus* (Linnaeus)
12. *Apanteles maro* Nixon
13. *Apanteles ruficrus* (Haliday)
14. *Apanteles stantoni* (Ashmead)

Key to the subfamilies of BRACONIDAE

1. Body generally rufobrownish in colour; antennae thin and long BRACONINAE
- Body generally testaceous black in colour; antennae thick and short 2
2. Thorax and abdomen thickly and broadly attached together CHELONINAE
- Thorax and abdomen thinly and narrowly attached together 3
3. Specimens small in size, 2-2.5 mm, wing venation reduced, demarcation of Internal Cubital and Discoidal Cells, clear MICROGASTERINAE
- Specimens big in size, 8-10 mm, wing venation not much reduced, demarcation of Internal Cubital and Discoidal Cells, not clear AGATHIDINAE

Family BRACONIDAE

I. Subfamily BRACONINAE

*Key to the genera of Subfamily
BRACONINAE*

1. Abdomen subglobular and short-length, in specimens *Meganura* szep.
— Abdomen not subglobular and short-length, rather elongate in specimens
..... *Stenobracon* szep.

(i) Genus *Meganura* Szepligeti1. *Meganura famulus* (Bingham)

1901. *Bracon famulus* Bingham. *Ann. Mag. Nat. Hist. Soc.*, (7) 8 : 556.
1978. *Meganura famulus* (Bingham) : Szepligeti, *Hym. Cat.*, (15) 10 : 1698.

Material examined : India : Tripura; Baramura; South Tripura District; 1 Male, 22. v. 1978, Coll. J. K. Jonathan.

Diagnostic characters : Colour of thorax and abdominal tergites brown.

Distribution : India : Tripura (South Tripura District) and West Bengal. Elsewhere : Australia and Pacific Regions.

Remarks : Host—*Sarcophaga nivella* Fabricius.

(ii) Genus *Stenobracon* Szepligeti2. *Stenobracon nicevillei* (Bingham)

1901. *Bracon nicevillei* Bingham. *Ann. Mag. Nat. Hist. Soc.*, (7) 8 : 555.
1978. *Stenobracon nicevillei* (Bingham). Szepligeti, *Hym. Cat.*, (15) 10 : 1726.

Material examined : India : Tripura; Teliamura; North Tripura District; 1 Male, 1 Female, 21. v. 1978; Coll. J. K. Jonathan.

Diagnostic characters : Colour of thorax and abdominal tergites grey.

Distribution : India : Tripura (North Tripura District) and West Bengal. Elsewhere : Sri Lanka,

Pakistan, China, Taiwan, Java, Sumatra, Philippines and Japan.

Remarks : Host—*Chilo simplex* Butler.

II. Subfamily CHELONINAE

(iii) Genus *Chelonus* Jurine*Key to the Species of Chelonus Jurine*

1. Yellow bands on abdominal tergites broad ...
..... *heliopae* Gupta
— Yellow bands on abdominal tergites narrow
..... *indicus* Cameron

3. *Chelonus heliopae* Gupta

1955. *Chelonus heliopae* Gupta. *Agra Univ. J. Res. (Sci.)*, 4 : 209-211.
1973. *Chelonus heliopae* Gupta : Vecht and Shenefelt, *Cat. Hym.*, Pt. 10 : 888.

Material examined : India : Tripura; Udaipur; West Tripura District; 2 Females, 14. v. 1978, Coll. J. K. Jonathan.

Diagnostic characters : Thorax not closely rugose; middle of mesonotum striated uniformly at base and apex.

Distribution : India : Tripura (West Tripura); West Bengal and Gujarat.

Remarks : Host—*Earias* sp.

4. *Chelonus indicus* Cameron

1907. *Chelonus indicus* Cameron. *J. Bombay Nat. Hist. Soc.*, 17 : 584.
1973. *Chelonus indicus* Cameron : Vecht and Shenefelt, *Hym. Cat.* Pt. x : 854.

Material examined : India : Tripura : Garjee; West Tripura District ; 2 Females and 2 Males, 12. v. 1978, Coll. J. K. Jonathan.

Diagnostic characters : Thorax closely rugose; middle of mesonotum striated weakly at base and strongly at apex.

Distribution : India : Tripura (West Tripura District); West Bengal and Punjab.

Remarks : Host—*Heliothis armigera* Fabr.

(iv) Genus *Phanerotoma* Wesmael

5. *Phanerotoma buchneri* Fahringer

1932. *Phanerotoma buchneri* Fahringer. *Z. Angew. Ent.*, **19** : 144.

1973. *Phanerotoma buchneri* Fahringer : Vecht and Shenefeld, *Hym. Cat.*, (10) **6** : 911.

Material examined : India : Tripura; Ambassa : North Tripura District; 2 Females, 25. v. 1978; Coll. J. K. Jonathan.

Diagnostic characters : Tibiae and tarsi of legs testaceous yellow.

Distribution : India : Tripura (North Tripura District) and Assam. Elsewhere : Australia and Pacific Regions.

Remarks : Host—*Holcocera pulverea* Meyr.

III. Subfamily AGATHIDINAE

(v) Genus *Disophrys* Forster

6. *Disophrys fumipennis* Cameron

1905. *Disophrys fumipennis* Cameron. *J. Straits Asiatic Soc.*, **44** : 114.

1970. *Disophrys fumipennis* Cameron : Ferrier and Vecht, *Hym. Cat.*, (6) **3** : 396.

Material examined : India : Tripura : Paratia : West Tripura District; 1 Male, 2. x. 1977; Coll. N. Muralidharan.

Diagnostic characters : Wings banded with black and yellow colour.

Distribution : India : Tripura (West Tripura District). Elsewhere : Borneo, Australia and Pacific Regions.

IV. Subfamily MICROGASTERINAE

(vi) Genus *Apanteles* Forster

Key to the Species of Apanteles Forster

1. Head black 2
- Head dark brown 3
2. Thorax testaceous 4
- Thorax brownish yellow 5
3. Stigma pale, hind tarsus with a small spine
.....*maro* Nixon

— Stigma not pale, hind tarsus without a small spine*glomeratus* (Linn.)

4. Abdomen black*flavipes* (Cam.)

— Abdomen dark-brown 6

5. Antennal scape red-brown*ruficrus* (Hal.)

— Antennal scape dark*bambusae* Wilk.

6. Fore femur infusate*stantoni* (Ash.)

— Fore femer not infusate 7

7. Antennae red-brown*cirphicola* Bhat.

— Antennae black*aristolochiae* Wilk.

7. *Apanteles aristolochiae* Wilkinson

1928. *Apanteles aristolochiae* Wilkinson. *Bull. Ent. Res.*, **19** : 84.

1948. *Apanteles aristolochiae* Wilkinson; Bhatnagar, *Ind. J. Ent.*, **10** : 170.

Material examined : India : Tripura; Udaipur; West Tripura District; 1 Male, 1 Female, 28. 11. 1991; Coll. K. K. Ray.

Diagnostic characters : First tergite with sides regularly converging to apex.

Distribution : India : Tripura (West Tripura District) and West Bengal.

Remarks : Host—*Papilio aristolochiae* F.

8. *Apanteles bambusae* Wilkinson

1928. *Apanteles bambusae* Wilkinson. *Bull. Ent. Soc.*, **19** : 129.

Material examined : India : Tripura : Charilam; West Tripura District; Females, 28. xi. 1991; Coll.; K. K. Ray.

Diagnostic characters : First tergite of the specimens rugose, while the hind femurs are infusate.

Distribution : India : Tripura : (West Tripura District) and Bihar.

Remarks : Host—*Cosmopteryx bambusae* Meyrick.

9. *Apanteles Cirphicola* Bhatnagar

1948. *Apanteles cirphicola* Bhatnagar, *Indian J. Ent.*, **10** : 135, 137.

Material examined : India : Tripura; Garjee : West Tripura District; 2 Females, 15. v. 1978; Coll. J. K. Jonathan.

Diagnostic characters : Disc of scutellum with punctures on anterior side of mesopleura.

Distribution : India : Tripura (West Tripura District) and Bihar.

Remarks : Host—*Cirphus insularis* (Butler).

10. *Apanteles flavipes* (Cameron)

1891. *Cotesia flavipes* Cameron. *Mem. Proc. Phil. Soc.*, **4** (4) : 185.

1948. *Apanteles flavipes* (Cameron); Bhatnagar, *Indian J. Ent.* **10** : 137, 139.

Material examined : India : Tripura : Kailasahr : North Tripura District; 1 Male, 1 Female, 28. v. 1978; Coll. J. K. Jonathan.

Diagnostic characters : Head dark-brown and antennae red-testaceous in colour.

Distribution : India : Tripura (East Tripura District); West Bengal; Bihar and Delhi.

Remarks : Host—*Chilo simplex* Butl.

11. *Apanteles glomeratus* (Linnaeus)

1758. *Ichneumon glomeratus* Linnaeus. *Syst. Nat.*, (10) **1** : 568.

1948. *Apanteles glomeratus* (Linnaeus) : Bhatnagar, *Ind. J. Ent.*, **10** : 145, 147.

Material examined : India : Tripura : Charilam : West Tripura District; 1 Female, 28. xi. 1991; Coll. K. K. Ray.

Diagnostic characters : Pterostigma equal to R_1 .

Distribution : India : Tripura (West Tripura District); Meghalaya and Bihar.

Remarks : Host—*Pieris brassicae* Linn.

12. *Apanteles maro* Nixon

1967. *Apanteles maro* Nixon. *Bull. Brit. Mus. Nat. Hist. (Ent.)*, **21** : 25.

Material examined : India : Tripura : Amarpur : West Tripura District; 1 Female, 14. x. 1977; Coll. N. Muralidharan.

Diagnostic characters : Apical segment of front tarsus with a small spine, in the specimen.

Distribution : India : Tripura (West Tripura District) and West Bengal.

Remarks : Host—*Diacrisia obliqua* Walker.

13. *Apanteles ruficrus* (Haliday)

1835. *Microgaster ruficrus* Haliday. *Ent. Mag.*, **2** : 253.

1948. *Apanteles ruficrus* (Haliday) : Bhatnagar, *Ind. J. Ent.*, **10** : 139, 141.

Material examined : India : Tripura: Khowai : North Tripura District, 2 Females, 23. x. 1977; Coll. N. Muralidharan.

Diagnostic characters : The vein r and r-m meeting at a distinct angle.

Distribution : India : Tripura (North Tripura District) West Bengal and Delhi.

Remarks : Host—*Agrotis* sp.

14. *Apanteles stantoni* (Ashmead)

1904. *Urogaster stantoni* Ashmead. *J. New York Ent. Soc.* **12** : 20.

1948. *Apanteles stantoni* (Ashmead) : Bhatnagar, *Ind. J. Ent.*, **10** : 180.

Material examined : India : Tripura : Ambassa : North Tripura District : 2 Males, 27. x. 1977. Coll. N. Muralidharan.

Diagnostic characters : Second tergite with distinct diverging discal sulci.

Distribution : India : Tripura (North Tripura District); West Bengal, Bihar, Madhya Pradesh

and Uttar Pradesh. Elsewhere : Malayasia and Philippines.

Remarks : Host—Pyralid Moths.

SUMMARY

Braconids belonging to 14 species, 6 genera and 4 subfamilies have been recorded, in this paper, for the first time from three districts of Tripura state, till date.

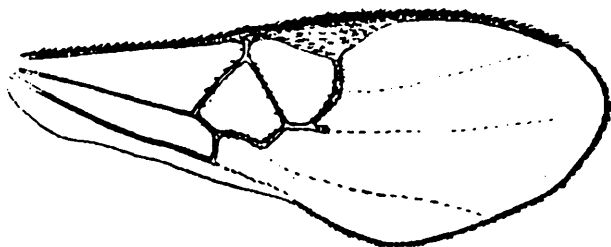
ACKNOWLEDGEMENT

The author acknowledges his grateful thanks to Dr. A. K. Ghosh, Director, Zoological Survey of India, Calcutta, for laboratory facilities; sincere thanks are also due to Dr. R. K. Varshney, Scientist-SG, Dr. S. K. Tandon, Scientist-SF, Dr. J. K. Jonathan, Scientist-SE, and Dr. Kuldip Rai, Scientist-SE, of the same Institute for guidelines and encouragement, during the course of work.

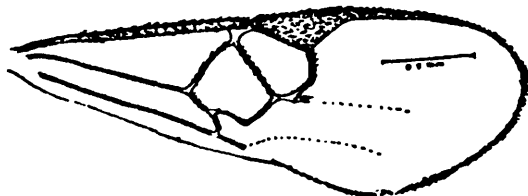
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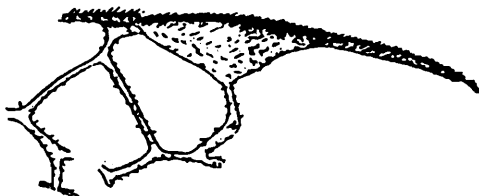
FORE WINGS



Apanteles aristolochiae
Wilk.



Apanteles glomeratus
(Linn.)



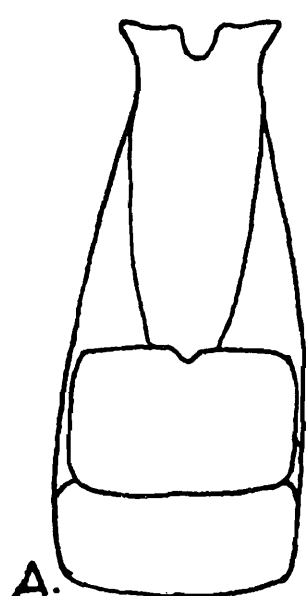
Apanteles ruficrus
(Hal.)



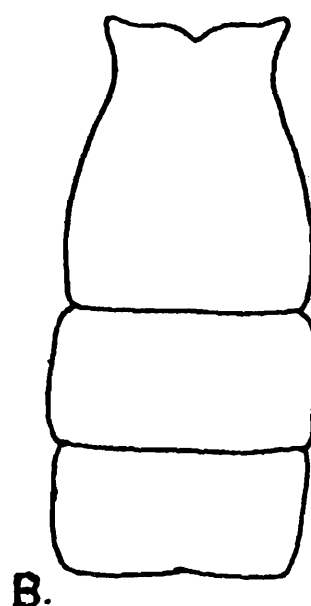
Apanteles stantoni
(Ashm.)

Fig. 1. Forewings of *Apanteles* species (after Bhatnagar, 1948).

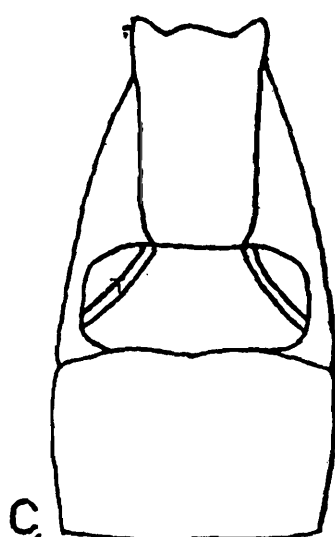
I, II & III ABDOMINAL TERGITES



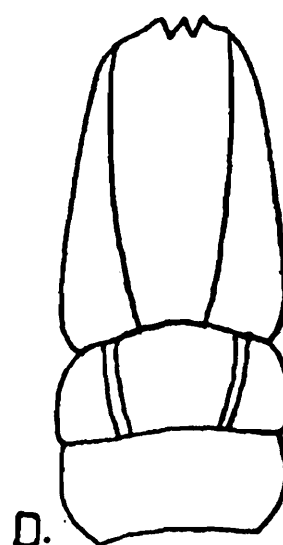
Apanteles aristolochiae
Wilk.



Apanteles ruficrus
(Hol.)

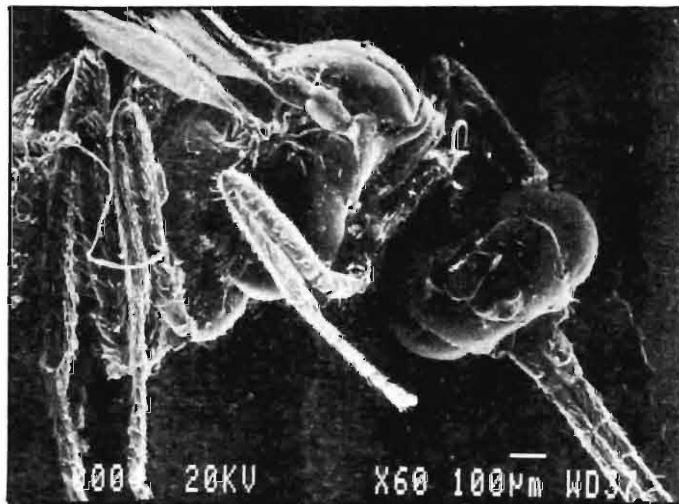


Apanteles starloni
(Ashm.)

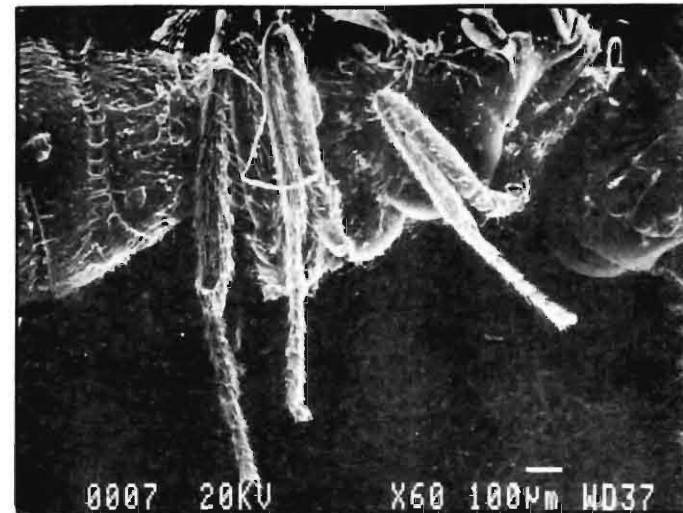


Apanteles glomeratus
(Linn.)

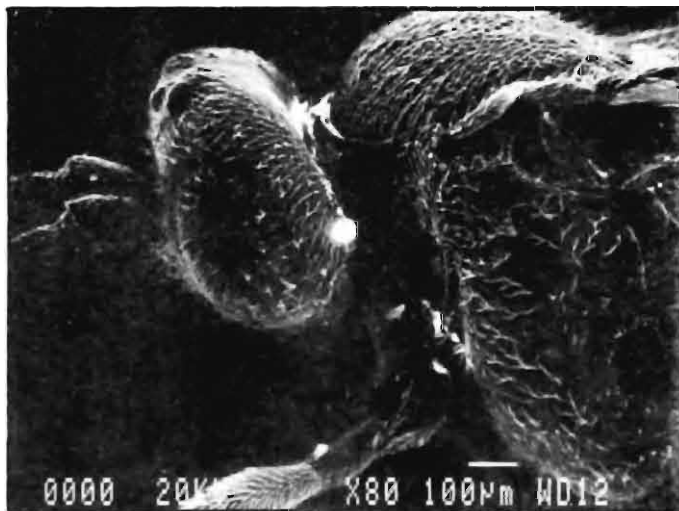
Fig. 2. Abdominal Tergites of *Apanteles* species (after Bhatnagar, 1948).



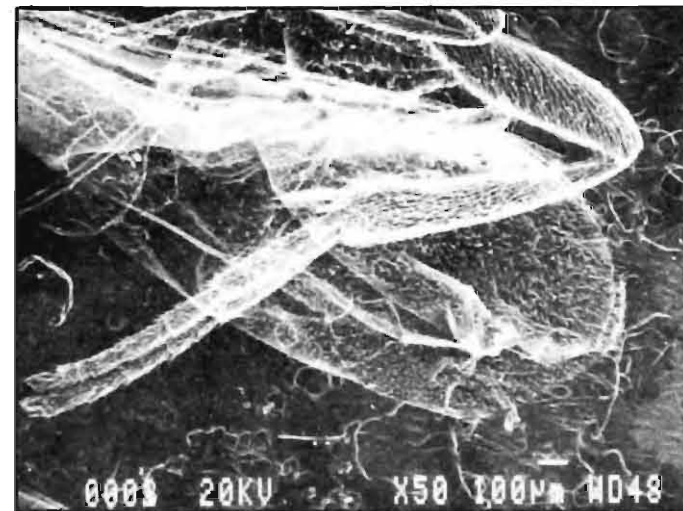
HEAD, PART OF ANTENNA & LEGS



THORAX WITH LEGS & I-II TERGITES



HEAD, THOREX & ANTENNA (PART)



HIND LEG & PART OF FOREWING

Fig. 3. Scanning Electron Microscopy Photographs of *Stenobracon nicevillei* (Bing.) and *Apanteles glomeratus* (Linn.)

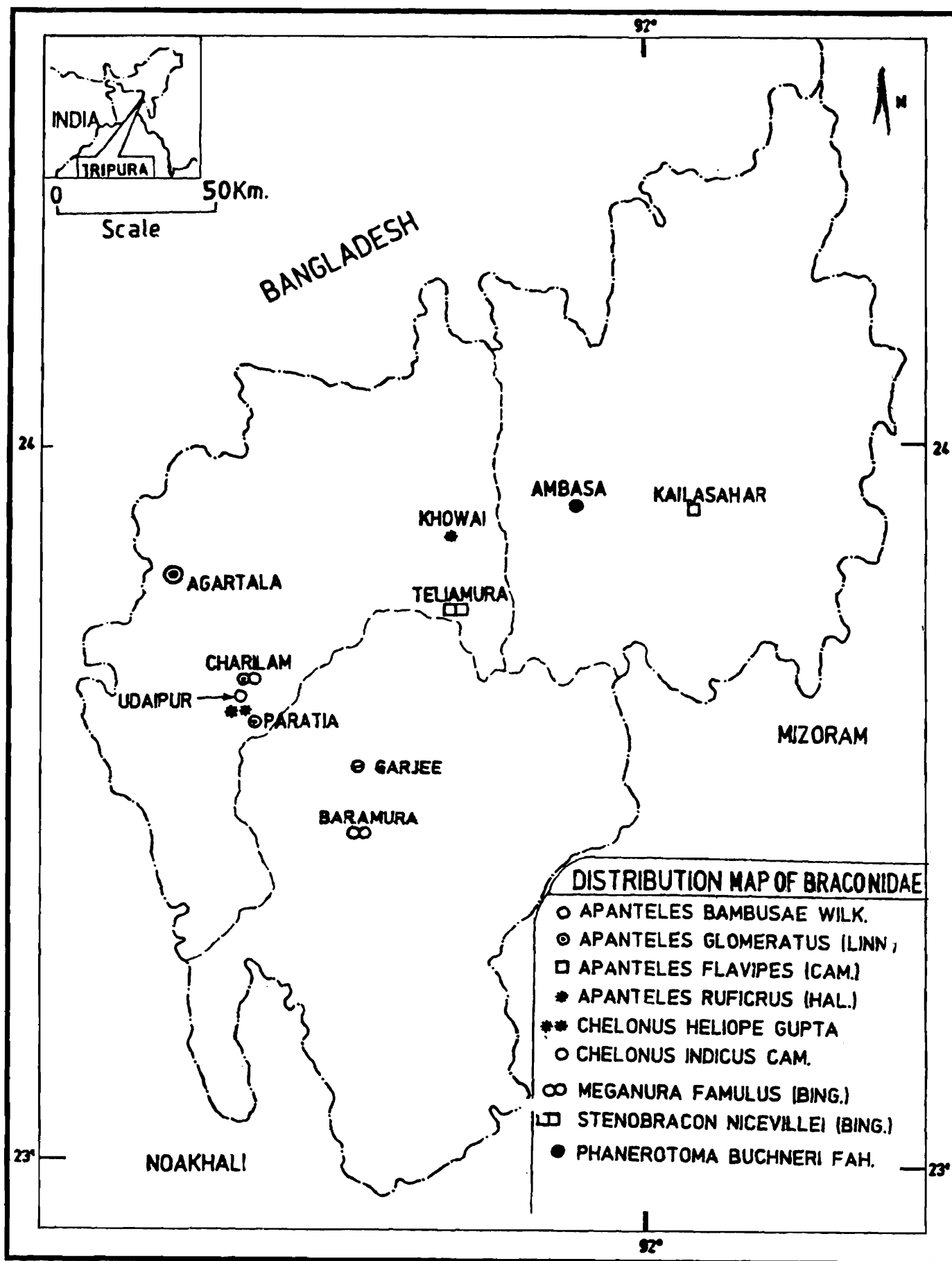


Fig. 4. Distribution Map of Braconid species in Tripura.

INSECTA : HYMENOPTERA : SCOLIIDAE

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INTRODUCTION

The family Scoliidae belongs to superfamily Scolioidea, which includes one of the most attractive groups of wasps.

The members of this family Scoliidae are commonly known as hairy wasps, usually black in colour, marked with spots or bands of yellow, white or red. Their wings are usually dark with a metallic iridescence. The members of this family are world-wide in distribution and their larvae are ectoparasitic on the larvae of Scarabaeidae.

Our knowledge about these wasps is very limited. Bingham (1897) made an attempt to provide an account of family Scoliidae. Betrem (1928) did a pioneering monographic work on the Indo-Australian genera and species of this family. In addition, significant contributions were made by several workers namely : Betrem and Bradley (1964); Bradley (1964-1974); Guiglia (1965); Krombein (1963-1978) ; Gupta and Jonathan (1991) and Jonathan and Gupta (1993).

The members of this family are readily distinguished from other wasps by having wing membrane beyond the cells closely striolate and meso- and metasternum form a flat plate overlying the bases of the middle and hind coxae.

The family is known by two subfamilies, viz., Proscoliinae and Scoliinae. The subfamily Proscolinae is known by two species, one each from Armenia and Greese. The subfamily

Scoliinae is represented by a large number of species and subspecies, and is distributed throughout the World.

The subfamily Scoliinae is subdivided into two tribes, viz., Campsomerini and Scoliini. In the state of Tripura this subfamily is represented by 5 species/subspecies under 5 genera and 3 subgenera.

TAXONOMIC TERMINOLOGY

The morphological terms followed by Betrem (1928) and Krombein (1928) are used in the present work. The morphological terms used in the text are illustrated in figures 1-4.

SYSTEMATIC ACCOUNT

Family SCOLIIDAE

Subfamily SCOLIINAE

I. Tribe CAMPSOMERINI

1. Genus *Phalerimeris* Betrem

1. *P. phalerata phalerata* (Saussure)

2. Genus *Sericocampsomeris* Betrem

2. *S. stygia stygia* (Burmeister)

3. Genus *Campsomeriella* Betrem

2. Subgenus *Annulimeris* Betrem

3. *C. (A.) annulata* (Fabricius)

II. Tribe SCOLIINI

4. Genus *Megascolia* Betrem & Bradley

2. Subgenus *Regiscolia* Betrem

* Northern Regional Station, Z.S.I. Dehra Dun, U.P.

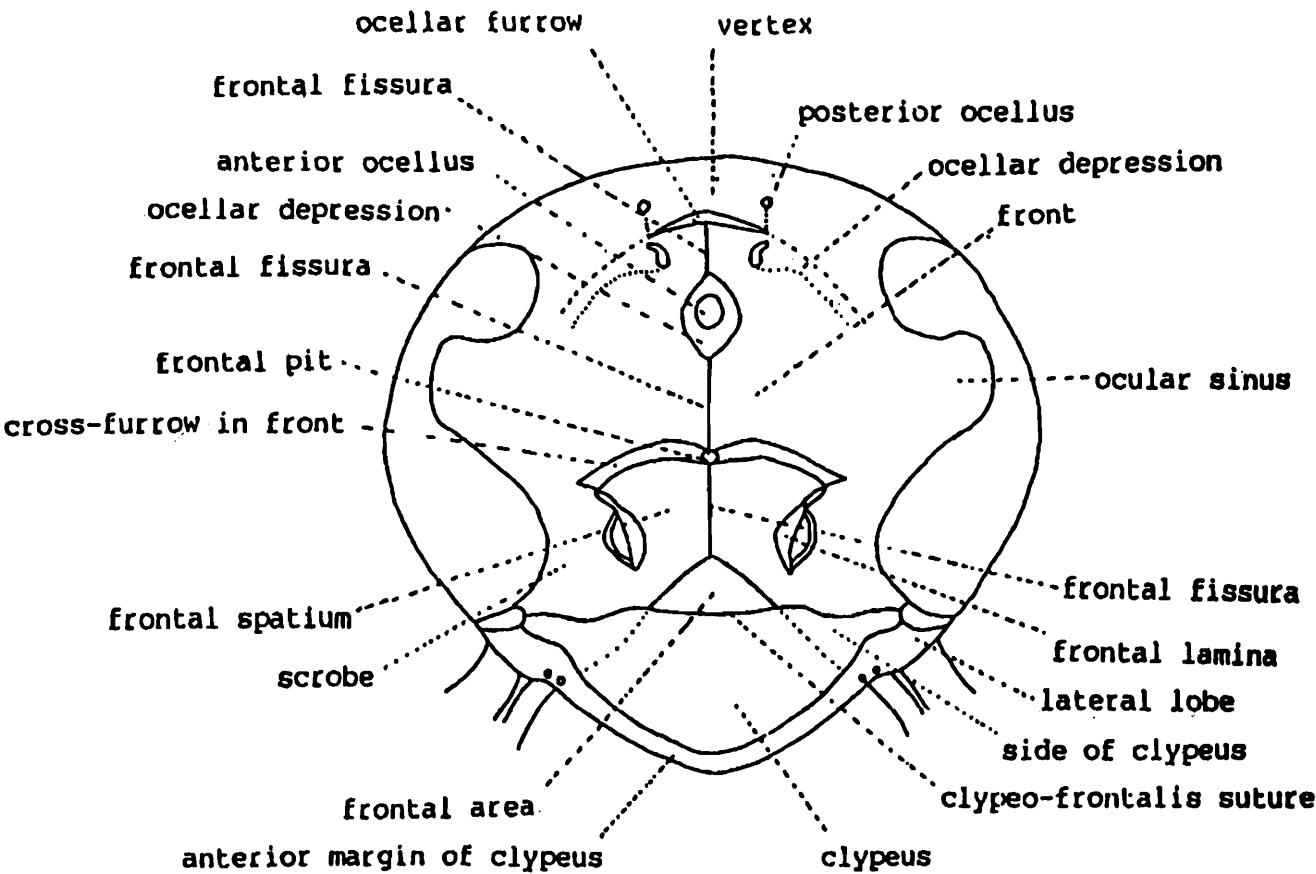


Fig. 1 : Anterior view of head of a Scoliid

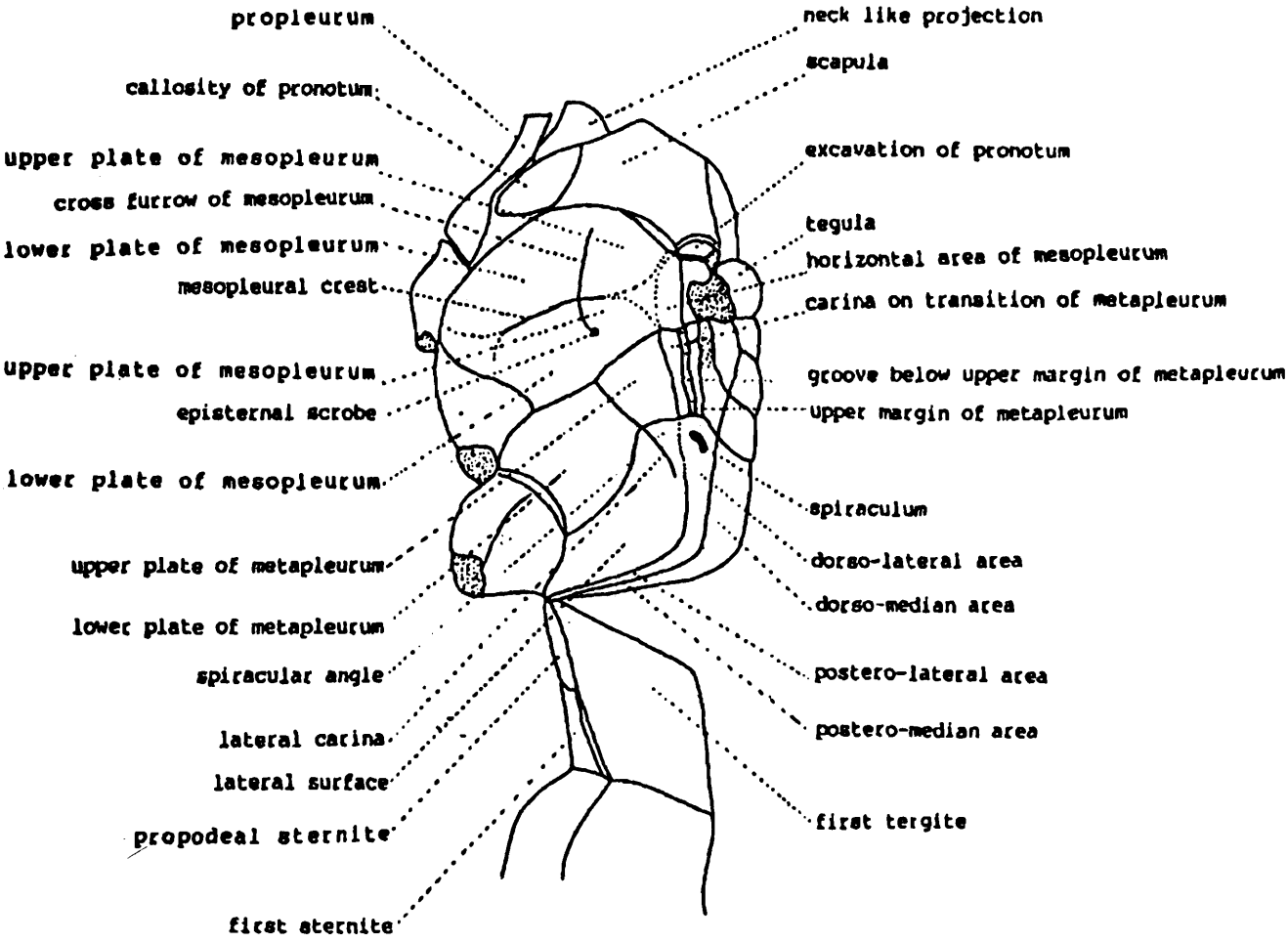


Fig. 2 : Lateral view of Thorax of a Scoliid.

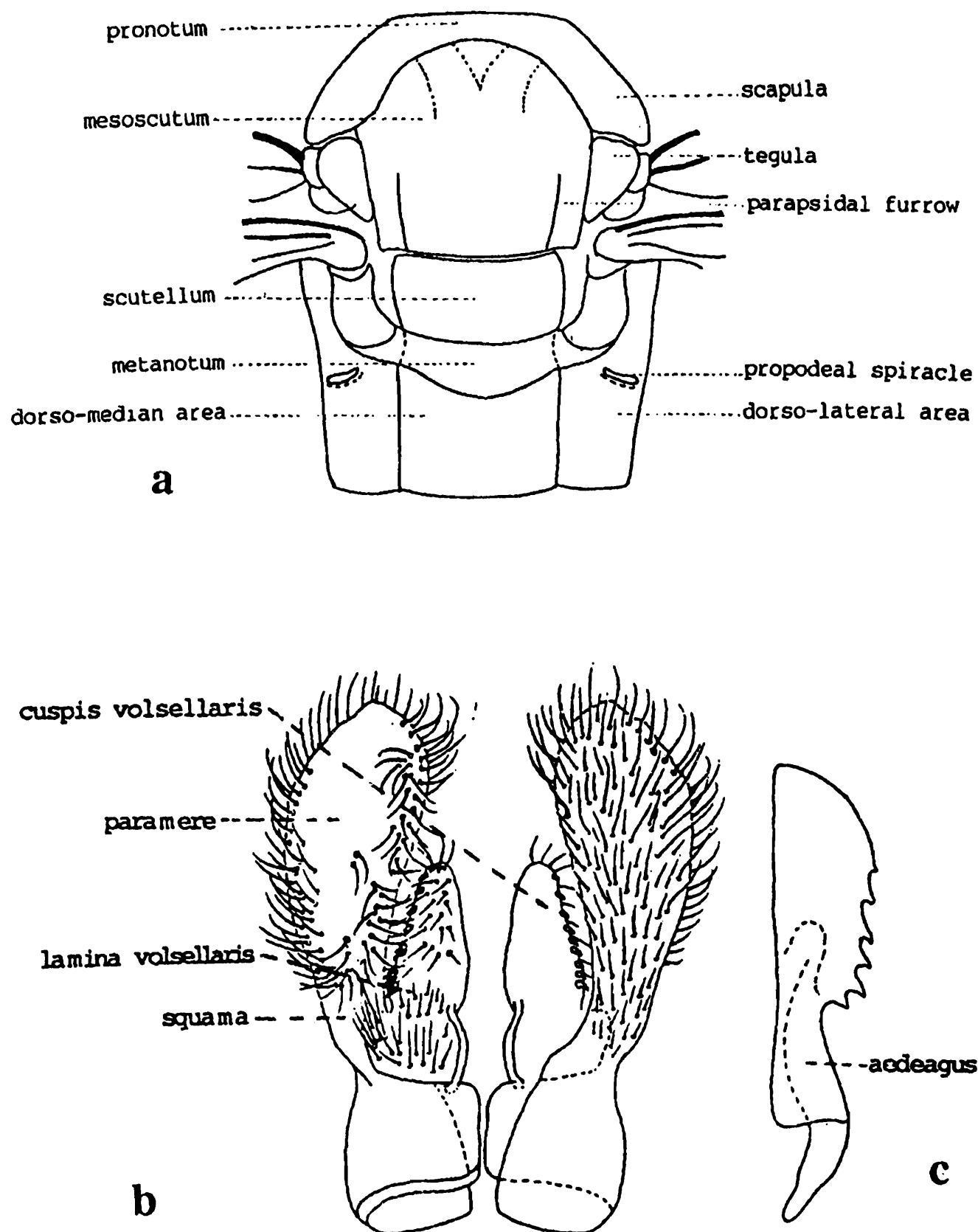


Fig. 3 : a, Dorsal view of thorax of a Scoliid;
b, male genitalia, ventral aspect at left; dorsal aspect at right; c, aedeagus.

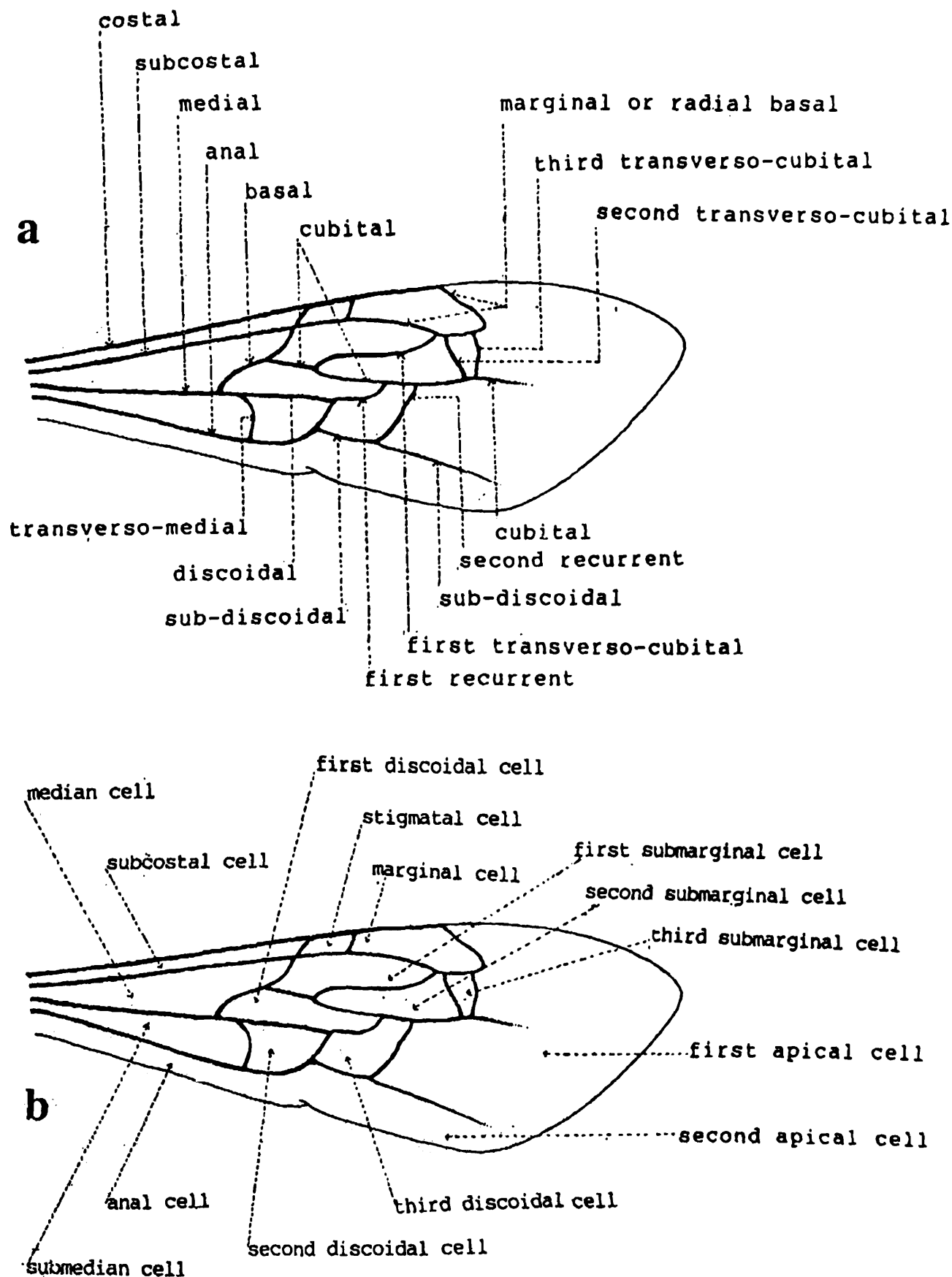


Fig. 4 : Diagrammatic view of fore wing : a, various veins; b, various cells.

4. *M. (R.) azuria christiana*
(Saussure)

5. Genus *Scolia* Fabricius

3. Subgenus *Discolia* Betrem & Bradley

5. *S. (D.) affinis* Guerin

Subfamily SCOLIINAE

Key to the tribes of SCOLIINAE

1. Fore wing with two recurrent veins, second recurrent not coalescent with first, however, reaching the cubital vein; sexual diamorphism well developed, males more slender and usually with extensive yellow integumental markings, while females robust and usually black; volsella divided into apical and basal parts by a transverse suture I. Tribe CAMPSOMERINI

Fore wing with single recurrent vein, second recurrent vein, when present, coalescing with first recurrent vein before reaching cubital vein; sexual diamorphism not so marked, males comparatively more robust than in Campsomerini and extensively marked with yellow only in a few species, where the females also maculated extensively; volsella not divided by a suture II. Tribe SCOLIINI

I. Tribe CAMPSOMERINI

Key to genera of the tribe Campsomerini
Female

1. Upper plate of metapleurum entirely impunctate, transition between its dorsal and vertical areas either sharp and marked by a carina or the transition very gradual 2
- Upper plate of metapleurum usually punctate above, transition between its vertical and dorsal areas gradual to blunt, usually sharp anteriorly and gradual posteriorly 3
2. Lateral carina of propodeum abbreviated or extended up to spiracles; head behind ocelli impunctate; dorso-median area of propodeum triangularly protruded posteriorly; posterior surface of propodeum impunctate to finely and sparsely punctate; longer spur of hind tibia black, white or testaceous, usually blunt or acute but

sometimes slightly spatulate at the apex. For wing yellowish hyaline to entirely fuscous, often basally hyaline and apically fuscous

..... *Campsomeriella* Betrem

- Lateral carina of propodeum extended beyond the spiracles; head behind the ocelli with scattered to close punctures; dorsomedian area of propodeum not triangularly protruded posteriorly; posterior surface of propodeum closely punctate at least above; longer spur of hind tibia black or testaceous, usually blunt at the apex. Fore wing usually dark brown
..... *Sericocampsomeris* Betrem

4. Front in front of anterior ocellus with a group of deep punctures, scapulae without shallow longitudinal grooves; lateral carina extended beyond the spiracles; carina along the outer margin of the dorsum of propodeum distinct but the high; longer spur of hind tibia straight, acute or somewhat blunt at the apex; first submarginal cell almost entirely setose; basal abdominal tergites usually with yellow or reddish-brown bands ... *Phalerimeris* Betrem

- Front in front of anterior ocellus usually without any group of deep punctures; scapulae with shallow longitudinal grooves; carina along the outer margin of dorsum of propodeum very strong and high and extended posteriorly up to the upper half of the postero-lateral area, with a deep groove along the inner side; dorso-median area, with a deep groove along the inner side; dorso-median area of propodeum sometimes with a median tubercle posteriorly; second submarginal cell bare, setose only above. Integument usually entirely black, sometimes basal tergites with yellow apical bands; vestiture usually yellowish or yellowish-brown, rarely entirely black; thorax especially the dorsum of propodeum with long vestiture. Wings hyaline to dark brown
..... **Magacampsomeris* Betrem

(* Not reported from Tripura)

Male

1. Head much broader than high in frontal aspect, frontal spatium distinctly defined posteriorly by a somewhat curved groove, surface impunctate posteriorly in the middle, front largely impunctate except for a group of punctures in front of anterior ocellus, and with a large flat triangular area in front of anterior ocellus; declivity of vertex sloping and the temples receding; anterior slope of second sternite not steep, but distinct, apical sternite usually with dense erect setae, known as copulatory brushes. Male genitalia with parameres slender, angular in circumference and their apices thickened, basal part of volsellae without dense hair.....
..... *Campsomeriella* Betrem

- Head not broader than high in frontal aspects ; front without a large punctate area in front of anterior ocellus; declivity of the vertex not strongly sloping and temple not receding; apical sternite without dense erect setae. Male genitalia with parameres slender but not angular in circumference and their apices not thickened, basal part of vosellae with sparse to dense hairs 2

2. Anterior ocellus usually large and placed in a broad shallow pit; integument entirely, or marked with bands or spots, yellow or reddish; vestiture predominantly black or white, or black mixed with white, sometimes apical abdominal segments with reddish setae; wings hyaline to fuscous. Male genitalia with paremeres short and slender, basal part of volsellae with short hair. Body length 20-26 mm.....
..... *Sericocampsomeris* Betrem

- Anterior ocellus small and usually placed in a small, shallow pit; integument usually marked with yellow or reddish-yellow spots and bands, rarely entirely black; apical abdominal segments always with black setae; wings hyaline with a subapical fuscous mark or sometimes entirely fuscous 3

3. Basal part of volsellae with short, sparse hair distance between the bases of these hairs more

than their thickness ... *Phalerimeris* Betrem

- Basal part of volsellae with long, dense hair, distance between the bases of these hair less than their own thickness.....
..... **Magacampsomeris* Betrem
(*Not reported from Tripura)

1. Genus *Phalerimeris* Betrem

1967. *Campsomeris* subgenus *Phalerimeris* Betrem, *Bull. British Mus. (Nat. Hist.) Ent.*, **20** (7) : 294-295.
Type-species : *Elis (Campsomeris) phalerata* Saussure, 1958.

1974. *Phalarimeris* Beterm : Bradley, *Revue suisse Zool.*, **81** (20) : 460 (*Phalerimeris* raised to generic status).

Type-species : *Elis (Campsomeris) phalerata* Saussure, 1858 (Original designation).

This genus is widely distributed in the Oriental Region and also occurs in New Guinea and adjacent Islands. The female of this genus can be easily distinguished from that of *Megacamsomeris* in having a group of deep punctures in front of anterior ocellus.

Of the three species known from Indian subregion, viz., *P. madurensis* Betrem, *P. lantachneri* (Dalla-Torre) and *P. phalerata* Saussure, only *P. phalerata* subspecies *phalerata* Saussure has been recorded from Tripura.

1. *Phalerimeris phalerata phalerata* Saussure

1856. *Ells (Campsomeris) phalerata* Saussure, *Ann. Soc. Ent. France* (3) **6** : 233. Female (not male) (Copenhagen Museum).

1897. *Ells iris* (Lapeletier) : Bingham, *Fauna of British India Hym.*, **1** : 94, Male, Female (specimens from North India, Mynamar and Java only).

1911. *Camposomeris albopilose* Rohwer, *Proc. U. S. Nat. Mus.*, **39** : 480. Male, Java (synonymised by Betrem, 1928).

1972. *Phalerimeris phalerata phalerate* (Saussure) : Bradley, *Revue suisse Zool.*, **81** (20) : 460.

Diagnostic characters : Female : Length 12-18 mm. Black. Antennae, tibiae and tarsi reddish; first three tergites with narrow apical orange bands, that on second narrowed towards sides. Erect vestiture reddish-golden, except black on the last

abdominal segment and pygidium. Tomentum golden. Wings yellowish, apex of fore wing with large, well defined dark mark.

Male : Length 10-16 mm. Black. Abdomen with faint blue reflections. The yellow markings as follows : clypeus (except for a small to large median triangular area), a line along lower inner eye orbit, scrobes, a long mark on gena, pronotum broadly along its posterior margin, a minute postero-lateral mark on mesoscutum, a narrow anterior band on scutellum small, anterior spot on metanotum, fore coxa, apical mark on fore femur below, middle femur with narrow stripes above and below, outer surface of fore and middle tibiae, posterior bands on first four tergites, band on first tergite usually covering apical half, band on third emarginate on sides, fourth band narrow and sometimes interrupted in the middle, rarely with postero-lateral spots on fifth tergite also ; second, third and usually fourth sternites with narrow apical lateral spots, spots on second and third sternites sometimes united in the middle, those on fourth widely separated in the middle. Erect vestiture pale, except black on last three abdominal tergites. Wings slightly infumated ; fore wing usually with a light subapical mark.

Material examined : India : Tripura : Teliamura, Gamartilla, 4 males, 19.x.1977, Coll. N. Muraleedharan; Ambassa, 1 male, 20.x.1977, Coll. N. Muraleedharan; 2 males, 24.v.1978, Coll. J.K. Jonathan & Party (Z.S.I, Calcutta).

Distribution : India : Tripura, Sikkim, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Meghalaya, Uttar Pradesh and West Bengal. *Elsewhere* : China, Myanmar, Nepal, Taiwan and Sulawesi.

2. Genus *Sericocampsomeris* Betrem

1941. *Campsomeris* subgenus *Sericocampsomeris* Betrem, *Notes Ent. Chinoise*, 8 (4) : 91-91, des. Type-species : *Scolia quadriguttulata* Burmeister.
1972. *Sericocampsomeris* Betrem. *Mon. Ned. Ent. Ver.*, 6 : 12.

Type-species : *Scolia stygia* Illiger (= *Scolia quadriguttulata* Burmeister).

This is a moderate sized genus, widely distributed in the Oriental Region, and is also known from southern China and Sulawesi. It is known by only one subspecies, *S. stygia stygia* (Illiger) from the state of Tripura, which is detailed below:

2. *Sericocampsomeris stygia stygia* (Illiger)

1802. *Scolia stygia* Illiger, *Mag. Ins.*, 1 : 195. Type Female Tranqueber (Berlin Museum).
1854. *Scolia 4-guttulata* Burmeister, *Abn. Naturf. Ges. Halle*, 1 (4) : 21. Female. Java (Halle Museum).
1855. *Scolia luctuosa* Smith, *Cat. British Mus. Hym.*, 3 : 101. Type Female. Silhet (British Museum).
1905. *Campsomeris sericeps* Cameron, *Tidjschr. Entom.*, 48 : 55. Type Female. Java (Artis Museum).
1915. *Dielis javanica* Leefmans, *Meded. Lab. V. Plantenziekten*, 13 : 62. Type Female. Java.
1972. *Sericocampsomeris stygia stygia* Illiger : Betrem and Bradley, *Mon. Ned. Ent. Ver.*, 6 : 12.

Diagnostic characters : *Female* : 31-35 mm. Black, third and fourth abdominal tergites usually with paired yellow spots, the spots sometimes small and present only on fourth tergite, sometimes abdomen entirely black. Vestiture black, except tomentum on scrobes and declivous portion of the vertex silvery white. Wings dark brown.

Material examined : India : Tripura : Manu : Jarulchrra, 1 female, 26.ii.1974, Coll. M.S. Shishodia & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, S. India, and West Bengal. *Elsewhere* : Myanmar and Indonesia.

Remarks : This species is readily recognised by having four spots on the abdomen.

3. Genus *Campsomeriella* Betrem

1941. *Campsomeris* subgenus *Campsomeriella* Betrem, *Notes Ent. Chinoise*, 8 (4) : 86-87. Type-species : *Scolia thoracica* Fabricius.
1967. *Campsomeriella* Betrem. *Entom. Bericht*, 27 : 25-29.

Type-species : *Scolia thoracica* Fabricius [= *Campsomeriella* (*Campsomeriella*) *thoracica* (Fabricius)].

This genus is widely distributed in the African, southern Palaearctic and Indo-Australian Regions, except Australia. This genus is divided into four subgenera, viz., *Campsomeriella* Betrem, *Annulimeris* Betrem, *Rodriguimeris* Betrem and *Madonimeris* Betrem. Of these, *Campsomeriella* and *Annulimeris* are widely distributed in Indian subregion.

Only one species under subgenus *Annulimeris* Betrem is known from the state of Tripura, which is discussed below :

1. Subgenus *Annulimeris* Betrem

1967. *Campsomerilla* subgenus *Annulimeris* section *Annulimeris* Betrem, *Ent. Ber.* 27 : 29. Type-species : *Typhia annulata* Fabricius, 1793.

1972. *Campsomeriella* subgenus *Annulimeris* Betrem : Betrem & Bradley, *Mon. Ned. Ent. Ver.*, 6 : 306 (section *Annulimeris* Betrem, 1967 and section *Madonimeris* Betrem, 1967 were elevated to the status of subgenus).

Type-species : *Typhia annulata* Fabricius, 1793 (Original designation).

This subgenus is represented by a single species, viz., *Campsomerilla (Annulimeris) annulata* (Fabricius), which is discussed below :

3. *Campsomeriella (Annulimeris) annulata* (Fabricius)

1793. *Typhia annulata* Fabricius, *Ent. Syst.*, 2 : 225. Type Female. China (Copenhagen Museum).

1845. *Campsomeris servillei* Lapeletier, *Hist. nat. Ins. Hym.*, 3 : 501. Type Female. Java (Italy Museum).

1901. *Elis aglaea* Cameron, *Proc. zool. Soc. London*, 2 : 19. Type Male. Malaya.

1967. *Campsomeris (Annulimeris) annulata* (Fabricius) : Betrem, *Entom. Berich.*, 27 : 29. (subgenus *Campsomeriella* raised to generic status; *annulata* placed under new subgenus *Annulimeris* Betrem).

Diagnostic characters : Female : 14-23 mm. Integument black, except spurs of middle and hind tibiae white. Erect vestiture and decumbent setae on abdominal segments, black; tomentum on the sides of the thorax silvery. Wings hyaline, fore wing dark brown at apical third.

Material examined : India : Tripura : Ambassa, 1 female, 24-26.v.1978, Coll. J.K. Jonathan & Party (Z.S.I, Calcutta)

Distribution : India : Tripura, Sikkim, Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Kashmir, Meghalaya, Uttar Pradesh and West Bengal. *Elsewhere* : Bangladesh, China, Indonesia, Korea, Malaysia, Myanmar, Nepal and Taiwan.

II. Tribe SCOLIINI

Key to the genera of tribe Scoliini from Tripura

1. Large sized species, 19-50 mm. Fore wing with three submarginal cells, except in *M. fulvifrons* Saussure with two submarginal cells ; first tergite with a strong tubercle anteriorly *Megascolia* Betrem
- Small to moderate sized species, 5-25 mm. Fore wing always with two submarginal cells ; first tergite with a small to moderate sized tubercle anteriorly, tubercle often absent *Scolia* Fabricius

4. Genus *Megascolia* Betrem

1928. *Scolia* subgenus *Triscolia* Saussure : Betrem, *Treubia*, 9 (suppl.) : 224. Type-species : *Scolia flavifrons* Fabricius, 1775.

1928. *Scolia* subgenus *Triscolia* section *Megascolia* Betrem, *Treubia*, 9 (suppl.) 239. Type-species : *Scolia procer* Illiger, 1802.

1964. *Megascolia* Betrem : Betrem & Bradley, *Zool. Meded.* 39 : 437 (*Megascolia* raised to generic status).

Type-species : *Scolia procer* Illiger, 1802. [= *Megascolia procer procer* Illiger, 1802]. Original designation.

This genus is widely distributed in the Oriental Region and is also known from southern Palaearctic and Mediterranean regions. The genus is subdivided into two subgenera, viz., *Megascolia* Betrem and *Regiscolia* Betrem & Bradley.

Of these two subgenera, only *Regiscolia* Bradley has been reported from the state of Tripura.

3. Subgenus *Regiscolia* Bradley & Betrem

1928. *Scolia* subgenus *Triscolia* Saussure : Betrem, *Treubia*, 9 (suppl.) : 228. Type-species : *Scolia flavifrons* Fabricius, 1775.

1964. *Megascolia* subgenus *Regiscolia* Betrem & Bradley, *Zool. Meded.*, 39 : 441 (established as a new subgenus).

Type-species : *Scolia flavifrons* Fabricius, 1775 [= *Megascolia (Regiscolia) flavifrons flavifrons* (Fabricius), 1775], subsequent designation.

This subgenus is widely distributed in the Oriental Region and is also known from Mediterranean and southern Palaearctic Regions.

M. (R.) azuria christiana (Betrem & Guiglia) is the only species known from the state of Tripura.

3. *Megascolia (Regiscolia) azuria christiana* (Betrem & Guiglia)

1892. *Scolia (Triscolia) rubiginosa* Fabricius : Magretti, *Ann. Mus. civico. Stor. nat. Geneva*, 32 : 236; Female, Male. Myanmar.

1897. *Scolia (Triscolia) rubiginosa* Fabricius : Bingham : *Fauna British India, Hym.*, 1 : 76-77.

1964. *Megascolia (Regiscolia) azuria christiana* (Betrem & Guiglia) : Betrem & Bradley, *Zool. Meded.*, 39 : 444.

Diagnostic characters : *Female* : Length 30-42 mm. Integument black. The following are red or yellowish-red : frontal spatium along its upper margin, front, vertex entirely including ocular sinuses, paired large oval spots on third tergite, fourth to last tergites usually with reddish tinge. Vestiture black, except yellowish-red or red on third to last abdominal segments, including pygidium. Wings dark brown with violaceous effulgence. Wings dark brown with purplish blue reflections.

Material examined : India : Tripura : Garjee, 1 Males, 12.v.1978, Coll. J.K. Jonathan & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Arunachal Pradesh, Assam Himachal Pradesh, Manipur, Meghalaya, Uttar Pradesh and West Bengal. *Elsewhere* : Bangladesh, Myanmar and Nepal.

5. Genus *Scolia* Fabricius

This genus is represented by two subgenera, viz., *Scolia* Betrem (1928) and *Discolia* (Saussure) in the Indian subregion. In the state of Tripura this genus is represented by a single species, under subgenus *Discolia* Saussure.

3. Subgenus *Discolia* Saussure

1863. *Scolia* subgenus *Discolia* Saussure, *Soc. ent. France. Ann.*, (4) 3 : 18.

Type-species : *Scolia nobilitata* Fabricius. Designated by Betrem and Bradley, 1964.

This subgenus is widely distributed in most geographical regions of the world. About 40 species/subspecies are known under this subgenus from India. Only one species has been recorded from Tripura which is discussed below :

5. *Scolia (Discolia) affinis* Guerin

1838. *Scolia affinis* Guerin, *Voy. Cog.* : 254. Type Male, Female "Senegal" (Paris Museum).

1855. *Scolia (Lacosi) jurinei* Saussure, *Mem. Soc. Phys. Hist. Nat. Geneva*, 14 : 45. Type Male, Female "Indes Orientales" (Geneva Museum).

1864. *Scolia (Discolia) aureipennis* Lepeletire : Saussure & Sichel, *Cat. Spec. Gen. Scolia* : 109 (misidentification of *S. aureipennis* Lepeletire ; *S. jurinei* synonymised under here).

1978. *Scolia (Discolia) affinis* Guerin : Krombein, *Smithsonian Contr. Zool.* 283 : 31.

Diagnostic characters : *Female* : 17-25 mm. Integument black, except antennal flagellum orange-red. Vestiture entirely black. Wings dark brown, fore wing darker apically, with dark brown effulgence.

Material examined : India : Tripura : Garjee, 1 male, 12-15, Coll. J.K. Jonathan & Party; Dharmnagar, Bagbassa, 1 male, 2.vi.1978. Coll. J.K. Jonathan & Party (Z.S.I., Calcutta).

Distribution : Tripura, Sikkim, Assam, Bihar, Delhi, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Orissa, Punjab, Tamil Nadu, Pondicherry, Uttar Pradesh and West Bengal. *Elsewhere* : Myanmar and Nepal.

Remarks : This is one of the most common and widely distributed scoliid. The female can be easily distinguished by having orange-red antennal flagellum and integument and vestiture entirely black.

SUMMARY

The scoliids are ectoparasitoids of coleopteran larvae, mainly Scarabaeidae, which are pests of forest and agriculture. Many of these may be economically exploited for the biological control of insect pests.

This paper deals with the Scoliidæ fauna from the state of Tripura. Altogether 5 species/

subspecies under 5 genera and two tribes are treated in the text. The keys for the identification of tribes and genera are provided.

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INSECTA : HYMENOPTERA : VESPIDAE

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INTRODUCTION

The family Vespidae belongs to superfamily Vespoidea which includes true wasps. They are chiefly predators of insect larvae and some of the species serve as effective predators for the control of some insect pests of agricultural crops.

On knowledge about these wasps is very limited. The important works available on Indian wasps are by Bingham (1897), Das and Gupta (1977, 1983, 1989). Besides these, there are some important contributions on wasps of Oriental Region by van der Vecht (1935-1979), Archer (1980-1987), Kojima (1982-1988), Yamane (1974-1987) and Williams (1983-1988). Jonathan, Roy and Kundu (2000) had published a consolidated account of the family Vespidae of the state of West Bengal and Meghalaya.

An attempt has been made here to provide a consolidated information on the Vespidae fauna of the State of Tripura in India.

The family Vespidae is characterised by the following characters : Antennae 13-segmented in male and 12-segmented in female; eyes emarginate; pronotum extending back to tegula, and mesopleurum without any oblique suture; wings longitudinally folded in repose (except in Masarinae and Stenogastrinae), fore wing with first discoidal cell elongate, longer than submedian cell; hind wing with an anal cell and enclosed cells; trochanters not divided and trochantellus absent, middle tibiae with one or two apical spurs, tarsal claws toothed, bifid or simple; thorax and gaster joined together by a long and slender or short petiole; gaster with spiracles on 1-7 segments and a string without

sheaths; male genitalia with characteristic spiniform parameres.

There are about 700 species of Vespidae known from the world and are classified under five subfamilies. In India, the family is represented by about 135 species/subspecies, 11 genera/subgenera under three subfamilies.

In Tripura, the Vespidae is represented by two subfamilies, viz., Vespinae and Polistinae, which includes 12 species/subspecies under 4 genera, 3 subgenera and 2 tribes from this state. Of these, 2 species (*) are reported for the first time from here.

The keys to the subfamilies, tribes, genera, subgenera, species and subspecies are provided for the identification of various taxa of this region. Illustrations of taxonomic terms used in the present work are included for ready reference.

TAXONOMIC TERMINOLOGY

The morphological terms used in the present work are mainly based on the works of Richards (1956, 1973), Sehgal (1963), van der Vecht (1941, 1975) and Das and Gupta (1989). The morphological terms used in the Text are illustrated in figures 1, 2 and 3.

SYSTEMATIC ACCOUNT

Family VESPIDAE

1. Subfamily POLISTINAE

1. Tribe POLISTINI

1. Genus *Polistes* Latreille, 1802

1. Subgenus *Polistes* (*Megapolistes*) van der Vecht, 1968

1. *olivaceus* (De Geer), 1773
2. Subgenus *Polistes* (*Polistella*) Ashmead, 1904
2. *strigosus atratus* Das and Gupta, 1989
3. *sagittarius* Saussure, 1953
- *4. *hoplitus* Saussure, 1853
2. Tribe ROPALIDIINI
2. Genus *Ropalidia* Guerin, 1989
3. Subgenus *Ropalidia* (*Anthreneida*) White, 1841
- *5. *brevita* Das and Gupta, 1989
6. *rufocollaris rufocollaris* (Cameron), 1900
7. *stigma stigma* (Smith), 1858
8. *fasciata* (Fabricius), 1804
9. *mathematica nigroplagiata* (Cameron), 1900
4. Subgenus *Ropadidia* (*Paraicaria*) Gribodo, 1892
10. *bicolorata shiva* Das & Gupta, 1989
2. Subfamily VESPINAE
3. Genus *Vespa* Linnaeus, 1758
5. Subgenus *Vespa* (*Vespa*) Linnaeus, 1758
11. *tropica tropica* (Linnaeus), 1758
4. Genus *Provespa* Ashmead, 1903
12. *anomala* (Saussure), 1853

Family VESPIDAE

Key to the Subfamilies of VESPIDAE

1. Wings not folded longitudinally when at rest. Tarsal claws with one tooth. Mandible elongate. Occipital carina either joining with or almost reaching near to hypostomal carina. Antennal sockets far apart, separated from the basal margin of clypeus by a long supraclypeal area. In male, clypeus and mandible produced like a beak. Nervulus distinct. Second cubital cell

rectangular. Thorax short, globular; first gastral segment petiolate, longer than rest of the gaster STENOGASTRINAE*

- Wings folded longitudinally when at rest. Tarsal claws simple, without tooth. Mandibles of normal shape. Occipital carina joining with or running towards the base of mandible. Antennal sockets not very far apart and separated from the basal margin of clypeus by short supraclypeal area. In male, clypeus and mandible normal, not beak shaped. Nervulus short. First cubital cell larger than second cubital cell. Thorax normal. First gastral segment petiolate or subpetiolate or sessile, not much longer than the rest of the gaster. 2
- 2. Hind wing usually with an anal lobe. Hind coxa without a dorsal carina. Mesepimeron not completely or not at all separated from the mesepisternum. Dorsal episternal groove and epicnemial carina present or absent. Gaster petiolate or subpetiolate. 1st tergite gradually curving from base to apex. Occipital carina always present. Apical margin of clypeus in female gradually tapering into a sharp or blunt tooth. Apical margin of postscutellum not at all or weakly produced in the middle of propodeum at base. Propodeum transversely rugose and curved at sides, its apical orifice elongate. Mandibles smaller, not expanded apically. Male antenna with a hook-like bend at apex. Smaller, more slender species with nest consisting of a single horizontal or vertical naked comb that is not enclosed by papery envelopes (*Ropalidia* has species which may build an envelope round the comb; some species have more than one comb). POLISTINAE
- Hind wing without an anal lobe. Hind coxa with a dorsal carina on posterior surface. Mesepimeron completely separated from mesepisternum. Dorsal episternal groove and epicnemial carina always absent. Gaster sessile, 1st tergite anteriorly truncate with an anterior vertical face and a posterior horizontal face, the two making a right angle. Occipital carina absent dorsally, usually present laterally but may

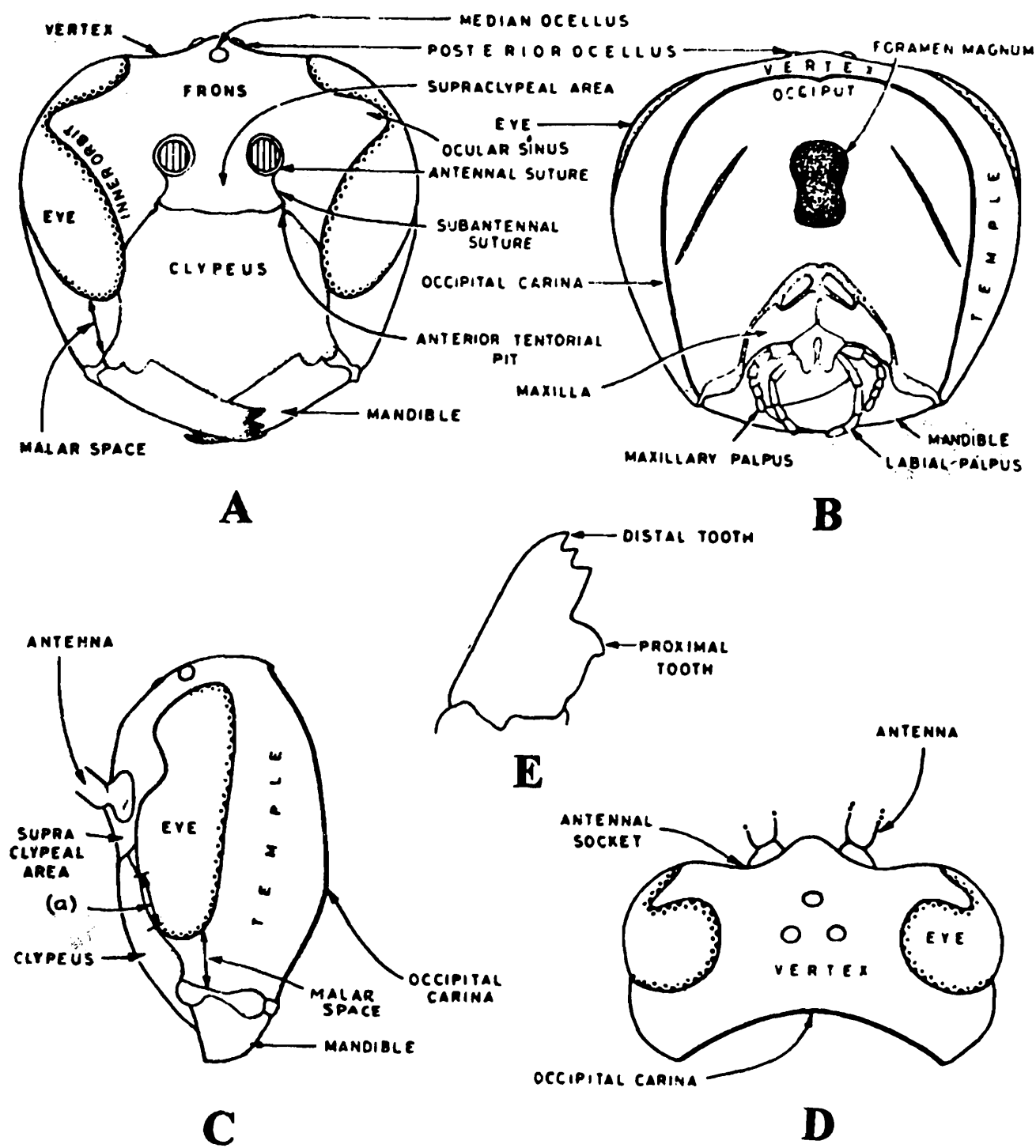


Fig. 1 : Structure of head of Vespidae : A, front view; B, posterior view; C, side view - (a) lateral margin of clypeus that lies along inner eye margin; D, dorsal view; E, mandible (after Das and Gupta, 1989)



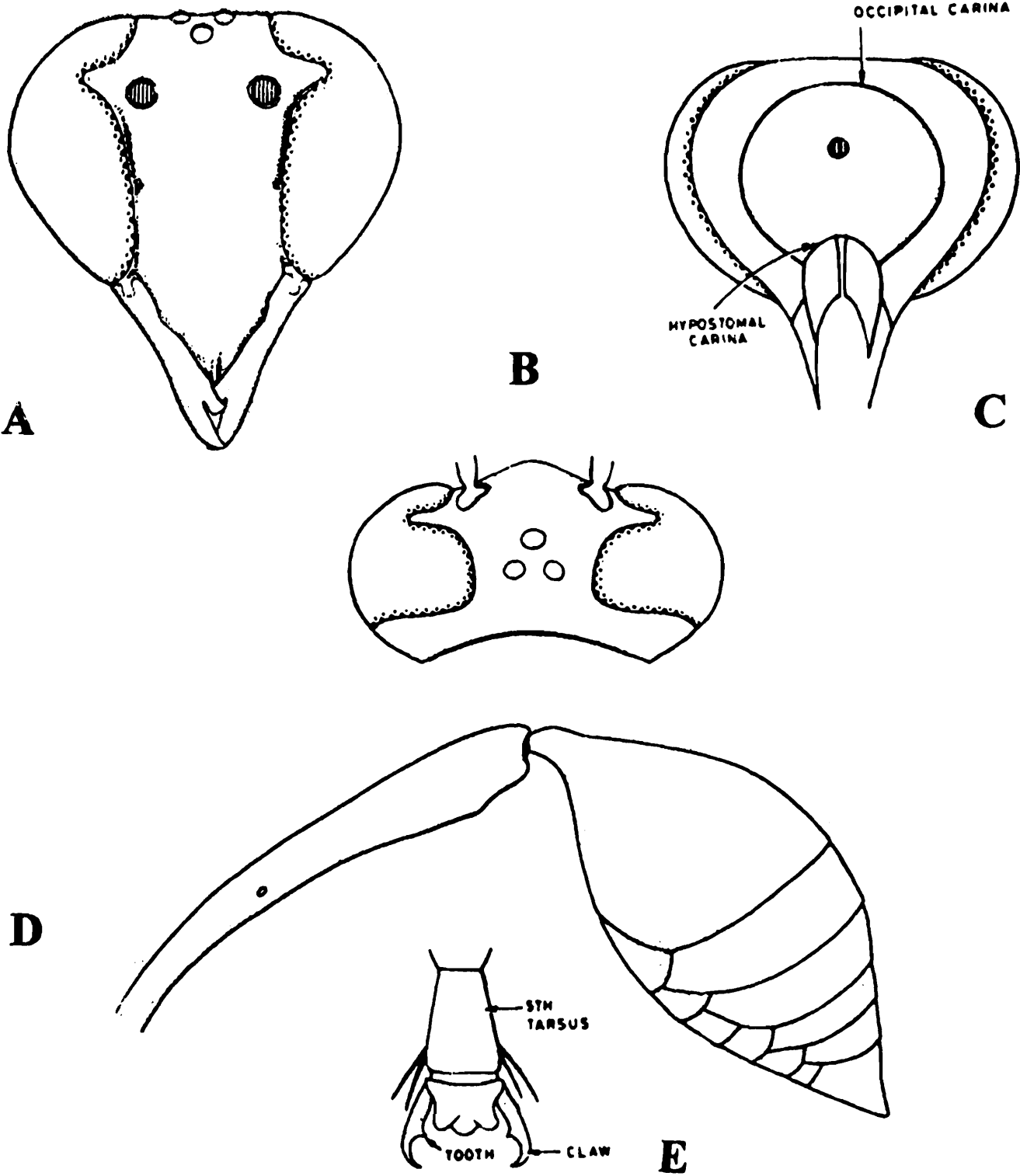


Fig. 3 : Structure of head, thorax, fifth tarsal segment and gaster of Stenogastrinae : A, head, front view; B, head, dorsal view; C, head, posterior view; D, gaster; E, fifth tarsal segment (after Das and Gupta, 1989)

or may not reach base of mandible. Apical margin of clypeus broadly truncate or emarginate medially forming two lateral sharp or blunt lobes. Apical margin of postscutellum produced in the middle forming a long triangular lobe in the basal part of propodeum. Propodeum almost vertical and without rugosities, with a circular apical orifice. Mandibles large with an expanded apical margin. Male antenna straight apically, without a hook-like bend. Larger, stouter species with nest consisting of several combs on a horizontal plane and wrapped by a papery envelope. ...
.....: VESPINAE

(*Not reported from Tripura)

1. Subfamily POLISTINAE

These are commonly called Paper-wasps. The nests consist of a single comb which is not enclosed in a paper envelope. In most of the Temperate zone species the nests are annual, each being founded by one or more overwintering females. One of the females becomes dominant and is the only one to lay eggs.

The normal larval food consists of dismembered caterpillars. Some species of *Polistes* exert considerable predator pressure on economically important insects such as tobacco horn worm and cotton ballworm. In an attempt to utilize the wasps as a biological control agent, shelters are sometimes placed in cultivated fields to afford nesting sites to founding females (Krombein and Burks, 1979).

Diagnostic characters : Body usually elongate; apical margin of clypeus tapering into a sharp or blunt tooth. Occipital carina always present; apical margin of postscutellum truncate to weakly produced in the middle at the base of propodeum; mesepisternum not completely or not at all separated from mesepisternum. Hind wing usually with an anal lobe; 1st gastral segment petiolate or subpetiolate.

Key to the Tribes of Polistinae

1. First gastral segment always petiolate and usually strongly swollen apically ; pronotal lobe

apically in front of tegula without a carina; dorsal episternal groove always absent; subtegular area basally in front of pronotal lobe not margined with a carina; second gastral tergite and stenite usually fused

..... ROPALIDIINI

- First gastral segment either petiolate or subpetiolate ; pronotal lobe apically in front of tegula with a distinct carina; dorsal episternal groove either present or absent; subtegular area basally in front of pronotal lobe margined with distinct carina, second gastral tergite and sternite never fused..... 2

2. First gastral segment subpetiolate, shorter than second segment ; muscle slit of propodeum long and narrow ; subdiscoideus joins postnervulus at or close to middle; mesepisternum with or without epicnemial carina; apical margin of postscutellum usually almost truncate

..... POLISTINI

- First gastral segment petiolate, not shorter than second segment ; muscle slit of propodeum short and wider; subdiscoideus joins postnervulus below middle; mesepisternum without epicnemial carina; apical margin of postscutellum weakly produced in the middle just at the base of propodeum

..... POLYBIINI*

(*Not reported from Tripura)

1. Tribe POLISTINI

This tribe is represented by a single genus in Indian subregion.

1. Genus *Polistes* Latreille

1802. *Polistes* Latreille, *Hist. Nat. Ins. Paris*, 3 : 363. Type-species : *Vespa gallica* Linnaeus, 1767.

This genus is subdivided into eleven subgenera (Richards, 1978). Of these, six, viz., *Polistes* (*Polistes*) Latreille, 1802; *P. (Gyrostoma)* Kirby and Spence, 1826; *P. (Nygmpolistes)* Richards, 1973; *P. (Megapolistes)* van der Vecht, 1968, *P. (Stenopolistes)* van der Vecht, 1972 and *P. (Polistella)* Ashmead, 1904 are represented in Indian subregion. In Tripura, two subgenera have

been reported. These can be recognised by the following key.

Key to the Subgenera of *Polistes*

1. Pronotal foveae present ; clypeus not extending far beyond the anterior tentorial pits; anal lobe of hind wing large and separated from the rest of the wing membrane by a smooth incision *Megapolistes* van der Vecht
- Pronotal foveae absent ; clypeus extending far beyond the anterior tentorial pits ; anal lobe of hind wing more or less reduced; mesepisternum without epicnemial carina and with incomplete dorsal episternal groove *Polistella* Ashmead

1. Subgenus *Polistes* (*Megapolistes*) van der Vecht

1968. *Polistes* (*Megapolistes*) van der Vecht, *Bijdr. Dierk.* **38** : 97. Type-species : *Vespa olivacea* (De Geer), 1773.

This is a moderate size subgenus and widely distributed in Oriental region. Three species, viz., *olivaceus* (De Geer), 1773; *wattii* Cameron, 1900 and *rothneyi* Cameron, 1900 are known from Indian region. Only *olivaceus* has been reported from the state of Tripura.

1. *Polistes* (*Megapolistes*) *olivaceus* (De Geer)

1773. *Vespa olivacea* De Geer, *Mem. Hist. Insect.*, **3** : 582, fig. Type : Sex ? (Stockholm Museum).
1787. *Vespa hebraea* Fabricius, *Mant. Ins.*, **1** : 292.
1897. *Polistes hebraeus* (Fabricius) : Bingham, *Fauna British India. Hymenoptera*, **1** : 398, F, W, des., fig., syn.
1983. *Polistes* (*Megapolistes*) *olivaceus* (De Geer) : Das and Gupta, *Oriental Ins.*, **17** : 407, cat., distr., Syn., Roy and Kundu, 1985, *Rec Zool. Surv.*, **82** (1-4) : 226; Jonathan, *et al.*, 1999, *Zool. Surv. India, State Fauna Series 3* : Fauna of West Bengal, Part 8 : 134.

Diagnostic characters : Female and Worker : Body bright yellow to yellowish-brown, with variable black and reddish markings. Dark forms with extensive black marking : mesoscutum with

two long median and two short lateral lines; first gastral tergite narrowly at base and a transverse band in the middle; second sternite narrowly at base, second to fifth tergites and sternites with bisinuate marks; basal half of hind metatarsus, black. Pronotum partly dorsally, two curved lines on propodeum on sides, second tergite at base and legs partly, reddish.

Material examined : India : Tripura : Hawabari, 2 Females, 11.v.1992, Coll. S. K. Chakraborty & Party; Pulipur, 1 Female, 10.v.1992, Coll. M. Sil (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Assam, West Bengal, Himachal Pradesh, Arunachal Pradesh, Meghalaya, Manipur, Jammu and Kashmir, Madhya Pradesh and Karnataka. **Elsewhere :** Japan, Iran, Tanzania (Zanzibar Is.), Seychelles, Madagascar, Mauritius; widely distributed in the Oriental Region and Oceanic islands and also found in Australia and New Zealand.

2. Subgenus *Polistes* (*Polistella*) Ashmead

1904. *Polistella* Ashmead, *Proc. U.S. Natl. Mus.*, **28** : 133.
Type-species : *Polistes manilensis* Saussure, 1853.

Das and Gupta (1989) reported twelve species, viz., *ephippium* Cameron, 1900; *dawnae* Dover and Rao, 1922; *lepcha* Cameron, 1900 ; *adustus* Bingham, 1897; *santoshae* Das and Gupta, 1989; *similis* Das and Gupta, 1989; *stigma* (Fabricius), 1793; *latinis* Das and Gupta, 1989; *strigosus* Bequaert, 1940; *sagittarius* Saussure, 1853; *assamensis* Bingham, 1897 and *maculipennis* Saussure, 1853 from Indian subregion. Subsequently, Jonathan *et al.* (2000) transferred another species, *Polistes hoplitus* Saussure, 1853 as a new combination to this subgenus *Polistes* (*Polistella*) which was previously referred to subgenus *Polistes* (*Nygmopolistes*) by Das and Gupta (1989), because of the absence of pronotal fovea. Thus the subgenus *Polistes* (*Polistella*) contains a total of 13 species from Indian subregion. Of these, three species/subspecies have been reported here from the state of Tripura and these can be identified by the following key.

Key to the species/subspecies of
Polistes (Polistella)

1. Pronotum ribbed ; head narrower than thorax; second gastral tergite almost yellow ; in males, subgenital plate with a broad central tubercle; thorax black with various yellow markings. ..
.....*strigosus atratus* Das and Gupta.
- Pronotum not ribbed ; head about as wide as thorax ; second gastral tergite entirely reddish-brown. 2
2. Body large about 23 mm ; thorax strongly rugoso-punctate*hoplitus* Saussure
- Body moderate in size, 16-18 mm; thorax weakly ruguloso-punctate
.....*sagittarius* Saussure

2. *Polistes (Polistella) strigosus atratus*
Das and Gupta

1989. *Polistes (Polistella) strigosus atratus* Das and Gupta, *Oriental Ins. Monogr.*, 11 : 81.
1999. *Polistes (Polistella) strigosus atratus* Das and Gupta : Jonathan *et al.* *Zool. Surv. India, State Fauna Series* 3 : *Fauna of West Bengal*, Part 8 : 137.

Material examined : India : Tripura : Ambassa, 1 Female, 25.v.1978, Coll. J.K. Jonathan & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Assam, Manipur, West Bengal, Bihar, Delhi and Uttar Pradesh.

Remarks : This subspecies can be distinguished from *Polistes (Polistella) strigosus strigosus* Bequaert, 1940 from China by having thorax black with various yellow markings.

3. *Polistes (Polistella) sagittarius* Saussure

1853. *Polistes sagittarius* Saussure, *Études Famille Vespides*, 2 : 56, F, des. Type : Female, China. "Indes Orientales" (Geneva Museum).
1989. *Polistes (Polistella) sagittarius* Saussure : Das and Gupta, *Oriental Ins. Monogr.*, 11 : 82.

Material examined : India : Tripura : Ambassa, 3 Females, 24.v.1978, Coll. A. Issar; Dharmnagar,

1 Female, 2.vi.1978, Coll. A. Issar (Gupta collection).

Distribution : India : Tripura, Sikkim, Assam, Manipur, Nagaland, West Bengal, Himachal Pradesh, Delhi and Uttar Pradesh. *Elsewhere* : Myanmar, China, Nepal, Malaysia, Greece, Sulawesi, Thailand.

4. *Polistes (Polistella) hoplitus* Saussure

1853. *Polistes hoplitus* Saussure, *Étud. Fam. Vespidae*, 2 : 55. Female, des. Type : Female, "Indes Orientalis" (Geneva Museum).
1979. *Polistes (Nygmpolistes) tenebricosus hoplitus* Saussure : Yamane & Yamane, *Insecta Matsumuran*, 15 : 32. distr. India.
1999. *Polistes (Polistella) hoplitus* Saussure : Jonathan *et al.*, *Zool. Surv. India, State Fauna Series* 4 : *Fauna of Meghalaya*, Part 7 : 134.

Material examined : India : Tripura : Sipaijola, 1 ex., 11.v.1992, Coll. B.C. Das & Party.

Distribution : India : Tripura, and Meghalaya. *Elsewhere* : Myanmar, China, Indonesia.

Remarks : This is the first record of this species from the state of Tripura.

2. Tribe ROPALIDIINI

This tribe is represented by a single genus, *Ropalidia* Guérin, 1838 (= *Icaria* Sausaure, 1853), which is widely distributed in the tropical parts of the old world.

2. Genus *Ropalidia* Guérin

This genus is subdivided into five subgenera, viz., *Ropalidia (Anthreneida)* White, 1847; *R. (Paraicaria)* Gribodo, 1892; *R. (Icarielia)* Dalla Torre, 1904; *R. (Polistratus)* Cameron, 1900 and *R. (Ropalidia)* Guérin, 1838. Of these, first three subgenera occur in Indian subregion. In the state of Tripura, first two subgenera have been reported (Das and Gupta, 1989).

Key to subgenera of *Ropalidia*

1. Fore wing with three cubital cells.
.....*Anthreneida* White

- Fore wing with two cubital cells.
 *Paraicaria* Gribodo

3. Subgenus *Ropalidia* (*Anthreneida*) White

1841. *Anthreneida* White, *Ann. Mag. Nat. Hist.* (1) 7 : 321.

Type-species : *Vespa sumatrae* Waber, 1801 (= *Anthreneida coronata* White, 1841).

This is a large subgenus, widely distributed in the Oriental, Wallacea and Australian regions. Das and Gupta (1989) reported 22 species from Indian subregion. From the state of Tripura five species/subspecies have been recorded and these can be distinguished by the following key.

Key to the species/subspecies of *Ropalidia* (*Anthreneida*)

1. Propodeum at base with a pair of short longitudinal carinae. (Gastral petiole as long as hind femur. *brevita* Das and Gupta
- Propodeum without such carinae 2
2. Second gastral tergite and sternite not fused; petiole more than 2x as long as wide, gradually swollen apically. *fasciata* (Fabricius)
- Second gastral tergite and sternite fused. ... 3
3. Third antennal segment atleast 3x as long as wide at apex ; sides of second gastral tergite marked with yellow at base; pronotum red. *rufocollaris rufocollaris* (Cameron)
- Third antennal segment less than 3x as long as wide at apex ; side of second gastral tergite not marked or differently marked. 4
4. Metapleuron smooth ventrally, Body reddish with black and yellow markings
 *stigma stigma* (Smith)
- Metapleuron punctate ventrally. No yellow mark on mesopleuron and scutellum.
 *mathematica nigroplagiata* (Cameron)

5. *Ropalidia* (*Anthreneida*) *brevita* Das & Gupta

1989. *Ropalidia* (*Anthreneida*) *brevita* Das and Gupta, *Oriental Ins. Monogr.* 11 : 121, F., des. Type : Male,

India : Delhi (Gupta Colln.). India : Himachal Pradesh, Delhi, Uttar Pradesh, Sikkim, West Bengal, Assam, Orissa, Goa, Karnataka and Kerala.

Material examined : India : Tripura : Ananda Bazar, 2 Female, 1 Male, 26.v.1992. Coll. M. Sil (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Assam, Himachal Pradesh, Uttar Pradesh, Orissa, West Bengal, Delhi, Goa, Karnataka and Kerala.

Remarks : The female of this species is distinguished by having the gastral petiole as long as hind femur. This is the first record of this species from Tripura.

6. *Ropalidia* (*Anthreneida*) *rufocollaris* *rufocollaris* (Cameron)

1900. *Icaria rufocollaris* Cameron, *Ann. Mag. Nat. Hist.* (7) 6 : 497, F. des. Type : Female, India : Meghalaya : Khasi Hills (British Museum).

1989. *Ropalidia* (*Anthreneida*) *rufocollaris rufocollaris* Cameron : Das and Gupta, *Oriental Ins. Monogr.* 11 : 125.

Material examined : India : Tripura : Ambassa, 1 Male, 25.v. 1978, Coll. J.K. Jonathan & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Meghalaya, Assam, West Bengal and Uttar Pradesh. *Elsewhere* : Myanmar, Thailand, Tibet.

Remarks : This subspecies is mainly recognised from other members of *Ropalidia* (*Anthreneida*) in having a yellow mark at the base of second gastral tergite and propodeum black at sides. In males, aedeaus is longer and narrower than any other species.

7. *Ropalidia* (*Anthreneida*) *stigma* *stigma* (Fabricius)

1858. *Polybia stigma* Smith, *J. Proc. Linn. Soc. Zool.*, 2 : 114, M. Type : Male, Malaysia : Sarawak (Oxford Museum).

1989. *Ropalidia* (*Anthreneida*) *stigma stigma* Smith : Das and Gupta, *Oriental Ins. Monogr.* 11 : 127.

Material examined : India : Tripura : Agartala, Joy Nagar, 1 Male, 30.x.1974, Coll. M.S. Shishodia & Party; Ambassa, 2 Females, 24-25.v.1978, Coll.

J. K. Jonathan & Party; Udaipur, 1 Female, 1 Male, 4-5.xi.1974, Coll. M.S. Shishodia & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Assam, Meghalaya, West Bengal, Manipur, Bihar, Orissa, Madhya Pradesh, Maharashtra, Uttar Pradesh and Kerala. **Elsewhere :** Sri Lanka, Myanmar, Indonesia, Indo-China, Malaysia, Philippines, Thailand.

Remarks : This species is distinguished by having body reddish with black and yellow markings. Das and Gupta (1989) gave a detailed account of this species.

8. *Ropalidia (Anthreneida) fasciata* (Fabricius)

1804. *Eumenes fasciata* Fabricius, *Syst. Piez.*: 290, des. Type : Male ?, Java (Copenhagen Museum).

1989. *Ropalidia (Anthreneida) fasciata* (Fabricius) : Das and Gupta, *Oriental Ins. Monogr.*, 11 : 140.

Material examined : India : Tripura : Ambassa, 1 Female, 25.v.1978, Coll. J.K. Jonathan & Party (Z.S.I., Calcutta).

Distribution : India : Tripura, Sikkim, Meghalaya, Assam, Arunachal Pradesh, West Bengal, Uttar Pradesh and Maharashtra. **Elsewhere :** Myanmar, South China, Nepal, Ryukyus, Indonesia, Philippines.

9. *Ropalidia (Anthreneida) mathematica nigroplagiata* (Cameron)

1900. *Icaria nigroplagiata* Cameron, *Ann. Mag. Nat. Hist.*, (7) 6 : 487, F, des. Type : F. India : Meghalaya : Khasi Hills (Oxford Museum).

1989. *Ropalidia (Anthreneida) mathematica nigroplagiata* : Das and Gupta, *Oriental Ins. Monogr.*, 11 : 134.

Material examined : India : Tripura : Dharmnagar, 1 Female, 2.vi.1978, Coll. A. Issar (Gupta collection).

Distribution : India : Tripura, Meghalaya, Uttar Pradesh.

Remarks : Das and Gupta (1989) gave a detailed description of this subspecies.

4. Subgenus *Ropalidia (Paraicaria)* Gribodo, 1892

1892. *Paraicaria* Gribodo, *Bull. Soc. Ent. Ital.*, 23 : 248.

Type-species : *Paraicaria bicolor* Gribodo, 1892 (nec *Icaria bicolor* Smith, 1864) = *R. bicolorata* van der Vecht, 1962, monobasic.

1983. *Ropalidia (Paraicaria)* : Das and Gupta, *Oriental Ins.*, 17 : 428, cat.

This is a small subgenus recorded from India, Myanmar, Thailand, Kalimantan and Malaya. This is a distinct subgenus of *Ropalidia* by having two cubital cells in fore wing. Only one subspecies is known from India, as well as from the state of Tripura, which is detailed below :

4. *Ropalidia (Paraicaria) bicolorata shiva* Das and Gupta, 1989

1989. *Ropalidia (Paraicaria) bicolorata shiva* : Das and Gupta *Oriental Ins. Monogr.*, 11 : 154, des., key. Type : Female. India : Tripura. Assam, Manipur.

Diagnostic characters : **Female :** Body small, 5.5 mm. Black. Pronotum, scutellum, postscutellum, red. Two narrow elongated marks on apical margin of clypeus, one small mark on mandible at base, another mark on lower part of inner orbit, yellow, (Das and Gupta, 1989)

Material examined : India : Tripura : Ambassa, 1 Female, 26.v.1978, Coll. A. Issar, Coll. No. A 13 (Gupta Collection) ; 4 Females, 24-25.v.1978, Coll. J. K. Jonathan & Party (Z.S.I.)

Distribution : India : Tripura, Sikkim, Meghalaya and West Bengal. **Elsewhere :** Myanmar.

2. Subfamily VESPINAE

This is morphologically the most specialized subfamily of the social wasps. Component species are commonly called hornets (those nesting above ground) and yellow jackets (those nesting usually subterraneously). The nests consist of several to many combs of hexagonal cells composed of paper ; cells constructed early in the year may be used for several larvae in succession. The combs are usually enclosed in a paper envelope. The nests are annual, new queens and males being produced late in the summer or early in the fall;

the newly fertilized queens overwinter and begin new nests in the spring. Adult vespines feed on liquid foods, primarily nectar or honey; some species are known to prey upon adult honey bees, which they kill and extract nectar from the crop.

Diagnostic characters : Apical margin of clypeus broadly truncate or concave medially and emarginate laterally, ending in two rounded lateral lobes ; mandibles short and wide; maxillary palps 6-segmented ; labial palps 4-segmented; antennae 12-segmented in female and worker and 13-segmented in male; mesepimeron separated from mesepisternum by a suture; hind margin of postscutellum produced in the middle forming a long, triangular lobe wedged in the upper part of the propodeum; gaster subsessile, first tergite with a distinct edge or rounded angle between the anterior vertical and the posterior horizontal face.

This subfamily is represented by four genera, viz., *Vespa* Linnaeus, 1758; *Provespa* Ashmead, 1903; *Vespula* Thomson, 1869 and *Dolichovespula* Rohwer, 1916 from Indian subregion. Of these, two genera have been reported from Sikkim. These can be distinguished by the following key.

Key to the genera of *Vespinae*
(After Das and Gupta, 1989)

1. Head small, with short vertex and narrow temples; ocelli very large, posterior ocelli much closer to the eyes than to each other, about as far from the occiput as from the eyes; carina on hind coxa incomplete, absent ventrally from posterior surface; fore wing with large stigma, basal vein joining subcosta close to stigma; first cubital cell-very long, as long as the distance of its apex to the tip of the wing; first gastral segment cup-shaped, the tergite convex anteriorly. Coloration uniformly brown, clypeus sometimes brownish. Nocturnal in habits. Colonies founded by swarming. *Provespa* Ashmead
- Head large, with long vertex and broad temples. Ocelli normal (except in *Vespa binghami*); interocellar distance shorter than ocellocular distance; hind coxa with a carina on its posterior surface; fore wing with short to inconspicuous

stigma, basal vein joining subcosta at a distance of 1.0-3.0x the length of stigma; first cubital cell shorter than the distance between its apex and the tip of fore wing; first gastral segment transverse, the tergite truncate and abruptly sloping anteriorly. Coloration predominantly yellow, brown and/or black. Large size, length varying from 14-40 mm. Diurnal in habits. Colonies founded by female only *Vespa* Linnaeus

3. Genus *Vespa* Linnaeus

This genus is divided into two subgenera : *Vespa* (*Vespa*) Linnaeus, 1758 and *Vespa* (*Nyctovespa*) van der Vecht, 1959. Only *Vespa* (*Vespa*) is represented in the state of Tripura.

5. Subgenus *Vespa* (*Vespa*) Linnaeus

1758. *Vespa* Linnaeus, *Systema Nature*. (10th Ed.), 1 : 343. Type-species : *Vespa crabro* Linnaeus, 1758.
1983. *Vespa* (*Vespa*) Linnaeus : Das and Gupta, *Oriental Ins.*, 17 : 435.

Eighteen species/subspecies are recognised from India. Of these, only one species/subspecies is known to occur in the state of Tripura, which is discussed below :

11. *Vespa* (*Vespa*) *tropica tropica* (Linnaeus)

1758. *Sphex tropica* Linnaeus, *System Naturae*, 10th Ed.), 1 : 571, des. Type : Female, "in Indiis" (Uppsala Museum).
1775. *Vespa cincta* Fabricius, *Systema Entomologiae* : 362. India : Malabar (Not of DeGeer, 1773 or Drury, 1775). misdet.
1983. *Vespa* (*Vespa*) *tropica tropica* (Linnaeus) : Das and Gupta, *Oriental Ins Monogr.*, 11 : 218, des., distr.

Diagnostic chracters : Body 22-25 mm. Head, pronotum and mesoscutum anteriorly reddish-brown; second abdominal segment bright yellow, rest of thorax and abdomen, black. Wings dark-brown, paler apically.

Material examined : Tripura : Khasia Mangal, 1 Male, 9.v.1992, Coll. M. Sil (Z.S.I., Calcutta).

Distribution : India : Tripura and widely distributed in India. *Elsewhere* : Sri Lanka, Myanmar, China, Malaysia.

Remarks : Das and Gupta (1989) have expressed their doubts about the correct identity of this subspecies.

4. Genus *Provespa* Ashmead

1903. *Provespa* Ashmead, *Ent. News*, 14 : 182. *Type-species* : *Vespa anomala* Saussure, 1853 (= *V. dorylloides* Saussure, 1853).

The genus *Provespa* is represented by three species, viz., *anomala* (Saussure), 1853; *barthelemyi* (Buysson), 1905 and *nocturna* van der Vecht, 1936. Of these, only *anomala* (Saussure) is known from Tripura (Das and Gupta, 1989), however a key to Indian species is given below :

Key to the Indian species of *Provespa* (After van der Vecht, 1936, 1957)

1. Body slender, thorax in dorsal view 1.5x as long as wide; mesocutum longer than wide; first gastral tergite slender, its width and apex 1.6x its length; clypeus brownish; length 14 mm (female), 11-13 mm (worker). Male flagellum without tyloids
..... *anomala* (Saussure)
 - Body stouter, thorax 1.25x as long as wide; mesoscutum as long or less longer than wide; clypeus pale yellow, darker along margins; length 14-15 mm (worker). Male flagellum with tyloids *barthelemyi* (Buysson)*
- (*Not known from Tripura).

12. *Provespa anomala* (Saussure)

1853. *Vespa anomala* Saussure, *Étude Famille Vespides*, 2 : Female, 112, des., fig. Type : Java (British Museum).
1853. *Vespa dorylloides* Saussure, *Étude Famille Vespides*, 2 : 256 (different name used in errata); Bingham, 1897, *Fauna British India, Hymenoptera*, 1 : 400, F. W. des.
1983. *Provespa anomala* (Saussure) : Das and Gupta, *Oriental Ins.* 17 : 433, syn. ref., distr.; Roy and Kundu, 1985, *Rec. zool. Surv. India*, 82 (1-4) : 227; Jonathan *et al.*,

1999, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, Part 7 : 157.

Diagnostic characters : *Female* : 12-14mm, worker 11-13mm. Body largely impunctate, silky, densely pubescent; eyes almost reaching the base of mandibles; ocelli large; abdomen long and narrow.

Yellowish-brown. Antennae, inner eye margin, hind margins of 1-3 gastral tergites; whole of apical 3 tergites, dark brownish-yellow. Vertex black; wings hyaline.

Distribution : India : Tripura, Sikkim, Meghalaya, Arunachal Pradesh and Uttar Pradesh. *Elsewhere* : Myanmar, Malaysia, Indonesia.

SUMMARY

The family Vespidae contains potter wasps, paper wasps, hornets or yellow jackets. Most of these wasps are beneficial, since the insects they feed their larvae are mostly injurious or at least not useful species. By their predatory habits, they destroy a large number of insect pests and may be used as effective predators for the control of some of the pest species.

The present paper deals with the Vespidae fauna of Tripura, India. Altogether 12 species/subspecies under 4 genera and 5 subgenera and 2 subfamilies are treated in the text. The keys are provided for the identification of various taxa of this region. Illustrations of taxonomic terms used in the present work are included for ready reference.

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(Note : for detailed Bibliography, Das and Gupta, 1989 may be consulted).