

State Fauna Series 4

FAUNA OF MEGHALAYA

PART-4



**Zoological Survey of India
Calcutta
1999**

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FAUNA OF MEGHALAYA

PART-4

INSECTA : HEMIPTERA : HOMOPTERA

Edited by

The Director
Zoological Survey of India, Calcutta



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Calcutta
1999**

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INSECTA : HOMOPTERA : CICADELLIDAE

M. GHOSH AND L.K. GHOSH

Zoological Survey of India, Calcutta

The Cicadellids or Leafhoppers are the auchenorrhynchous homopteran insects constituting the largest family in the order Hemiptera.

They have been considered insects of economic importance. These insects usually cause damage to the plants by sucking plant's sap, injecting toxins while sucking, by laying eggs covering the leaf circle. Some are vectors transmitting viruses and microplasmalike organism. Nielson (1979) listed 128 species of Cicadellidae as vectors of plant pathogens in the world. Despite their damage caused to the crops plant, very little attention has been paid to explore their fauna, abundance and distribution in the country. Though the leaf hopper fauna of the Western parts of the world are well-known, studies on oriental leaf-hoppers with special reference to India including Meghalaya are very much limited.

The Indian Cicadellidae are known through the works chiefly by Distant (1908, 1916, 1918); Pruthi (1930, 1934, 1936); Ghauri (1963, 1967, 1974); Rao (1967, 1973, 1989); Ramakrishnan and Menon (1971, 1972a, 1972b, 1973, 1974); Singh (1969); Bindra (1973); Bindra et. al (1970); Sohi (1972); Datta (1972, 1973, 1988); Datta & Ghosh (1973a, 1973b, 1974); Viraktamath (1976a, 1976b, 1979a, 1979b, 1980a, 1980b, 1981, 1982, 1983); Datta and Dhar (1984); Sohi and Dworakowska (1984) etc.

Hamilton (1984) estimated that 15000 species of Leafhoppers were described sofar from the world. In India about 680 species are sofar known (Basu *et. al* 1991)

The Cicadellidae fauna of Meghalaya is known through the works of paiva (1919) Rao (1981, 1990).

The present contribution is an attempt to provide a comprehensive account of the family Cicadellidae of Meghalaya comprising 38 species belonging to 27 genera distributed over 12 subfamilies. It is based on the recent as well as the old collections made by different survey party members of Zoological Survey of India.

The account deals with a brief note on earlier investigations, diagnosis of each species, keys to taxa, geographical distribution of each species, new locality records of 11 species (marked *), literature and references. Genitallic structures of 26 species (Male studied) have been provided in this paper as an aid to identification of these species. Maps showing the distribution of 38 species examined from various districts of Meghalaya have also been included in the paper.

The classification of the family has been adopted after Distant (1908-1918); Young (1952), Ghauri (1963, 1967, 1971, 1974); Borror *et. al* (1976); Knight and Neilson (1986).

SYSTEMATIC ACCOUNT

Classified List of Cicadellidae of Meghalaya

Family	Cicadellidae
Subfamily	I. <i>Cicadellinae</i>
Genus	1. <i>Bothrogonia</i> Melichar
	1. <i>Bothrogonia ferruginae</i> (Fabricius) Fig. 1)
	*2. <i>B. indistincta</i> (Walker) (Fig. 2)
	3. <i>B. leopardina</i> (Distant) Fig. 3)
Genus	2. <i>Cicadella</i> Melichar
	4. <i>Cicadella spectra</i> (Distant) (Fig. 4)
Genus	3. <i>Cofana</i> Melichar
	5. <i>Cofana mimica</i> (Distant) (Fig. 5)
Genus	4. <i>Kolla</i> Distant
	6. <i>Kolla genesha</i> Distant (Fig. 6)
	7. <i>K. insignis</i> Distant (Fig. absent)
	8. <i>K. opponens</i> Walker (Fig. 7)
	*9. <i>K. unimaculata</i> Signoret (Fig. 8)
Genus	5. <i>Tettigella</i> China & Fennah
	*10. <i>Tettigella bellona</i> Distant (Fig. absent)
Subfamily	II. <i>Penthimia</i> Germar
Genus	6. <i>Penthimia</i> Germar
	11. <i>Penthimia melanocephala</i> de Motsch (Fig. absent)
	*12. <i>P. noctua</i> Distant (Fig. absent)
Subfamily	III. <i>Ledrinae</i>
Genus	7. <i>Ledra</i> Fabricius
	13. <i>Ledra dilatata</i> Walker (Fig. absent)
Genus	8. <i>Petalcephala</i> Stal
	*14. <i>Petalcephala confusca</i> Distant (Fig. absent)
	15. <i>P. latifrons</i> Walker (Fig. absent)
Genus	9. <i>Tituria</i> Stal
	16. <i>Tituria assamensis</i> Distant (Fig. absent)
	17. <i>T. planata</i> Fabricius (Fig. absent)

- Subfamily IV. Ulopinae
- Genus 10. *Moonia* Distant
18. *Moonia albivitta* Distant (Fig. 9)
- *19. *M. variabilis* Distant (Fig. absent)
- Subfamily V. Nirvaninae
- Genus 11. *Nirvana* Kirkaldy (Fig. 10)
20. *Nirvana pallida* Melichar
- Subfamily VI. Aphrodinae
- Genus 12. *Gurawa* Distant
21. *Gurawa vexillum* distant (Fig. 11)
- Subfamily VII. Hecalinae
- Genus 13. *Parabolocratus* Fieber
- *22. *Parabolocratus albomaculatus* (Distant) (Fig. 12)
- Subfamily VIII. Deltocephalinae
- Genus 14. *Arya* Distant (Fig. 13)
23. *Arya rotunda* Pruthi
- Genus 15. *Balclutha* Kirkadly
- *24. *Balclutha viridis* Pruthi (Fig. absent)
- Genus 16. *Cicadula* Zetterstedt
- *25. *Cicadula maculata* Pruthi (Fig. 14)
- Genus 17. *Dio* Distant
26. *Dio facialis* Distant (Fig. 15)
- Genus 18. *Eutettix* van Duzee
27. *Eutettix phycitis* Distant (Fig. 16)
- Genus 19. *Exitianus* Ball
28. *E. indicus* (Distant) (Fig. 17)
29. *E. nanus* (Distant) (Fig. 18)
- Genus 20. *Goniagnathus* Fieber
30. *Goniagnathus punctifer* Walker (Fig. 19)
- Genus 21. *Nephotettix* Matsumura
31. *Nephotettix nigropicta* Stal (Fig. 20)
32. *N. viriscens* Fabricius (Fig. 21)

- Genus 22. *Recilia* Edwards
 33. *Recilia dorsalis* de Mots (Fig. 22)
- Genus 23. *Thomsoniell* Signoret
 34. *Thomsoniella porrecta* Walker (Fig. 23)
- Subfamily IX. *Macropsinae*
- Genus 24. *Magnentius* Pruthi
 *35. *Magnentius clavatus* Pruthi (Fig. 24)
- Subfamily X. *Agalliinae*
- Genus 25. *Nehela* White
 *36. *Nehela violacea* Distant (Fig. absent)
- Subfamily XI. *Iassinae*
- Genus 26. *Iassus* Fabricius
 37. *Iassus indicus* (Walker) (Fig. 25)
- Subfamily XII. *Krisninae*
- Genus 27. *Keisna* Kirkaldy
 38. *Krisna strigicollis* (Spinola) (Fig. 26)

*New record from Meghalaya State

Key to subfamilies

- 1(2) Male valve and Pygofer fused; genital plates narrow basally 3
- 2(1) Male valve usually more or less triangular, genital plates triangular 9
- 3(4) Lateral margin of pronotum rather long, carinate;.....5
- 4(3) Lateral margin of pronotum short and not carinate; Forewing without or with very narrow appendix; lateral facial sutures terminating at antennal pits 7
- 5(6) Hind wing with submarginal vein extending to jugum Krisninae
- 6(5) Hind wing with submarginal vein not extending to jugum Iassinae
- 7(8) Hind wings always present, with three closed apical cells.....Macropsinae
- 8(7) Hind wings with four closed apical cells, face without carinate frontal suture above terminating at antennal pits, pronotum not extending forward beyond anterior margin of eye Agalliinae
- 9(10) Ocellion crown, if submarginal frontoclypeus not medially carinate 11
- 10(9) Ocellion margin anterior to eye, if submarginal, frontoclypeus with median carina 17
- 11(12) Head not produced; lateral facial sutures extending over margin; lateral margins of pronotum rounded with a weak keel; face tumid..... Cicadellinae

- 12(11) Head usually produced forward; lateral facial sutures not briefly extending on to crown ... 13
- 13(14) Pronotum with indistinct longitudinal keel; antennae very long Nirvaninae
- 14(13) Pronotum with lateral margin distinctly keeled; antennae short 15
- 15(16) Squat-shaped insects; hind tibial spines normal, large and densely packed; ocelli nearer to anterior margin of crown Penthiminae
- 16(15) Large elongate insects; hind tibial setae short, fine widely spaced; ocelli nearer to hind margin of head Ledrinae
- 17(18) Pro-episterna exposed; body with circular pits Ulopinae
- 18(17) Proepisterna concealed 19
- 19(20) Ocello ocular area with distinct transverse ledge above antennal pit; face broad; pronotum coarsely rugulose; tegmina leather-like with thick veins Aphrodinae
- 20(19) Ocello ocular area not produced as above; face variable 21
- 21(22) Distinctly dorsoventrally flattened insect; lateral margin of pronotum carinate; margin of gena usually incised Hecalinae
- 22(21) Insects not dorso-ventrally flattened; lateral margin of pronotum usually not carinate; margin of gena not incised or strongly sinuate Deltocephalinae

Subfamily I. Cicadellinae

1. Genus *Bothrogonia* Melichar

1926. *Bothrogonia* Melichar, *Ann. Mus. Nat. Hist. Hung.*, 23 : 341

Type, by subsequent designation

Bothrogonia ferruginea Fabricius

1787. *Cicada ferruginea* Fabricius, *Mantissa Insectorum* 2 : 269

Key to the species of *Bothrogonia*

- 1(2) Pronotum with 5 spots *leopardina*
- 2(1) Pronotum with 3 spots 3
- 3(4) Abdomen light brown; aedeagus massive and with complex structure (Fig. 2a); Style with rod-shaped preapical lobe, mesal apical extension almost hook-shaped (Fig. 2b).. *indistincta*
- 4(3) Abdomen black; aedeagus not massive, $\frac{3}{4}$ apically oarshaped, deeply cleft lengthwise; style with short apical knob, rest cylindrate *ferruginea*

1. *Bothrogonia ferruginea* (Fabricius)

1794. *Tettigoniella ferruginea* Fabricius, *Entomologia Syst.* 4 : 32.

1988. *Bothrogonia ferruginea* (Fabricius) : Datta, *Rec. Zool. Surv. India*, Occ. paper 90:4

Material examined : 12 exs., Meghalaya : Garo Hills; 16.3.91, coll. A.K. Hazra and party : 15 exs., Tura, West Garo Hill, 15.10.74, coll. S.K. Gupta.

Diagnosis : Vertex with black spots, one at apex and other between ocelli; pronotum with three black spots one at anterior margin and other two at base; scutellum centrally with a black spot; Tegmina piceous, claval suture with black patches its apical cell blackish; Abdomen blackish.

Aedeagal shaft (Fig. 1a) terminating in oar-shaped processes; style (Fig. 1b) with short apical knob, rest cylindrate; Male plate (Fig. 1c) massive, gradually tapered; Pygofer (fig. 1d) hook infolded, base serrate on outer margin, apex acuminate.

Length : male 14 mm. female 15 mm.

Distribution : India : Meghalaya (Garo Hills, Khasi Hill); Maharashtra, Tamil Nadu, West Bengal, Uttar Pradesh, Elsewhere : Borneo; Burma; Ceylon; coorg; Dutch East Indies; Japan; Java; Liangs; Korea; Malay Peninsula; Malacca; Nepal; Philippine; Perak; Pahang; Singapore; Sumatra.

Remarks : It is reported to be injurious to apple. (in Hida Province, Nowa 1916 : 325), agricultural crops in Philippine (Woodworth 1921 : 31) Silkworm mulberry (Yokeyama 1925 : 192), citrus plants in Japan (Miyoshi, 1926 : 338). It is suspected in spreading spike disease of Sandal forest (Dover 1934 : 36), reported on cotton from Formosa (Shiraki 1937 : 43), often it is parasitised by *Halictophagus serratus* Boh (Strepsiptera) (Bohart 1943 : 352-359).

2. *Bothrogonia indistincta* (Walker)

1851. *Tettigoniella indistincta* Walker., *List. Hom. B.M.*, : 739.

1988. *Bothrogonia indistincta* (Walker) : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 5.

Material examined : 2 exs., Meghalaya : Elephant Falls Shillong; Dt. East Khasi Hill, 28.10.74, coll. S.K. Gupta.

Diagnosis : Vertex, pronotum and scutellum brownish yellow; vertex with two black spots, one at base and other at apex; pronotum trinotate. Scutellum with a black spot; subapically, tegmina testaceous; abdomen brown.

Aedeagal structure (Fig. 2a) complex, massive; connective Y-shaped; style (Fig. 2b) straight stout, male plate (Fig. 2c) massive, convergent apicad with row of microsetae; pygofer (Fig. 2d) triangulate apicad; posterolateral margin infolded, hook massive arising from laterobasal margin, stout, elongate.

Length : 13.5 mm (male), 14.5 mm (female)

Distribution : India : Meghalaya (Elephant Falls, Shillong); Assam; Uttar Pradesh, Elsewhere: Borneo; Burma; Ceylon; China (Western and Northern); Fukien; Java; Philippine; Sumatra; Szechwan.

3. *Bothrogonia leopardina* (Distant)

1908. *Tettigoniella leopardina* Distant, *Fauna Brit. India* 4 : 204.

1988. *Bothrogonia leopardina* (Distant) : Datta, *Rec. zool. surv. India*, Occ. Paper No. 90 : 7.

Material examined : 1 ex., Meghalaya : Garo Hills, 12.3.91, coll. B.C. Das and party.

Diagnosis : Vertex brownish yellow, with five black spots two each on anterior, basal margin and one central; pronotum with five black spots; scutellum with three spots; tegmina castaneous with a black spot on its claval suture.

Aedeagal structure (Fig. 3a) complex, massive; connective V-shaped; style (Fig. 3b) about half as long as male plate, preapical lobe not prominent, mesal apical extension gradually tapered to pointed apex. Male plate (Fig. 3c) robust, discal, surface spined densely, lateral margin setose; pygofer (Fig. 3d) subrectangulate, pygofer hook stout twisted.

Length : 11.5 mm (male)

Distribution : India : Meghalaya (Garo Hills), Assam. Elsewhere : Java; Myitta; Tenasserim.

2. Genus *Cicadella* Latreille

1817. *Cicadella* Latreille, *Contenant Crustaces Arachnides insectes* 3 : 406.

Type, by subsequent designation, *Cicadella viridis* Van-Duzee.

1916. *Cicadella viridis* Van Duzee, *Check List of America, North Mexico*, 11 : 66.

4. *Cicadella spectra* (Distant)

1853. *Tettigonia albida* Signoret, *Ann. Soc. ent. Fr.*, 21 : 663.

1908. *Telligoniella spectra* Distant, *Fauna Brit. India* 4 : 211.

1910. *Cicadella spectra* (Distant), *Insect. Trans*, 10 : 234.

1988. *Cicadella spectra* (Distant) : Datta, *Rec. zool. surv. India*. Occ. Paper No. 90 : 26.

Material examined : 9 exs., Meghalaya : Garo Hills, 17.10.74, coll. S.K. Gupta; 11 exs., Elephant Falls Material, Shillong, Dt. East Khasi Hill, 28.10.74, coll. S.K. Gupta.

Diagnosis : Vertex with 4 black spots, pronotum with transverse striation. Male plate (Fig. 4c) triangulate, lateral margin convex; mesal margin almost linear gradually tapered from base to apex; discal setae stout; much longer than those on apical and densely spinuled, pygofer densely spinuled, with micro-setae on posterior part, style (Fig. 4b) beak-like, gradually tapering to pointed apex, Aedeagus subapically curvate, shaft slender, connective T-shaped.

Length : female 10 mm. and male 8 mm.

Distribution : India : Assam, Meghalaya (Garo Hills, Elephant Falls, Shillong), Assam, Bihar, Karnataka, Maharashtra, Madhya Pradesh, Orissa; Elsewhere : Australia; Bangladesh; Nepal; Sri Lanka.

Remarks : The species is commonly found on paddy during winter period. It also feeds on wild grasses.

3. Genus *Cofana* Melichar

1926. *Cofana* Melichar, *Ann. Mus. Nat. Hist.*, **23** : 345.

Type species, by subsequent designation of China, *Tettigonia eburnea* Walker

1938. *Tettigonia eburnea* Walker, *China Ann. Mag. Nat. Hist.*, **2**(11) : 85.

5. *Cofana mimica* (Distant)

1908. *Kolla mimica* Distant, *Fauna Brit. India*, **4** : 225.

1988. *Cofana mimica* (Distant) : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. **90** : 12.

Material examined : 2 exs., Meghalaya : Garo Hills, 16.3.91, coll. A.K. Hazra and party; 2 exs., Tura Dist. West Garo Hill, 15.10.74, coll. S.K. Gupta and party.

Diagnosis : Vertex with one central black spot and two identical spots close to ocelli. Pronotum with fine transverse impression, tegmina greenish white. Aedeagus (Fig. 5a) with well developed basal strut, strongly geniculate at base, directed caudad; connective 'Y' shaped, style dorsoventrally compressed, male plate (Fig. 5c) robust, lateral margin uniseriate; pygofer simple rectangulate.

Length : female 6.5. mm, male 5 mm.

Distribution : India : Meghalaya (Garo Hill and Tura); Bihar, Uttar Pradesh and West Bengal.

Remarks : The species is common on paddy crop during winter season.

4. Genus *Kolla* Distant

1908. *Kolla* Distant, *Fauna Brit. India*, **4** : 223.

Type by original designation, *Kolla insignis* Distant

1908. *Kolla insignis* Distant, *Fauna Brit. India*, **4** : 223.

Key to the species of *Kolla*

- 1(2) Aedeagus distinctly bulbous at base; vertex with a single spot.....*ganesha*
- 2(1) Aedeagus variably shaped but not bulbous; vertex with three spots 3
- 3(4) Style robust, much swollen basally; Male plate blunt at posterior extremity; aedeagus spoon-shaped; body smaller in size (5 mm) *unimaculata*
- 4(3) Style rather slender, not swollen as above; male plate robust, narrowed beyond middle, apex rounded; aedeagus foot-shaped (Fig. 7a); body larger in size (8-9 mm) *Opponens*

6. *Kolla ganesha* Distant

1918. *Kolla ganesha* Distant, *Fauna Brit. India*, **7** : 8.

1984. *Kolla ganesha* Distant : Datta and Dhar, *Bull. zool. surv. India*, **6**(1-3) : 181.

Material examined : 1 ex., Meghalaya : Jaintia Hill, 29.9.88, coll. V.D. Srivastava & party.

Diagnosis : Vertex with a black small spot at its tip; a dark transverse band of its sub-anterior margin extending to antennal base. Pronotum ochraceous centrally with a dark triangular fascia each basal angle of scutellum with a black spot. Tegmina blackish, its vein greyish and costal margin darker.

Aedeagus (Fig. 6a) bulbous at base with a filamentous process, style (Fig. 6b) shot, apex conical, preapical lobe well differentiated; male plate (Fig. 6c) convergent at distal end; pygofer (Fig. 6d) densely spinulate, pygofer hook geniculate with sharp apex.

Length : female 6.5 mm and male 5.5 mm.

Distribution : India : Meghalaya (Jaintia Hill), West Bengal. Elsewhere : Southern Peninsula.

7. *Kolla insignis* Distant

1908. *Kolla insignis* Distant, *Fauna Brit. India*, 4 : 223.

Material examined : 3 exs., Meghalaya : Jaintia Hills; Jowai, Reithsesim, 29.9.88; coll. V.D. Srivastava; 2 exs., Garampani, Luchook, 2.10.88, coll. V.D. Srivastava; 1 ex., Garo Hill, Tambo William nagar; 11.3.91, col. B.C. Das; 2 exs., Shillong; East Khasi Hill, 16.3.91, coll. B.C. Das.

Diagnosis : Vertex with two spots and with three spots centrally, anterior spots united by a short thick line; pronotum bronzy black with a wavy transverse fascia close to anterior margin; scutellum with black spot at each basal angle; tegmina shiny black, apical cell pigmented.

Length: female 5 mm.

Distribution : India : Meghalaya (Jaintia Hills, Shillong, Garo Hills), Uttar Pradesh, West Bengal; Elsewhere : Nepal.

8. *Kolla opponens* (Walker)

1851. *Tettigonia opponens* Walker, *List. Hom. B.M.*, 3 : 757.

1988. *Kolla opponens* (Walker) : Datta, *Rec. Zool. Surv. India*, Occ. Paper 90 : 12.

Material examined : 2 exs., Meghalaya; Shillong, Dt. East Khasi Hill sericulture farm; 19.4.1979, coll. J.K. Jonathan and party; 2 exs., Jaintia Hill, 22.9.1988 coll. V.D. Srivastava; 1 ex., Tura Peak, West Garo Hill, 2.4.1979, coll. J.K. Jonathan and party.

Diagnosis : Vertex with two anterior black spots and at base a transverse black spot; anterior margin of pronotum black; scutellum with a black spot at its basal angle; abdomen with a black fascia.

Aedeagus (Fig. 7a) red-shaped apical portion foot-shaped; style (Fig. 7b) with apex beak-shaped; male plate (Fig. 7c) narrowed beyond middle and apex rounded; pygofer (Fig. 7b) also robust, dagger-shaped.

Length : female 9 mm and male 8 mm.

Distribution : India : Meghalaya (Jaintia Hills, Shillong and Tura), Assam Uttar Pradesh, West Bengal; Elsewhere : Burma; Netherlands.

9. *Kolla unimaculata* Signoret

1854. *Tettigonia unimaculata* Signoret, *Ann. Ent. Soc. France*, 2(3) : 26.

1988. *Kolla unimaculate* Signoret : Datta, *Rec. Zool. Surv. Occ. paper No. 90* : 16.

Material examined : 1 ex., Meghalaya, Shillong; East Khasi Hills, 20.4.79, coll. J.K. Jonathan; 1 ex., Jaintia Hill, 22.9.1988, coll. V.D. Srivastava.

Diagnosis : Vertex with 3 dark spots at its anterior margin, pronotum beyond middle with a transverse band, scutellum with a dark spot; tegmina with a pale brownish longitudinal band at its claval area.

Aedeagal shaft spoon-shaped basally (Fig. 8a); shaft of style (Fig. 8b) with broader base, somewhat conical with acuminate apex, preapical lobe well differentiated; male plate (Fig. 8c) gradually converging; anal hook prominent.

Length : female 6 mm. male 5 mm.

Distribution : India : Meghalaya (Jaintia Hill, Shillong); Karnataka, Tamil Nadu, West Bengal; Elsewhere : Burma; Java; Malacca; Philippines; Sri Lanka.

5. Genus *Tettigella* China & Fennah

1945. *Tettigella* China & Fennah, *Ann. Mag. Nat. Hist.*, **12**(11) : 711.

Type by original designation, *Cicada viridis* China and Fennah.

1945. *Cicada viridis* China and Fennah, *Ann. Mag. Nat. Hist.* **12**(11) : 711.

10. *Tettigella bellona* Distant

1908. *Tettigella bellona* Distant, *Fauna Brit. India*, **4** : 212.

Material examined : 1 ex., Meghalaya : Forest around Mawsmi, Cherrapunji, East Khasi Hills, 25.5.1979, coll. G.K. Srivastava.

Diagnosis : Vertex yellowish, with a prominent black spot at central and at lateral margin, longitudinal ridge present; pronotum yellowish, tegmina golden yellow.

Length : 8 mm. (female)

Distribution : India : Meghalaya (Shillong), Nilgiri Hills; Elsewhere : Burma.

Subfamily II. Penthiminae

6. Genus *Penthimia* Germar

1821. *Penthimia* Germar, *Mag. Ent.* **4** : 46.

Type by monotypy, *Cercopis atra* Fabricius

1794. *Cercopis atra* Fabricius, *Ent. Syst.*, **4** : 50.

Key to the species of *Penthimia*

- 1(2) Body blackish; apex of each claval area with a small dull ochraceous spot; posterior tibiae black *noctua*
- 2(1) Body castaneous; claval area without such spot; posterior tibiae strongly spinose and somewhat castaneous..... *melanocephala*

11. *Penthimia melanocephala* Motsch

1863. *Penthimia melanocephala* Motsch, *Bull. Soc. Nat. Musc.* **21** : 95.

Material examined : 1 ex., Meghalaya, Barapani, dist. East Khasi Hills, 1991, coll. A.K. Sanyal; 1 ex., Jowai, Krllehrmei Ghat, Dist. Jaintia Hills, 18.9.88, coll. V.D. Srivastava.

Diagnosis : Vertex black, punctate; pronotum bright reddish brown with fine transverse wrinkle; scutellum punctate; tegmina at apex whitish black shade.

Length : female 4.5 mm.

Distribution : India : Meghalaya (East Khasi Hills and Jaintia Hills), South India; Burma; Coorg; Newera Elia; Elsewhere : Sri Lanka; Tanasserin.

12. *Penthimia noctua* Distant

1918. *Penthimia noctua* Distant, *Fauna Brit. India*, 4 : 22

Material examined : 1 ex., Meghalaya, Willim-nagar, East Garo Hills, 8.3.1991, coll. B.C. Das and party.

Diagnosis : Vertex black, present a strongly sloping line, pronotum rounded; tegmina rugose; orchraceous at apex.

Length : female 4.5 mm.

Distribution : India : Meghalaya (East Garo Hills); West Bengal.

Subfamily III. Ledorinae

7. Genus *Ledra* Fabricius

1803. *Ledra* Fabricius, *Systema Rhyn.* Vill : 24.

Type by subsequent designation *Ledra aurita* Linnaeus

1758. *Ledra aurita* Linnaeus, *Systema Naturae*, Ed. 10 : 435.

13. *Ledra dilatata* Walker

1851. *Ledra dilatata* Walker, *List. Hom. B.M.*, 3 : 811.

1988. *Ledra dilatata* : Datta, *Rec. Zool. Surv. India*, Occ. paper No. 90 : 40.

Material examined : 1 ex., Meghalaya (Tura, West Garo Hills), 2.10.1991, coll. R.K. Varshney and party.

Diagnosis : Vertex brownish, thickly granulated and with central longitudinal ridge, pronotum tuberculate, finely punctate; scutellum distinctly bilineate; tegmina coriaceous, strongly reticulate beyond middle.

Length : 22 mm (female).

Distribution : India : Meghalaya (Tura); 'Bengal', Madras, Nilgiri Hills, Elsewhere : Burma; East Indies; Sri Lanka.

8. Genus *Petaloccephala* Stal

1854. *Petaloccephala* Stal, *Sevensky vet-akad. Ofv. Forhandl.*, 11 : 251.

Type by subsequent designation of Atkinson, *Petaloccephala bohemani* Stal

1854. *Petaloccephala bohemani* Stal, *Sevensky vet-Akad. Ofv. Forhandl.* 11 : 251.

Key to the species of *Petalcephala*

- 1(2) Scutellum finely punctate; face narrow, centrally sulcate near antennae, tegmina hyaline*confusa*
- 2(1) Scutellum rather deeply punctate, with transverse striation; face obscurely sulcate; tegmina rusty brown, clavus area purplish brown.....*latifrons*

14. *Petalcephala confusa* Distant

1908. *Petalcephala confusa* Distant, Fauna Brit. India, 4 : 104.

Material examined : 1 ex., Meghalaya : sonapahar; West Khasi Hills, 5.5.1979, coll. J.K. Jonathan and party.

Diagnosis : Vertex greenish yellow, pronotum punctate, with a longitudinal compressed line; scutellum finely punctate; tegmina hyaline, strongly punctate; face narrow, broadening posteriorly, centrally sulcate near antennae.

Length : female 12.5 mm.

Distribution : India : Meghalaya (West Khasi Hills); Elsewhere : Sri Lanka.

15. *Petalcephala latifrons* Walker

1851. *Petalcephala latifrons* Walker, List, Hom. 3, : 824

Material examined : 1 ex., Meghalaya : Umiam, Shillong, East Khasi Hill, 19.9.91, coll. R.K. Varshney and party.

Diagnosis : Vertex greenish yellow with centrally distinct longitudinal carina; pronotum strongly punctate; scutellum with transverse striation apically; tegmina rusty brown, clavus area purplish brown; face obscurely, not prominently sulcate.

Length : 13.5. mm (female).

Distribution : India : Meghalaya (Shillong), Assam, Maharashtra, Sikkim, West Bengal ; Elsewhere : Sri Lanka.

9. Genus *Tituria* Stal

1865. *Tituria* Stal, Ofv. vet-Ak-Förh : 158.

Type by subsequent designation *Tituria planata* Fabricius

1794. *Tituria planata* Fabricius, Ent. Syst. 4 : 11.

Key to the species of *Titurea*

- 1(2) Pronotum thickly punctate and with fine transverse striation; scutellum dark virescence at base *assamensis*
- 2(1) Pronotum punctate and finely rugulose, scutellum testaceous at basal angle *planata*

16. *Tituria assamensis* Distant

1908. *Tituria assamensis* Distant, Fauna Brit. India, 4 : 161.

Material examined : 1 ex., Meghalaya; Tura. dist. West Garo Hills; 3.10.1991, coll. R.K. Varshney and party.

Diagnosis : Vertex greenish with thickly and finely punctate; pronotum finely thickly punctate and finely transversely striate; scutellum dark green; tegmina thickly coarsely punctate at claval area.

Length : 10.5 mm (female).

Distribution : India : Meghalaya (West Garo Hills), Assam.

17. *Tituria planata* Fabricius

1794. *Tituria planata* Fabricius, *Ent. Syst.* 4 : 11.

1908. *Tituria planata* Distant, *Fauna Brit. India*, 4 : 160.

Material examined : 1 ex., Meghalaya; Shangpung, dist. Jaintia Hills, 21.9.75, coll. N. Muraleedharan.

Diagnosis : Vertex greenish yellow, thickly punctate, longitudinally central carinate; pronotum punctate and finely rugulose; tegmina coarsely punctate at claval area and rest thickly punctate.

Length : female 16 mm.

Distribution : India : Meghalaya (Jaintia Hills); Eastern India, Madras, West Bengal; Elsewhere : Cambodia; East Indies; Formosa; Indochina; Japan; Malacca; siam; Tenasserim.

Subfamily IV. *Ulopinae*

10. Genus *Moonia* Distant

1908. *Moonia* Distant, *Fauna Brit. India*, 4 : 197.

Type by original designation, *Moonia sancita* Distant 4 : 197.

1908. *Moonia sancita* Distant, *Fauna Brit. India*, 4 : 197.

Key to the speices of *Moonia*

- 1(2) Pronotum with two large discal spots sometimes coalesced; pronotum black; tegmina pale, with dark veins *variabilis*
- 2(1) Pronotum without such discal spots but with a transverse series of pale greyish spots before middle and two small black spots near base; pronotum dark brownish; tegmina greyish white; with dull brown veins..... *albivitta*

18. *Moonia albivitta* Distant

1916. *Moonia albivitta* Distant, *Fauna Brit. India* 6 : 236.

1988. *Moonia albivitta* : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 46.

Material examined : 1 ex., Meghalaya : Tura, on way to Tura peak., dist. West Garo Hill, 2.5.1979, coll J.K. Jonathan and party.

Diagnosis : Vertex light brownish; pronotum with a series of spots; scutellum with a spot at each basal angle; tegminal vein brownish. Aedeagal shaft (Fig. 9a) medially notched; Stylar shaft (Fig. 9b) twisted abruptly subapically, apex truncate; male plate (fig. 9c) club-shaped. Pygofer as figured (Fig. 9d).

Length male 4.5 mm female 5 mm.

Distribution : India : Meghalaya (Tura, West Garo Hill); South India.

19. *Moonia variabilis* Distant,

1916. *Moonia variabilis* Distant, *Fauna Brit. India*, 6 : 234.

Material examined : 1 ex., Meghalaya : Jaintia Hills, Jowai Kalbhrnei Ghat; 18.9.88, coll. V.D. Srivastava and party.

Diagnosis : Vertex with linear spots; pronotum black with small spots; scutellum with a small spot at each basal angle; tegminal vein lightly spotted, with piceous transverse fascia at base.

Length : female 4.5 mm.

Distribution : India : Meghalaya (Jaintia Hills), Kodaikanal, Nilgiri Hills.

Subfamily V. *Nirvaninae*

11. Genus *Nirvana* Kirkaldy

1900. *Nirvana* Kirkaldy, *Entomologist*, 33 : 293.

Type, by original designation *Nirvana pseudommatus* Kirkaldy

1900. *Nirvana pseudommatus* Kirkaldy, *Entomologist*, 33 : 293.

20. *Nirvana pallida* Melichar

1903. *Nirvana pallida* Melichar, *Fauna Vol Ceylon*, Hom., : 166

1988. *Nirvana pallida* : Datta, *Rec. Zool. Surv. India*, Occ. paper No. 90 : 63

Material examined : 1 ex., Meghalaya (Rongra, West Garo Hills), 12.1.91, coll. B. Nandi and party.

Diagnosis : Vertex eliplical, with pale white line; pronotum with an ore shaped impressed line; scutellum with a transversely impressed line in middle; tegmina transparent, apical cell with brownish dots.

Aedeagal shaft (Fig. 10a) elongated, narrowed to apex; Style simple; Male Plate (Fig. 10b) finger-shaped, lateral margin with a row of hair-like setae. Pygofer with a tuft of long setae; pygofer hook (Fig. 10c) projected beyond pygofer tip.

Length : female 5.5 mm, male 5 mm.

Distribution : India : Meghalaya (West Garo Hill), Madras, Karnataka, Uttar Pradesh; Elsewhere Burma; China; Formosa; Hong Kong; Japan; Kyushu Limbok; Malay States; Oshima Island; Ryukyu; singapore; Sri Lanka.

Subfamily VI. *Aphrodinae*

12. Genus *Gurawa* Distant

1908. *Gurawa* Distant, *Fauna Brit. India*, 4 : 263.

Type by original designation *Gurawa vexillum* Distant

21. *Gurawa vexillum* Distant

1908. *Gurawa vexillum* Distant, *Fauna Brit. India*, 4 : 263.

1990. *Gurawa vexillum* : Rao, *Rec. Zool. Surv. India* : Occ. paper No. 127.

Material examined : 1 ex., Meghalaya, Jaintia Hills, Jowri Thadlaskein lake; 17.9.'88, coll. V.D. Srivastava and party.

Diagnosis : Vertex subtriangular, with a central black band; pronotum with a pair of black spots on each side; scutellum with 3 spots one at tip rest at centre; tegmina semitransparent.

Aedeagus (Fig. 11a) funnel-shaped, gradually attenuating; stylar shaft (Fig. 11b) prominent; male plate (Fig. 11c) short, triangular, setose; pygofer densely spined.

Length : female 4.5 mm and male 4 mm.

Distribution : India : Meghalaya (Jaintia Hill); Eastern Himalaya; South India.

Subfamily VII *Hecalinae*13. Genus *Parabolocratrus* Fieber

1866. *Paraboloratus* Fieber, *Zool.-bot. Gesell Wien. Verhandl.*, 16 : 502.

Type by monotype, *Parabolocratrus sulcatus* (Fieber)

1866. *Hecalus sulcatus* Fieber, *Zool. bot. Geswell. Wien Verhandl*, 16 : 502.

22. *Parabolocratrus albomaculatus* (Distant)

1908. *Thomsoniella albomaculatus* Distant, *Fauna Brit. India* 4 : 280.

1988. *Parabolocratrus albomaculatus* : Datta, *Rec. Zool. Surv. India*. Occ. paper No. 90 : 82.

Material examined : 1 ex., Meghalaya : Dist. Jaintia Hills; Jowai 8 miles village; 24.9.88, coll. V.D. Srivastava and party.

Diagnosis : Vertex dark brown; pronotum fasciate : scutellum with a dark spot on each basal angle; apical cell of tegmina brownish with white spots.

Aedeagal shaft tube-like except basal third broadened (Fig. 12a) otherwise tube like; a pair of elongate slender acute apical processes directed cephaled; stylar shaft with preapical lobe differentiated (Fig. 12b) mesal apical extension sharply pointed, directed laterocaudad; Male plate (Fig. 12c) gradually connivent, disc spinulate; pygofer simple (Fig. 12d).

Length : female 5 mm, male 4.5 mm.

Distribution : India : Meghalaya (Jaintia Hill); Orissa, Tamil Nadu, West Bengal; Elsewhere : Bengian Congo; Luzon; Philippine islands; Sri Lanka; Sumbawa.

Remarks : The species has affinity with paddy pests like *Nephotettix virescens* (Fabr.), *N. apicalis* de Mots. *Kolla mimica* Dist. and *Cicadella spectra* (Dist.) but can be separated by the structure of aedeagal shaft with terminal processes.

Subfamily VIII. Deltocephalinae

14. Genus *Arya* Distant

1908. *Arya* Distant, *Fauna Brit. India*, 4 : 338.

Type, by original designation *Arya rubrolineata* Distant.

1908. *Arya rubrolineata* Distant, *Fauna Brit. India*, 4 : 338.

23. *Arya rotunda* Pruthi

1930. *Arya rotunda* Pruthi, *Mem. Ind. Mus.*, 2 : 40.

1988. *Arya rotunda* : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 91

Material examined : 1 ex., Meghalaya : Jaintia Hills, Jowai Dawki; 25.9.88; coll. V.D. Srivastava.

Diagnosis : Vertex reddish brown; two linear impressions at base; pronotum transversely striated, with a paired dark impression (female) and a black stripe (male) close to anterior margin; tegmina sub-hyaline.

Aedeagal shaft tubular (Fig. 13a) apex spoon-shaped style (Fig. 13b) with mesal apical extension slender, apex pointed; Male plate (Fig. 13c) egg-shaped at posterior half; pygofer (Fig. 13d) flattened, massive; hook extending 3/4 part of male plate.

Length : female 5 mm and male 4 mm.

Distribution : India : Meghalaya (Jaintia Hill), Madhya Pradesh.

15. Genus *Balclutha* Kirkaldy

1901. *Balclutha* Kirkaldy, *Entomologist*, 34 : 338.

Type, by subsequent designation, *Cicada punctata* Fabricius

1775. *Cicada punctata* Fabricius, *Systema Entomologiae*, 4 : 687.

24. *Balclutha viridis* Pruthi

1930. *Balclutha viridis* Pruthi, *Mes. Indian Mus.*, 11(1) : 46.

Material examined : 1 ex., Meghalaya : Shillong, 19.10.1979, coll. S.K. Gupta.

Diagnosis : Vertex binotate; pronotum with greenish tinge; scutellum binotate; tegmina hyaline.

Length : female 3 mm, male 2.5 mm.

Distribution : India : Meghalaya (Shillong) : Maharashtra, Orissa, South India, West Bengal.

16. Genus *Cicadula* Zetterstedt

1840. *Cicadula* Zetterstedt, *Insecta Lappoinica*, 1 : 296.

Type, by subsequent designation *Cicada quadrinotata* Fabricius

1794. *Cicada quadrinotata* Fabricius, *Entomologia systematica*, 4 : 43.

25. *Cicadula maculata* Pruthi

1930. *Cicadula maculata* Pruthi, *Mem. Indian Mus.*, 11 : 58.

1988. *Cicadula maculata* Pruthi : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 108.

Material examined : 2 exs., Meghalaya : Office Comp. Risa Colony, Shillong; East Khasi Hills, 27.10.1976, coll. M.S. Jydraw; 2 exs., Jaintia Hills, Garampani, Safaibasti; 3.10.1988, coll. V.D. Srivastava and party.

Diagnosis : Vertex with large subapical spots; pronotum with black patches; scutellum with a black spot at each basal angle; tegmina pale brown.

Aedeagal shaft (Fig. 14a) gradually connivent to acute apex; style (Fig. 14b) with apex pointed; Male plate (Fig. 14c) gradually connivent, apex having a row of fine hair-like setae; Pygofer (Fig. 14d) ovoid, spined.

Length : female 3.5 mm, male 3 mm.

Distribution : India : Meghalaya (Jaintia Hills and Shillong); Elsewhere : Sikkim.

17. Genus *Dio* Distant

1918. *Dio* Distant, *Fauna Brit. India*, 7 : 56

Type, by original designation, *Dio Facialis* Distant

1918. *Dio facialis* Distant, *Fauna Brit. India* 7 : 56.

26. *Dio facialis* Distant

1918. *Dio facialis* Distant., *Fauna Brit. India*, 7 : 56.

1988. *Dio facialis* : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 125.

Material examined : 1 ex., Meghalaya; Shillong, Botanical Garden; East Khasi Hills; 25.5.1979, coll. G.K. Srivastava and party.

Diagnosis : Vertex brownish yellow; anterior half of pronotum and tegmina marked with spots.

Aedeagal shaft elongated (Fig. 15a) slender, arcuate, subapically with a minute projection and a pair of apical processes; style (Fig. 15b) narrowed in the middle, serrate, apex hood-shaped; Male plate (Fig. 15c) massive. oar-shaped, pygofer (Fig. 15d) ovoid, pygofer hook sharp, short, directed caudad.

Length : male 2.5 mm.

Distribution : India : Meghalaya (Shillong); so far known from Eastern Himalaya.

18. Genus *Eutettix* van Duzee

1892. *Eutettix* van Duzee, *Psyche* 6 : 307.

Type, by original designation, *Thamnotettix luridus* van Duzee.

1890. *Thamnotettix luridus* van Duzee, *Canad. Ent.* 22 : 205.

27. *Eutettix phycitis* Distant

1908. *Eutettix phycitis* Distant, *Fauna Brit. India*, 4 : 263.

1988. *Eutettix phycitis* : Datta, *Rec. Zool. Surv. India*, 4 : 363.

Material examined : 1 ex., Meghalaya, Umtyngar, Cherrapunji; Dist. East Khasi Hill, 8.11.1991, coll. R.C. Basu and party.

Diagnosis : Vertex anteriorly rounded, pronotum broader, rugulose, tegminal surfaces finely ornamented with reddish brown patches.

Aedeagus (Fig. 16a) with a pair of tube-like shafts, outer margin sinuate, apex sharp, hook-shaped, triangulate; connective Y-shaped, style (Fig. 16b) attenuate, inner margin of apical half serrate; Male plate (Fig. 16c) setose.

Length : female 4 mm; male 3.5 mm.

Distribution : India : Meghalaya (Umtyngar, Cherrapunji); Assam, Bihar, Tamil Nadu, West Bengal; Elsewhere: Australia.

Remarks : According to Pruthi (1934) the species is a suspect vector of spike disease of Sandal (*Salanum album*). In India.

19. Genus *Exitianus* Ball

1929. *Exitianus* Ball, *Trans. Amer. Ent. Soc.*, **55** : 5.

Type by original designation *Exitianus obscurinervis* (Stal).

1859. *Jassus* (*Thamnotettix*) *obscurinervis* Stal, *Svenska Akad. Zool.* **4** : 293.

Key to the species of *Exitianus*

- 1(2) Scutellum with a rounded black spot on each side of basal margin; pygofer posterior third with four microsetae at apex, almost of same size and shape. *nanus*
- 2(1) Scutellum without such spots on each side of basal margin; pygofer with two microsetae at apex..... *indicus*

28. *Exitianus indicus* (Distant)

1908. *Athysanus indicus* Distant, *Fauna Brit. India*, **4** : 344

1938. *Exitianus indicus* : Oman, *Kans. Univ. Sci. Bull.*, **24** : 383.

1989. *Exitianus indicus* (Distant) : Ghosh, L.K., Biswas, Chakraborty and Sen, *Fauna of Orissa* (Insecta : Hemiptera). *State Fauna Series* 1, pt. 2 : 195.

Material examined : 3 exs., Meghalaya, Shillong, East Khasi Hill, 3.10. 1974, coll. S.K. Gupta; 2 exs., Jaintia Hills, 22.9.88; coll. V.D. Srivastava and party.

Diagnosis : Vertex ochraceous with a black fascia across eyes, scutellum granulate on basal area; tegmina subhyaline; veins pale brown; abdomen fuscous.

Aedeagus (Fig. 17a) laterally compressed, beak shaped, apex sharp; Style (Fig. 17b) with apex sharply pointed. Male plate (Fig. 17c) posteriorly converging to angulate apex; pygofer (Fig. 17d) densely spinulate, with a pair of distinct apical spur.

Length : female 5.5 mm, male 4.5 mm.

Distribution : India, Meghalaya (Shillong, Jaintia Hill); Bihar, Uttar Pradesh; Elsewhere: Nepal.

Remarks : In the paddy field the species is usually found in association with *Nephotettix* spp. In India Cheo (1935) reported the species to be injurious to economic plant, in China (Helgon 1951). The species transmits "witches broom virus" of lucerne and Sugarcane.

29. *Exitianus nanus* (Distant)

1908. *Athysanus nanus* Distant, *Fauna Brit. India*, 4 : 345.

1938. *Exitianus nanus* Oman, *Kans Univ. Sci. Bull.* 24.: 383.

1988. *Exitianus nanus* : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 69.

Material examined : 2 exs., Meghalaya : Shillong; Dist. East Khasi Hills, 3.11.1974, coll. S.K. Gupta; 1 ex., Jaintia Hills, 22.9.1988, coll. V.D. Srivastava and party.

Diagnosis : Vertex rounded with an arcuate fascia between eyes, pronotum greenish yellow, scutellum brown, a dark spot at basal angle; tegmina hyaline, its vein brown; abdomen pale brown.

Aedeagal (Fig. 18a) shaft robust, curvate inwards; styler shaft with beak-shaped mesal apical extension (Fig. 18b); male plate (Fig. 18c) thick somewhat conical than others; Pygofer as figure (Fig. 18d).

Length : female 5 mm, male 4 mm.

Distribution : India : Meghalaya (Shillong, Jaintia Hills); Bihar, Himachal Pradesh, Maharashtra, Punjab, Tamil Nadu; Elsewhere : Iraq.

20. Genus *Goniagnathus* Fieber

1866. *Goniagnathus* Fieber, *Verh. Z-6-Ges Wien*, 16 : 506.

Type, by monotypy, *Jassus brevis* Herrich Sch.

1835. *Jessus brevis* Herrich Sch., *Nomenclator Entomologicus*, I(I-V) : 71.

30. *Goniagnathus punctifer* Walker

1858. *Bythoscopus punctifer* Walker, *Insecta Saundersiana* : 108.

1988. *Goniagnathus punctifer* Walker : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 139.

Material examined : 1 ex., Meghalaya; West Garo Hills 12.5.59, coll. S.B. Ray and party.

Diagnosis : Vertex with dark spots, face punctate with distinct transverse stripes; pronotum finely striate, anterior margin smooth; tegmina smoky with thick veins, spots fuscous.

Aedeagus (Fig. 19a) with an apodeme, lateral part of shaft concave with a pair of sharp terminal processes; style (Fig. 19b) with mesal apical extension, margin at apex bifurcate; male plate (Fig. 19c) simple; pygofer 1/3 densely spined apically; pygofer hook dagger-shaped.

Length : female 7 mm, male 6 mm.

Distribution : India : Meghalaya (Garo Hills); Bihar; Maharashtra, Uttar Pradesh; Elsewhere: Burma, Maldives, Malagasy, Sri Lanka.

21. Genus *Nephotettix* Matsumura

1902. *Nephotettix* Matsumura, *Term Fuzetek*, 25 : 356.

Type, by subsequent designation, *Selenocephalus cinticeps* Uhler

1892. *Selenocephalus cinticeps* Uhler, *Proc. U.S. Nat. Hist. Mus.*, 19 : 292.

Key to the species of *Nephotettix*

- 1(2) Vertex with a transverse submarginal black band; anterior margin of pronotum marked by a transverse black band; aedeagus with 8 pairs of spines; pygofer without any long spur (Fig. 20d).....*nigropicta*
- 2(1) Vertex usually without sub-marginal black band; anterior margin of pronotum without black band; aedeagus with five pairs of spines; pygofer with a long, sharp, spur besides three spurs (Fig. 21d).....*virescens*

31. *Nephotettix nigropicta* (Stal)

1870. *Thamnotettix nigropicta* Stal, *Ofv-vet. Ak. Forh* : 74.

1906. *Nephotettix nigropicta* Kirkaldy, *Rep. Exp. Sta. Haw. Plant Assoc.* pt. ix : 333.

1908. *Nephotettix apicalis* Distant, *Fauna Brit. India*, 11 : 360.

1971. *Nephotettix nigropicta* Ghauri, *Bull. Ent. Res.* 60(3) : 481-572.

1989. *Nephotettix nigropicta* (Stal) : Ghosh, L.K., Biswas, Chakraborty and Sen, *Fauna of Orissa (Insecta : Homiptera)* : State Fauna Series No. 1, pt. 2 : 195.

Material examined : 3 exs., Meghalaya; East Garo Hills, 17.10.74, coll. S.K. Gupta; 1 ex., Jaintia Hills, 24.9.88, coll. V.D. Srivastava and party.

Diagnosis : Vertex with a transverse line between eyes; tegmina with an oblique broad stripe extending medially to claval suture; apical 1/3 of tegmina and abdomen blackish.

Aedeagus (Fig. 20a) with well developed apodeme with 3 pairs of lateral processes; styler shaft with mesal apical extension gently notched posterolaterally (Fig. 20b); male plate (Fig. 20c) beyond middle spinulate on both margin; pygofer (Fig. 20d) subrectangular.

Length : female 5.5 mm and male 4.5 mm.

Distribution : India : Meghalaya (East Garo Hills and Jaintia); Bihar, Orissa, Punjab and West Bengal; Elsewhere : East Africa; Philippines and Sri Lanka.

Remark : The species enjoys wide distribution in all rice growing areas of the world. This is a common seasonal insect of rice fields in West Bengal. It is abundantly found during Kharif season particularly during August - November. The species is a vector of viruses on paddy crops. It occurs along with *N. virescens* (Fabr.) during winter in the Eastern and Western India. The species is reported to transmit dwarf disease in Japan and Tungro disease in India.

32. *Nephotettix virescens* (Fabricius)

1803. *Nephotettix bipunctatus* Fabricius, *Sys. Rhyn* : 78.

1908. *Solenoccephalus virescens* Distant, *Fauna Brit. India*, 4 : 291.

1971. *Nephotettix virescens* (Fabricius) : Ghauri, *Bull. Ent. Res.*, 60 : 481-512.

Material examined : 1 ex., Meghalaya, Shillong, Dist. East Khasi Hills, 29.10.1974, coll. S.K. Gupta, 2 exs., Jaintia Hills; 23.9.88, coll. V.D. Srivastava.

Diagnosis : Face black, clypeus in male with a black spot on each side absent in female; tegmina deep black.

Aedeagal shaft linguiform, short, flat, apex with 3 pairs of spur-like processes (Fig. 21a); style (Fig. 21b) with apical extension, saw-like; male plate (Fig. 21c) gradually converging, apex obtuse, mesal margin spined; pygofer (Fig. 21d) posteriorly with a long sharp spur besides three smaller spurs.

Length : female 5 mm and male 4 mm.

Distribution : India : Meghalaya (Shillong, Jaintia Hills); Bihar, West Bengal; Elsewhere : Ethiopian region Indonesia; Japan; Korea; Malayasia; Micronesia; Netal; Palestine; Philippines; Singapore; Sumbawa; Taiwan; Thailand.

Remarks : The species transmits viruses consisting of Transitory yellowing (Taiwan), Rice Tungro virus (Philippines and India) and rice dwarf virus (Japan), Ponyakit morah (Tungro) (Malayasia. Rice tungro virus (RTV) occasionally occurs as epidemics in several states of the country including West Bengal.

22. Genus *Recilia* Edwards

1922. *Recilia* Edwards, *Ent. Mon. Mag.*, **58** : 206.

Type, by original designation, *Deltocephalus dorsalis* Motschulsky

1859. *Deltocephalus dorsalis* de Motschulsky, *Etude Ent.*, **8** : 114.

33. *Recilia dorsalis* (de Mot.)

1988. *Recilia dorsalis* (de Motschulsky) : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. **90** : 169.

Material examined : 1 ex., Meghalaya : Jaintia Hills Jowai Dawki, 25.9.88, coll. V.D. Srivastava and party.

Diagnosis : Vertex with two spots; scutellum with spots at each basal angle; tegmina with an irregular fuscous fascia from near to apex and a row of brown spots extend from apex of clavus to apical cell.

Aedeagal shaft (Fig. 22a) elongate, stout, stylar shaft beyond middle tapered to a point (Fig. 22b); male plate (Fig. 22c) simple; pygofer also simple.

Length : female 4 mm, male 3.5 mm.

Distribution : India : Meghalaya (Jaintia Hills); Tamil Nadu, West Bengal; Elsewhere : Burma; Sri Lanka; South-East and Far East Asian countries.

23. Genus *Thomsoniella* Signoret

1879. *Thomsoniella* Signoret, *Ann. Soc. Ent. de France*, **9**(5) : 51.

Type, by monotype, *Thomsoniella kirschbaumi* Signoret

1880. *Thomsoniella kirschbaumi* Signoret, *Ann. Soc. Ent. de France*, **10**(5) : 52.

34. *Thomsoniella porrecta* Walker

1858. *Accocephalus porrectus* Walker, *List. Hom. Suppl.* : 262.

1903. *Thomsoniella porrecta* Melichar, *Hom. Faun. Ceylon* : 173.

1988. *Thomsoniella porrecta* : Datta, *Rec. Zool. Surv. India*. Occ. Paper 90 : 188.

Material examined : 2 exs., Meghalaya : Shillong, 27.10.76, coll. M.S. Jyrwa, 2 exs., East Khasi Hills; 30.9.88, coll. A.R. Lahiri and party, 3 exs., Tura, 20.10.74, coll. S.K. Gupta.

Diagnosis : Anterior margin of vertex usually blackish pronotum transverse; scutellum usually trifasciate; tegmina transparent.

Aedeagus (Fig. 23a) slender, basally broad and with hook-shaped spines apically; style (Fig. 23b) robust dagger-shaped, apically pointed; Male plate (Fig. 23c) long, slender, broadened at bases gradually tapered with apical half transversely rugulose, lateral margin of basal half with spines; pygofer (Fig. 23d) broad basally, posterior half subtriangulate and spinulose.

Length : female 5.5 mm, male 4.5 mm.

Distribution : India : Meghalaya (Shillong; Tura, Khasi Hills); Bihar, Orissa, Punjab; Elsewhere : Burma; Formosa; Maldives; Philippine Islands; Queensland.

Subfamily IX. Macropsinae

24. Genus *Magnentius* Pruthi

1930. *Magnentius* Pruthi, *Mem. Indian Mus.* 11 : 6.

Type, by original designation, *Magnentius clavatus* Pruthi

1930. *Magnentius clavatus* Pruthi, *Mem. Indian Mus.*, 11: 7-8.

35. *Magnentius clavatus* Pruthi

1930. *Magnentius clavatus* Pruthi, *Mem. Indian Mus.* 11 : 7-8.

1988. *Magnentius clavatus* : Datta, *Rec. Zool. Surv. India*, Occ. Paper No. 90 : 203.

Material examined : 1 ex., Meghalaya; Shillong, Dist. East Khasi Hills, 12.11.1974, coll. S.K. Gupta.

Diagnosis : Vertex stout; blackish; pronotum and scutellum somewhat punctate; tegmina with white pubescence.

Apex of aedeagal shaft spatulate but distinctly bifid (Fig. 24a); style (Fig. 24b) with pre-apical lobe not differentiated; mesal apical extension obliquely extended; Male plate (Fig. 24c) stout, gradually tapered, a few fine setae at tip; pygofer (Fig. 24d) appearing rectangulate, with a row of macrosetae subapically.

Length : (female) 6 mm, male 5 mm.

Distribution : India : Meghalaya (Shillong); South India.

Subfamily X. Agalinae

25. Genus *Nehela* White

1878. *Nehela* White, *Proc. Zool. Soc.* p. 473.

Type, by subsequent designation, *Nehela vulturina* White

1878. *Nehela vulturina* White, *Proc. Zool. Soc.* p. 473.

36. *Nehela violacea* Distant

1916. *Nehela Violacea* Distant, *Fauna Brit. India*, **6** : 233.

Material examined : 1 ex., Meghalaya : Shillong, Botanical Garden, East Khasi Hill, 20.5.77, coll. G.K. Srivastava and Party.

Diagnosis : Vertex dark purplish red; with a large spot in the middle; pronotum rounded convexly; scutellum dark brown; tegmina dark purplish red.

Length : (female) 5 mm.

Distribution : India : Meghalaya (Shillong), South India.

Subfamily XI. Iassinae

26. Genus *Iassus* Fabricius

1803. *Issus* Fabricius, *Systema Rhyngotorum* : 85.

Type, by subsequent designation *Cicada lania* Fallen

1826. *Cicada lanio* Fallen, *Hemiptera seveciae*, **2** : 58.

37. *Iassus indicus* (Lethierry)

1892. *Macropsis indica* Lethierry, *Bull. Zool. Soc. France* : 209.

1988. *Iassus indicus* (Lethierry) : Datta, *Rec. Zool. Soc. France*, Occ. Paper No. **90** : 218.

Material examined : 1 ex, Meghalaya, Khasi Hill, 30.9.88, coll. A.R.Lahiri and party; 1 ex., Shillong, East Khasi hills, 20.10.74, coll. S.K. Gupta.

Diagnosis : Vertex blunt at apex rounded, frons raised above cheeks; pronotum finely striate; scutellum depressed at base.

Aedeagal shaft (Fig. 25a) semi transparent, dorsoventrally flattened, deeply notched at base, a stout lateral process arising medially, inner margin at apex serrate; stylar shaft (Fig. 25b) tip beak-shaped; pygofer (Fig. 25d) with a sharply geniculate hook; male plate (Fig. 25c) ligulate with minute setae.

Length : female 7.5 mm, male 7 mm.

Distribution : India : Meghalaya (Shillong, Khasi Hills); Andaman Is.; Karnataka and Mysore; Elsewhere : Africa; Buru; Philippine Island; Samoa; Sri Lanka; Sumbawa; Upolu.

Remarks : Pruthi (1934) and Mathew (1953) recorded the species as a suspect vector of spike disease of Sandal wood.

Subfamily XII. Krishninae

27. Genus *Krisna* Kirakaldy

1900. *Krisna* Kirakaldy, *Entomologist* **33** : 243.

Type, by subsequent designation *Siva strigicollis* Spinola

1850. *Siva strigicollis* Spinola, *Mem. Soc. Ital. Modena*, **25**(1) : 128.

38. *Krisna strigicollis* (Spinola)

1850. *Siva strigicollis* Spinola, Mem. Soc. Ital Modena, 25(1) : 128.

1988. *Krisna strigicollis* (Spinola) : Datta, Rec.Zool. Surv. India, Occ. Paper No. 90 : 222.

Material examined : 1 ex., Meghalaya : Shillong, dist. East Khasi Hills, 18.5.79, coll. G.K. Srivastava and party.

Diagnosis : Vertex binotate, pronotum with transverse lines; scutellum transversely striate; tegmina brownish yellow.

Aedeagal shaft simple (Fig. 26a) style (Fig. 26b) slender, elongate, extreme apical part appearing spatulate; Male plate (Fig. 26c) broadened basally, gradually connivent, mesal margin with rugal projection; pygofer hook dagger-shaped (Fig. 26d).

Length : male 9.5 mm, female 10.5 mm.

Distribution : India : Meghalaya (Shillong); Bihar, Maharashtra, Tamil Nadu, Utta Pradesh; Elsewhere : Africa; Belgium; Billiran Is.; and Borneo; Burma; Compuchia; China; Dutch; East Indies; Indochina; Japan; Java; Luzon; Malay Peninsula; Malaysia; Philippine Islands; Singapore; Sri Lanka.

SUMMARY

The paper presents an account of 38 species belonging to 27 genera distributed over 12 subfamilies of Cicadellidae from Meghalaya. Of these, 12 species constitute new locality record from the state. Running key to various taxa, wherever applicable, is provided for easy identification. Besides, reference to original literature, notes on economic importance wherever possible, general diagnosis, geographical distribution of each species are incorporated. Necessary illustrations on genitalic armature of 26 species (male) are also provided. Also, a list of Cicadellid species so far known from the state of Meghalaya is appended. The paper is based on the collections made by various survey parties of Zoological Survey of India.

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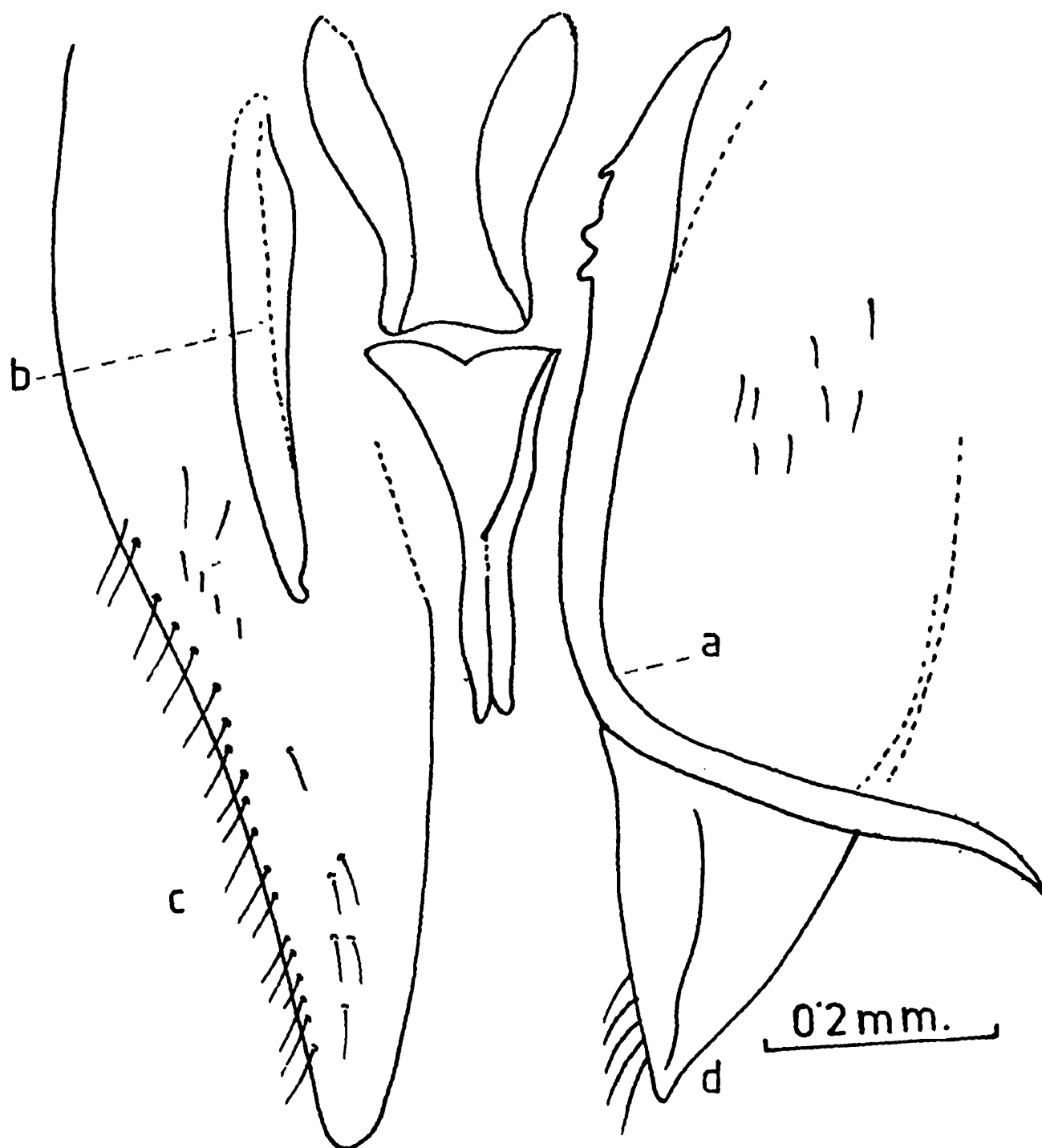


Fig. 1. *Bothrogonia ferruginea* (Fabricius). a - Aedeagus; b Style; c Male plate; d Pygofer.

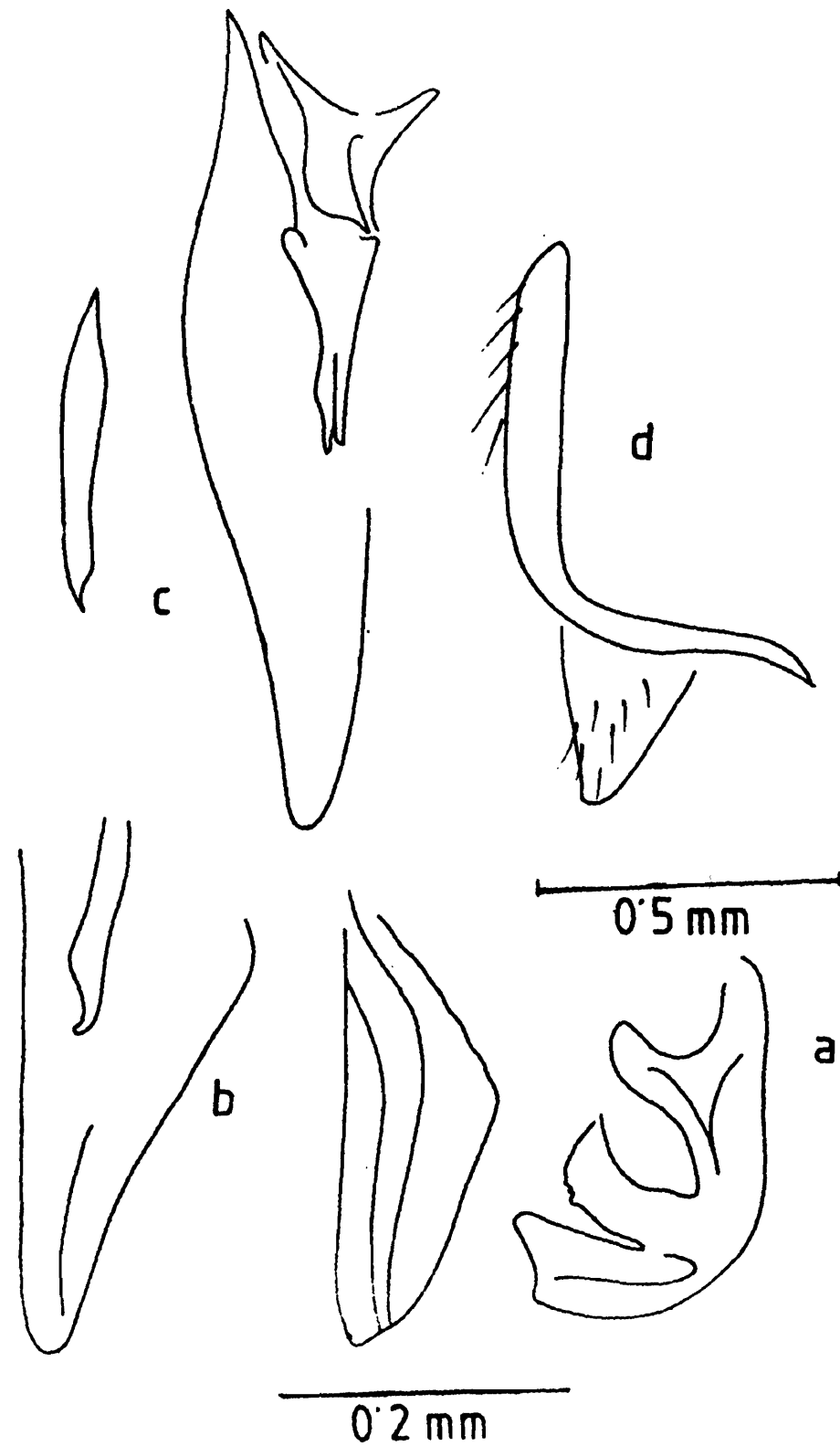


Fig. 2. *Bothrogonia indistincta* (Walker). a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

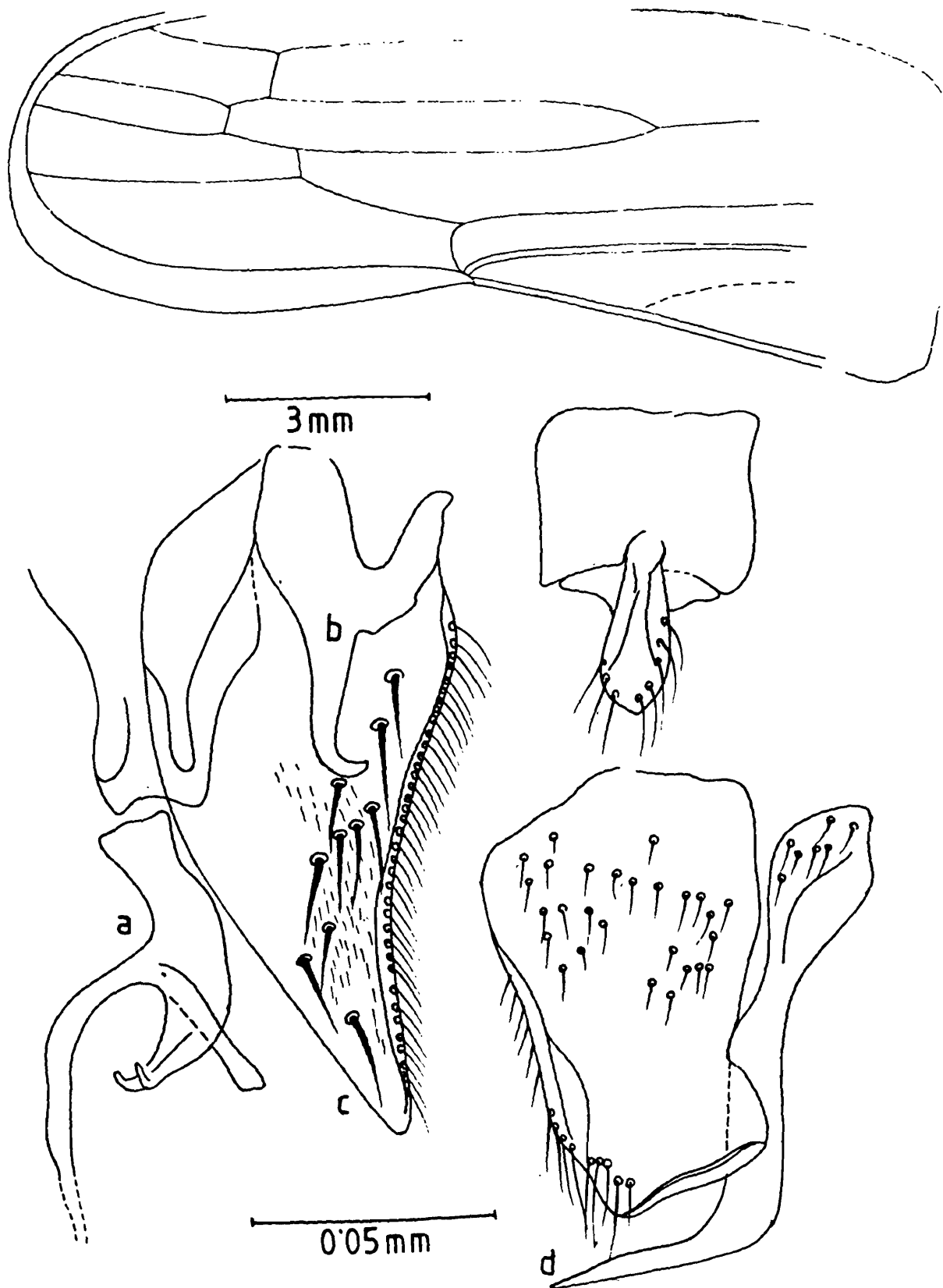


Fig. 3. *Bothrogonia leopardina* (Distant). a - Aedeagus; b Style; c Male plate; d Pygofer.

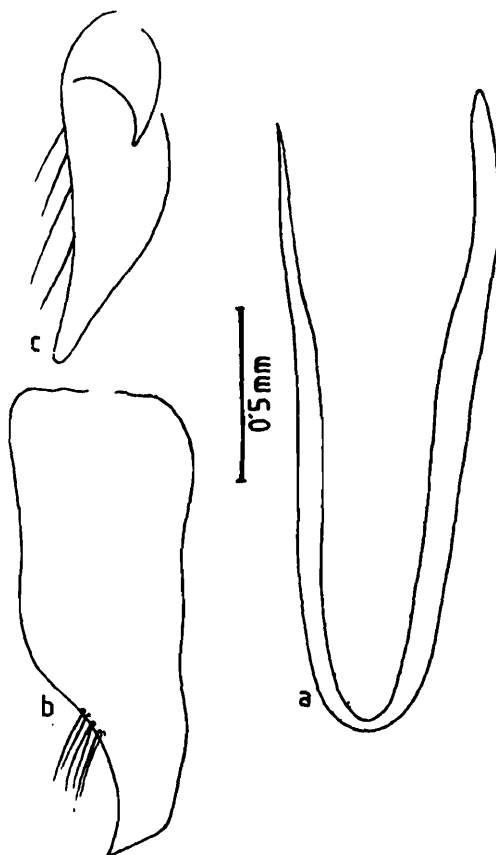


Fig. 4. *Cicadella spectra* (Distant). a - Aedeagus; b - Style; c - Male plate.

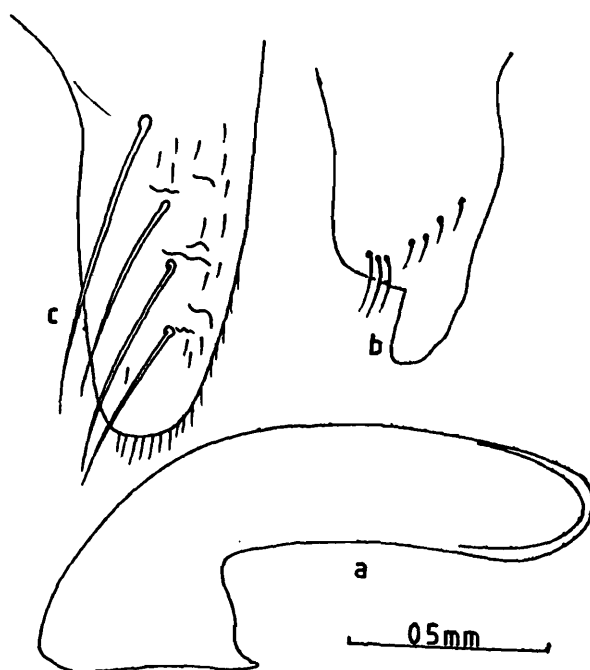


Fig. 5. *Cofana mimica* (Distant). a - Aedeagus; b - Style; c - Male plate.

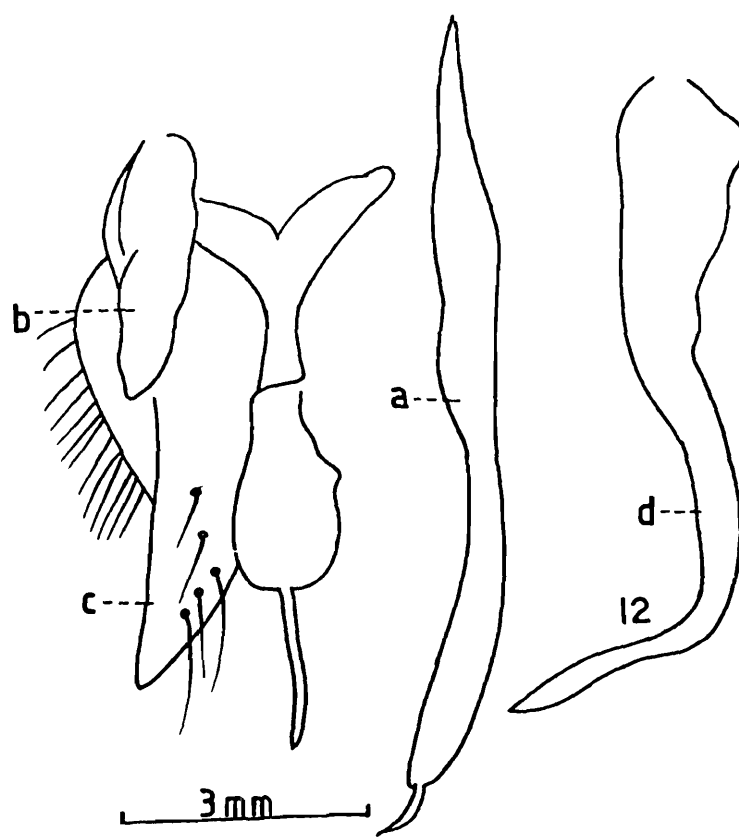


Fig. 6. *Kolla ganeshi* Distant. a - Aedeagus; b Style; c Male plate; d Pygofer.

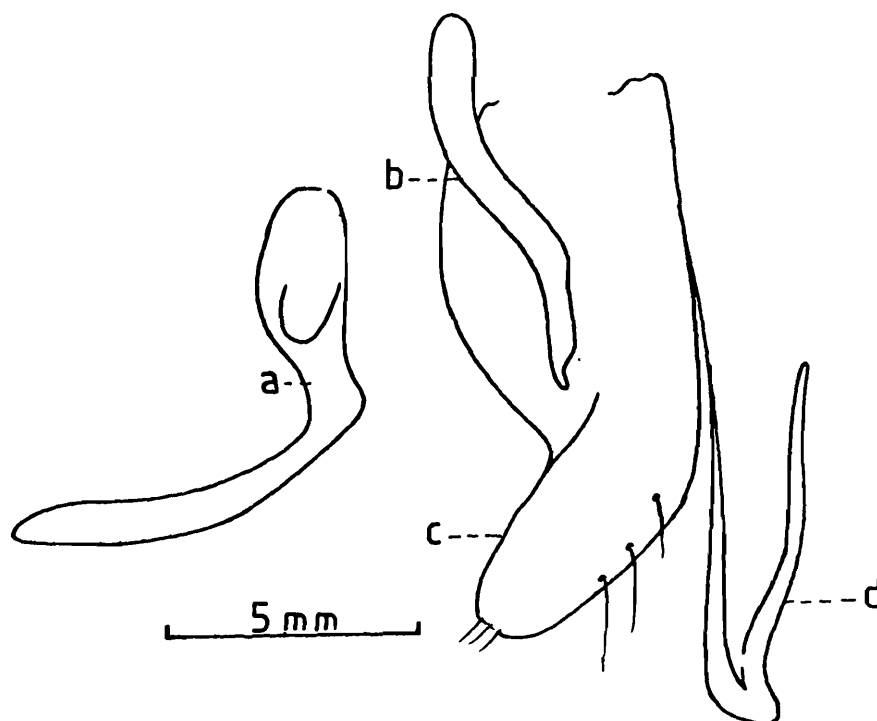


Fig. 7. *Kolla opponens* Walker. a - Aedeagus; b Style; c Male plate; d Pygofer.

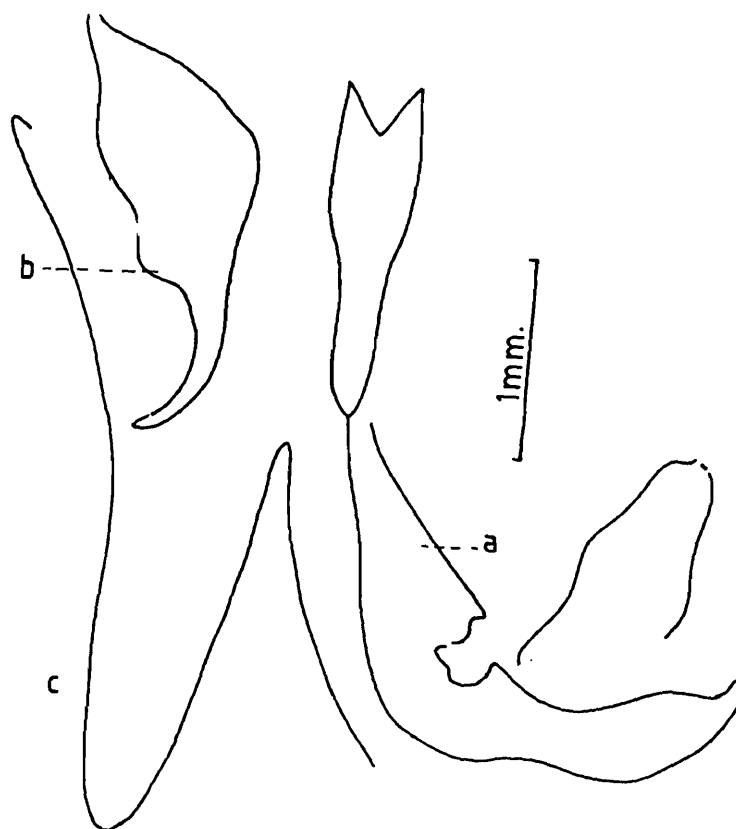


Fig. 8. *Kolla unimaculata* Signoret. a - Aedeagus; b - Style; c - Male plate.

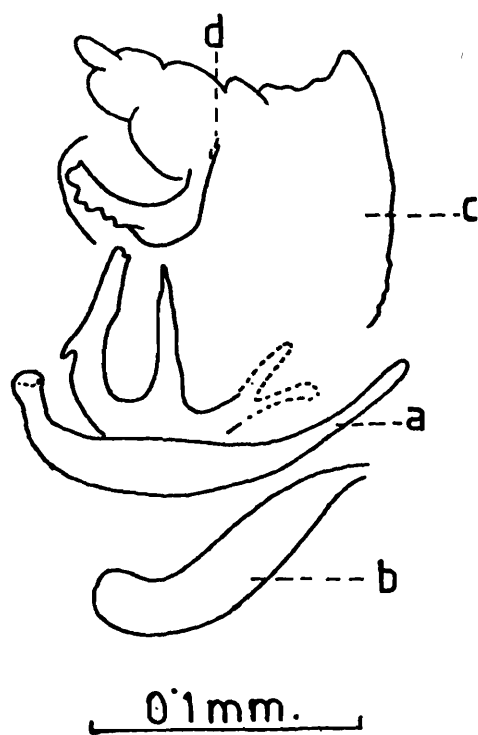


Fig. 9. *Moonia albivitta* Distant. a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

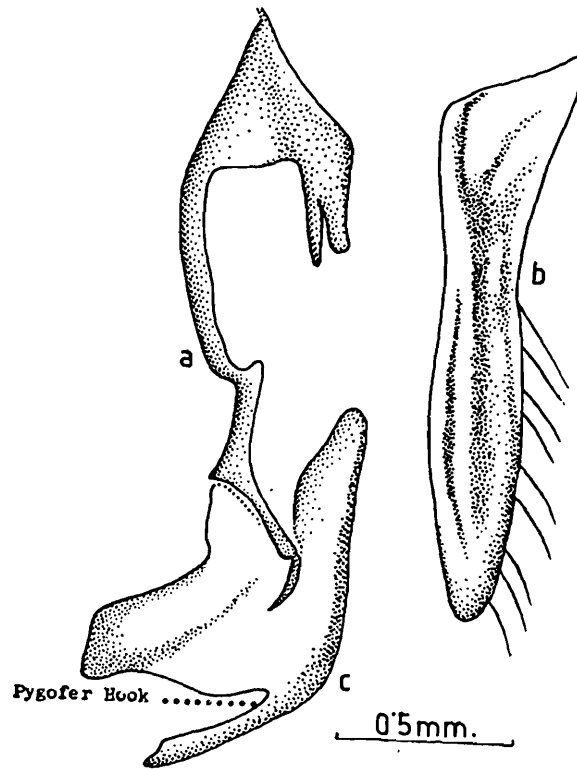


Fig. 10. *Nirvana pallida* Melichar. a - Aedeagus; b - Style; c - Male plate.

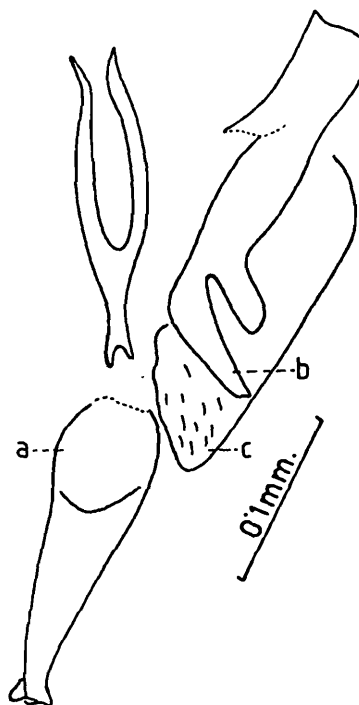


Fig. 11. *Gurawa vexillum* Distant. a - Aedeagus; b - Style; c - Male plate.

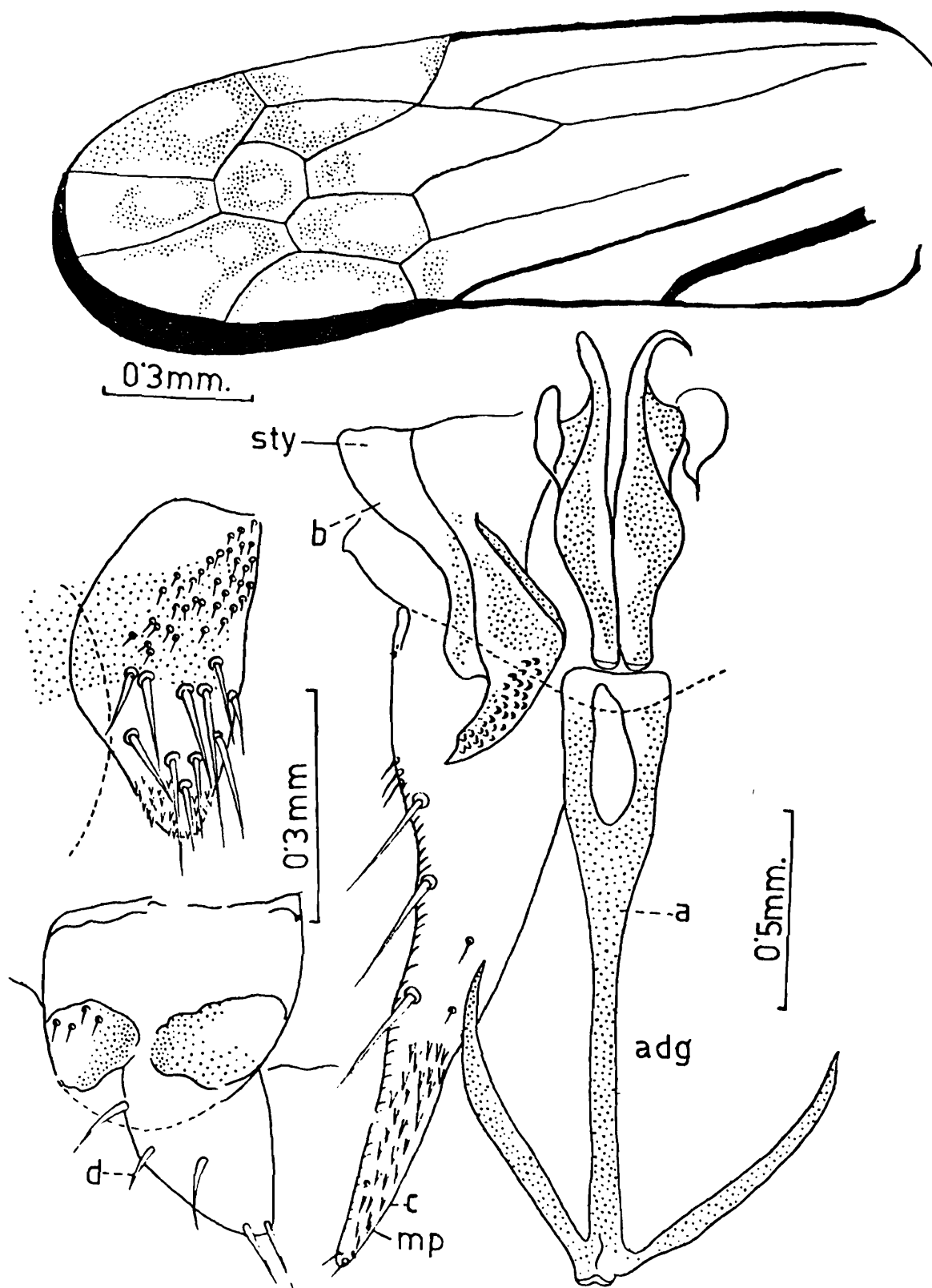


Fig. 12. *Parabolocratus albomaculatus* (Distant). a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

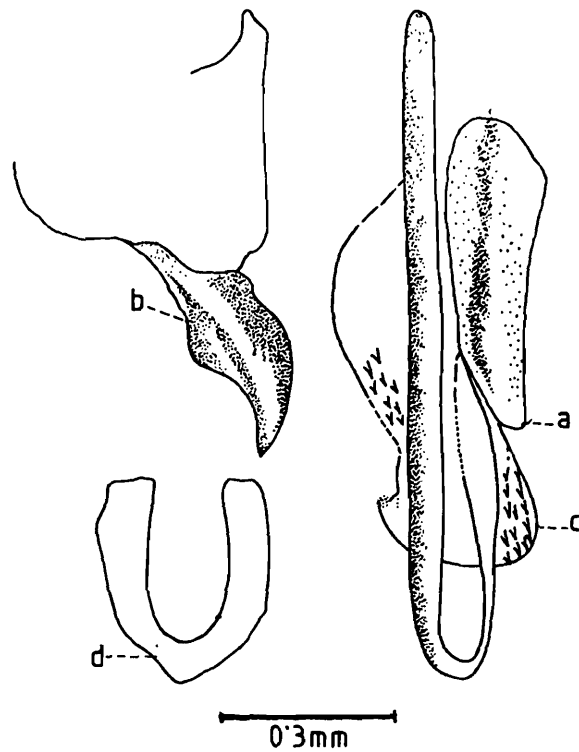


Fig. 13. *Arya rotunda* Pruthi. a - Aedeagus; b Style; c Male plate; d Pygofer.

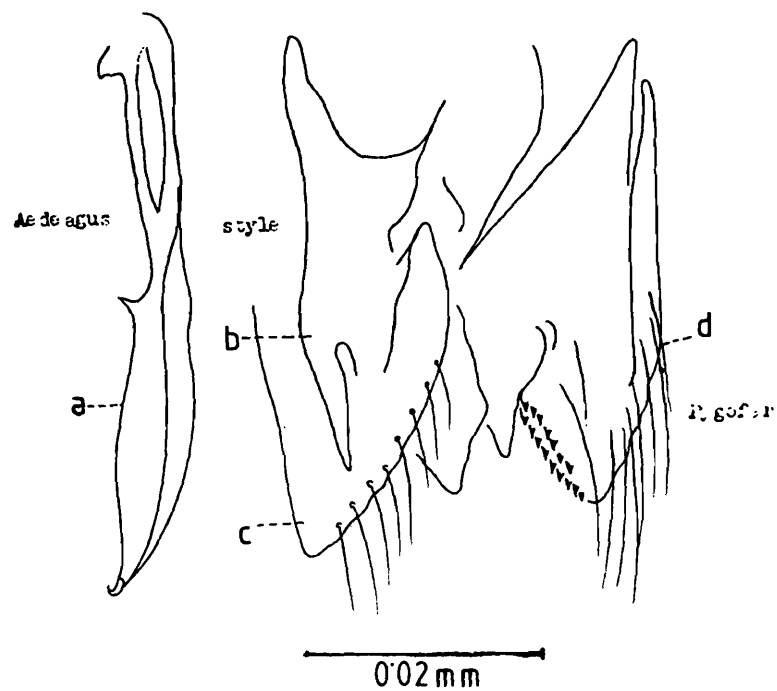


Fig. 14. *Cicadula maculata* Pruthi. a - Aedeagus; b Style; c Male plate; d Pygofer.

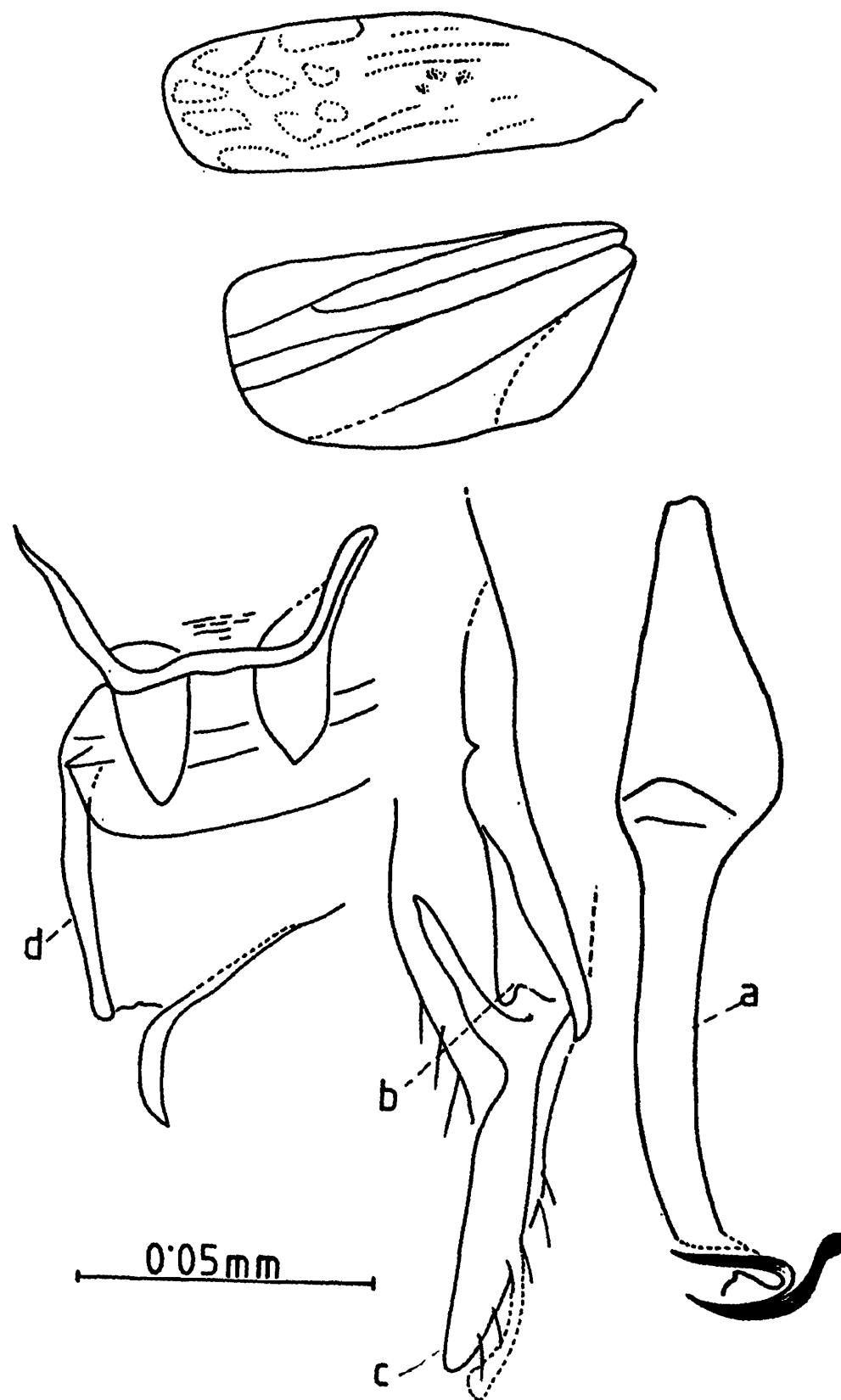


Fig. 15. *Dio facialis* Distant. a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

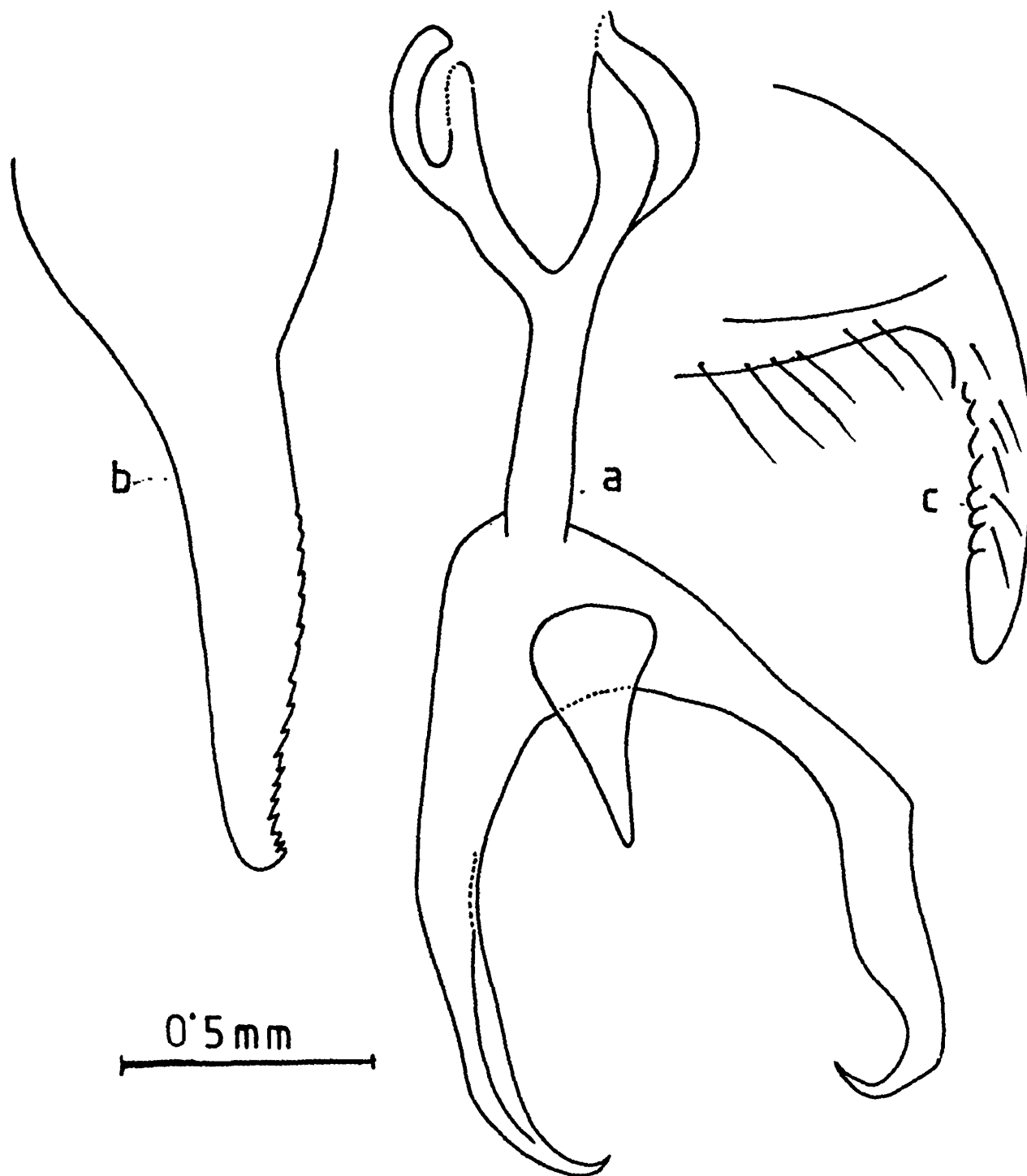


Fig. 16. *Eutettix phycitis* Distant. a - Aedeagus; b Style; c Male plate.

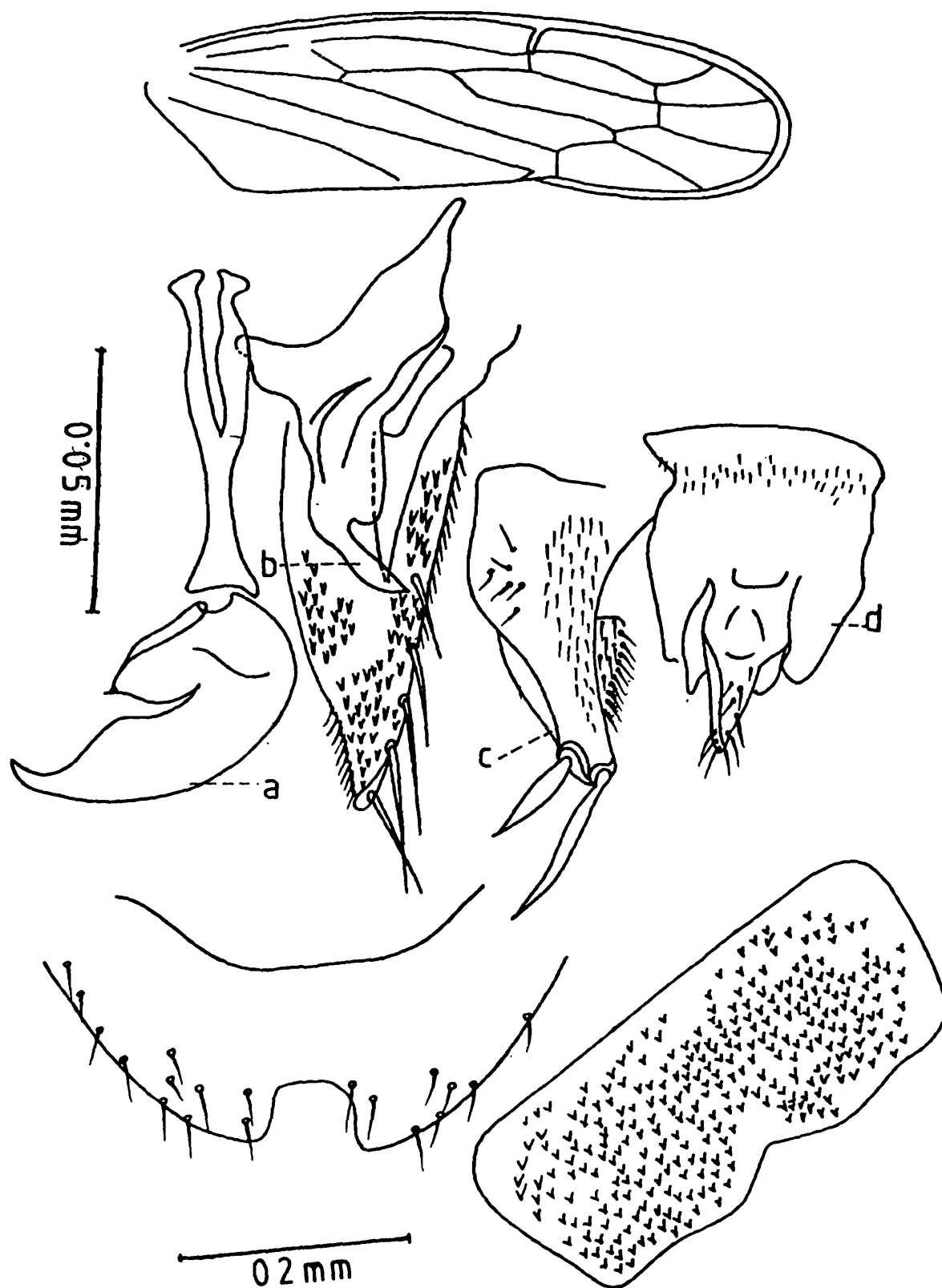


Fig. 17. *Exitianus indicus* (Distant). a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

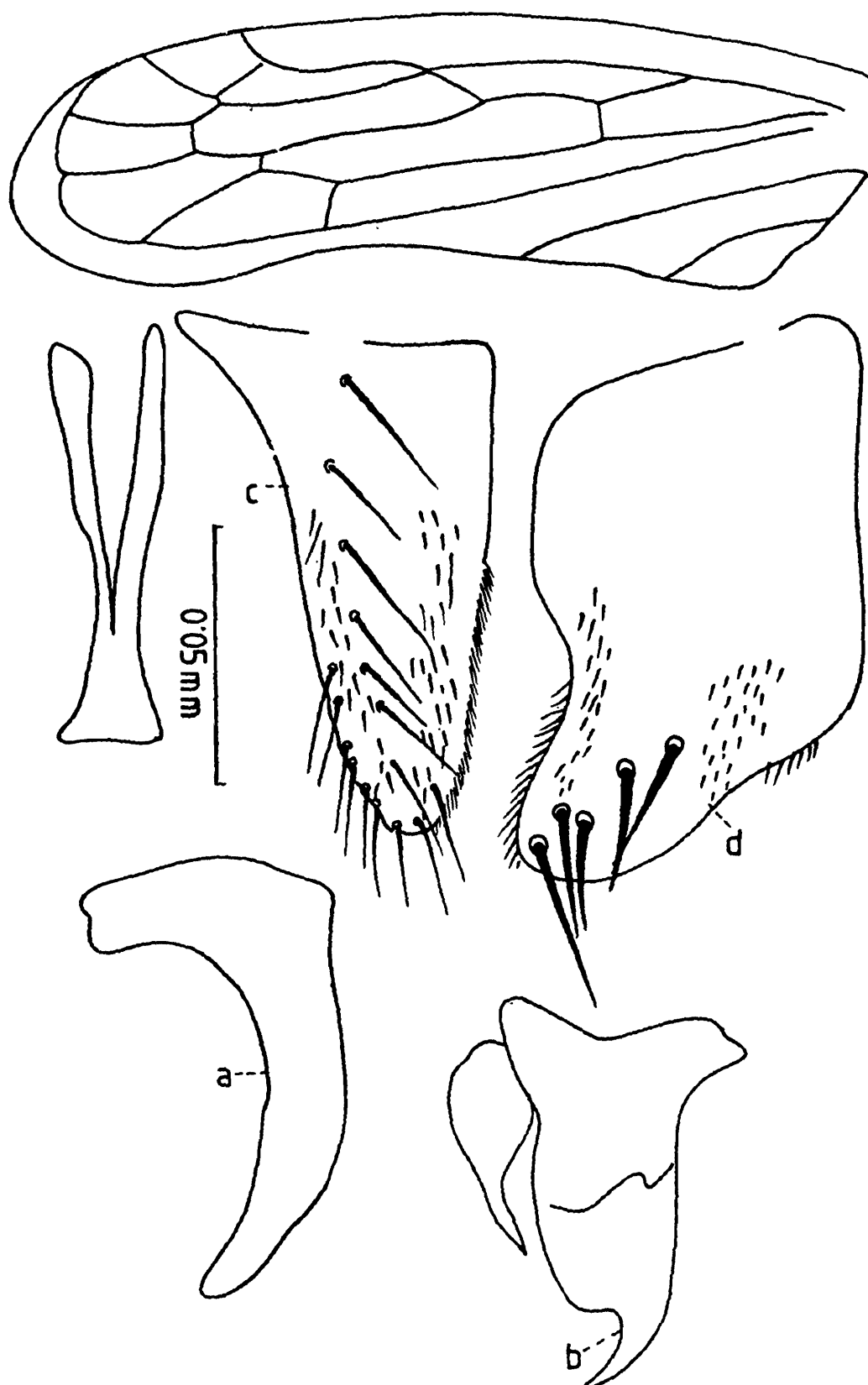


Fig. 18. *Exitianus nanus* (Distant). a - Aedeagus; b Style; c Male plate; d Pygofer.

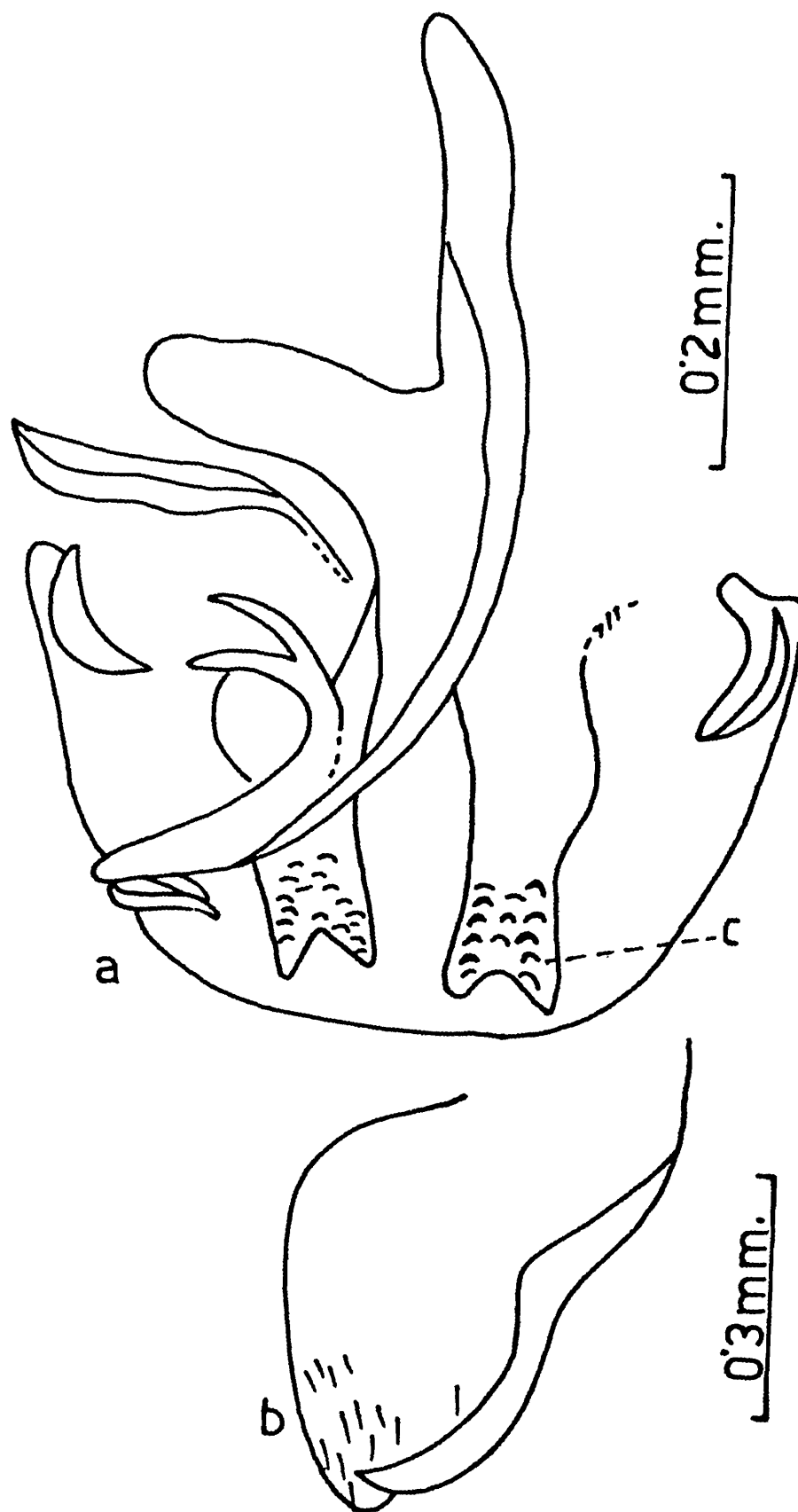


Fig. 19. *Goniagnathus punctifer* Walker. a - Aedeagus; b - Style; c Male plate; d - Pygofer.

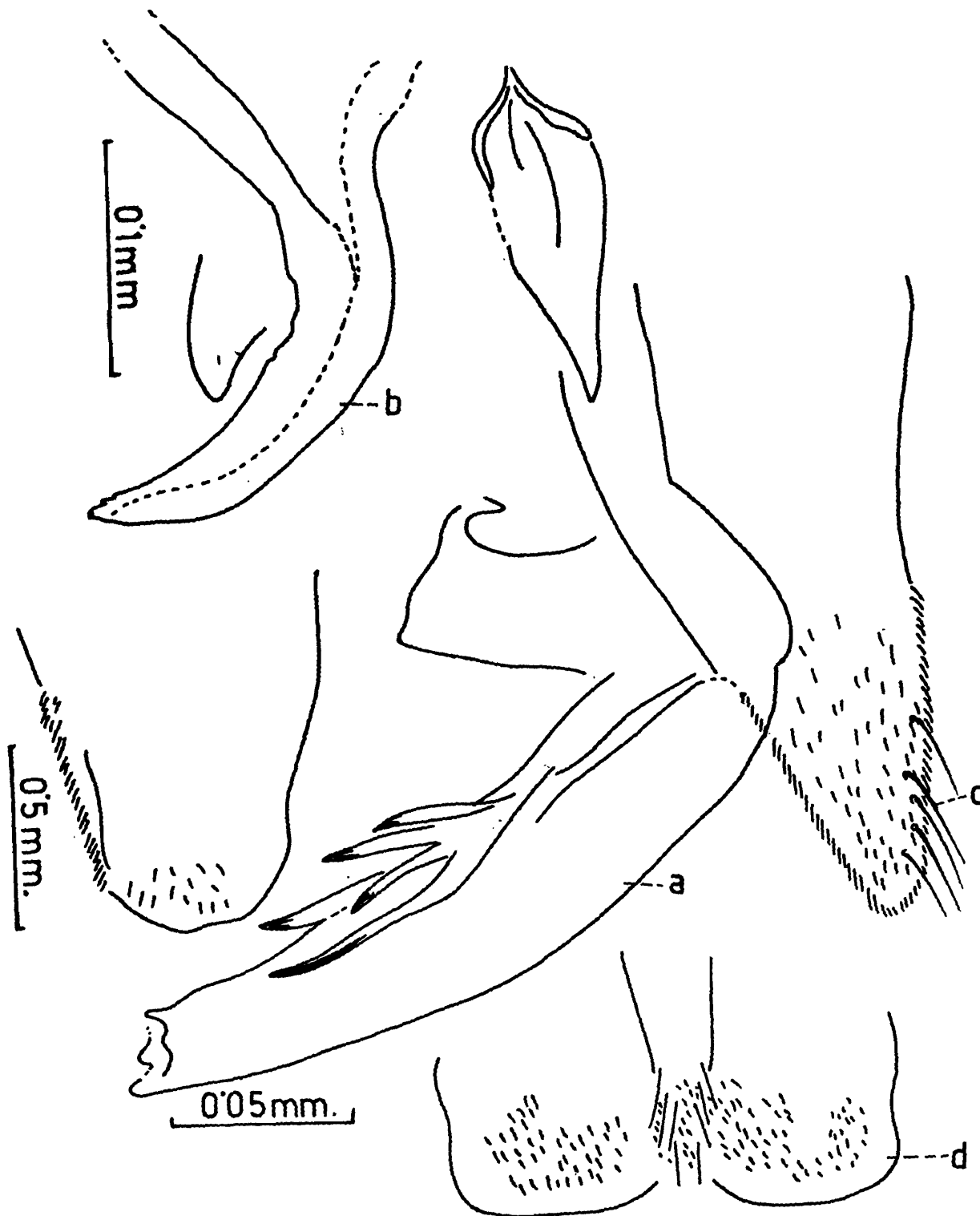


Fig. 20. *Nephotettix nigropicta* Stal. a - Aedeagus; b Style; c Male plate; d Pygofer.

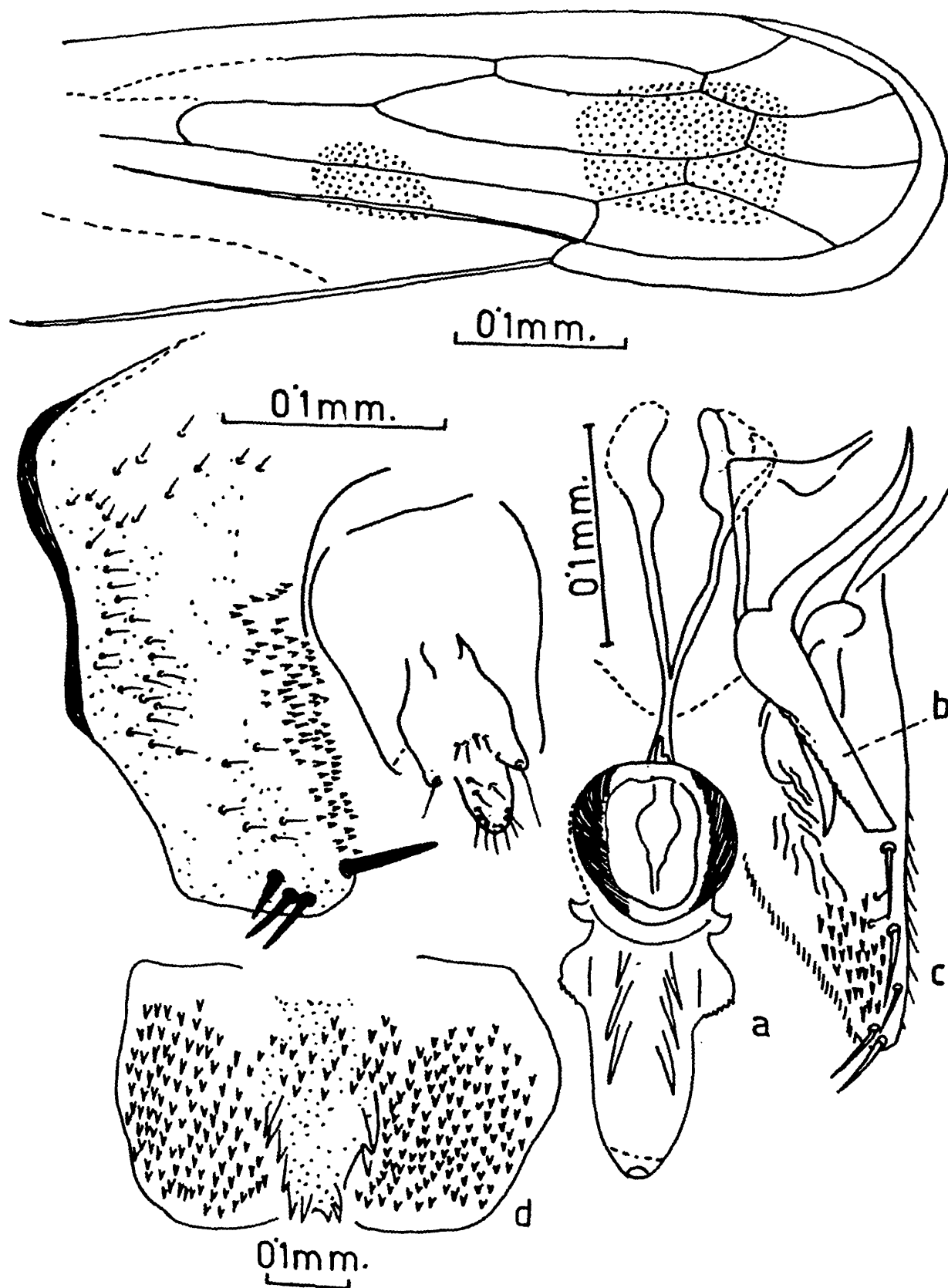


Fig. 21. *Nephotettix virescens* Fabricius. a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

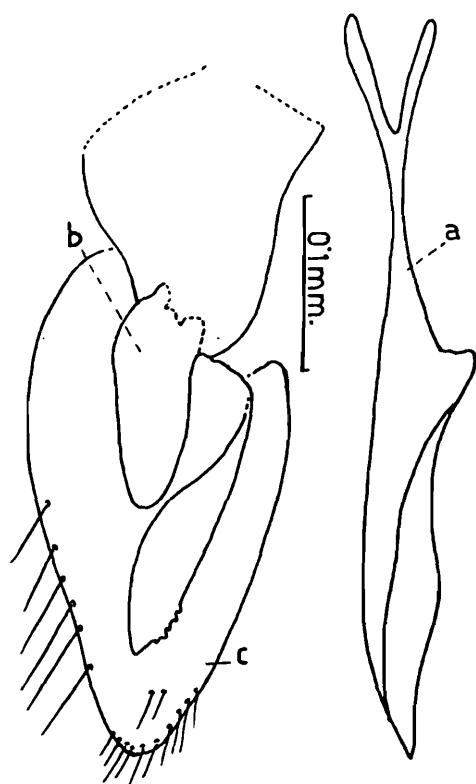


Fig. 22. *Recilia dorsalis* de Mots. a - Aedeagus; b - Style; c Male plate; d - Pygofer.

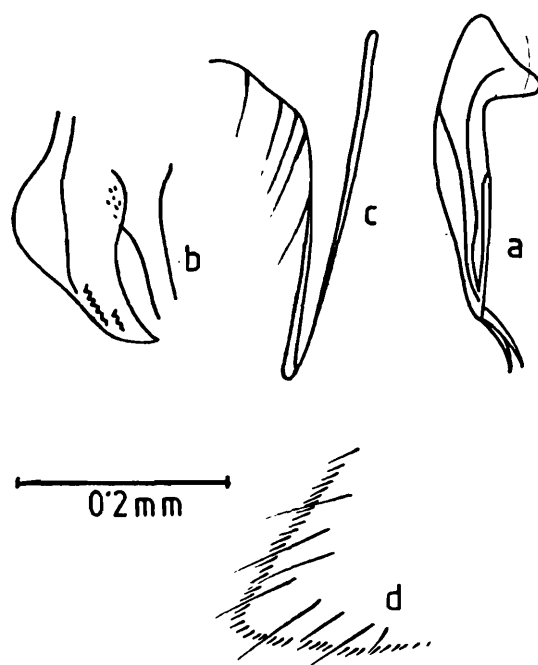


Fig. 23. *Thomsoniella porrecta* Walker. a - Aedeagus; b Style; c Male plate; d Pygofer.

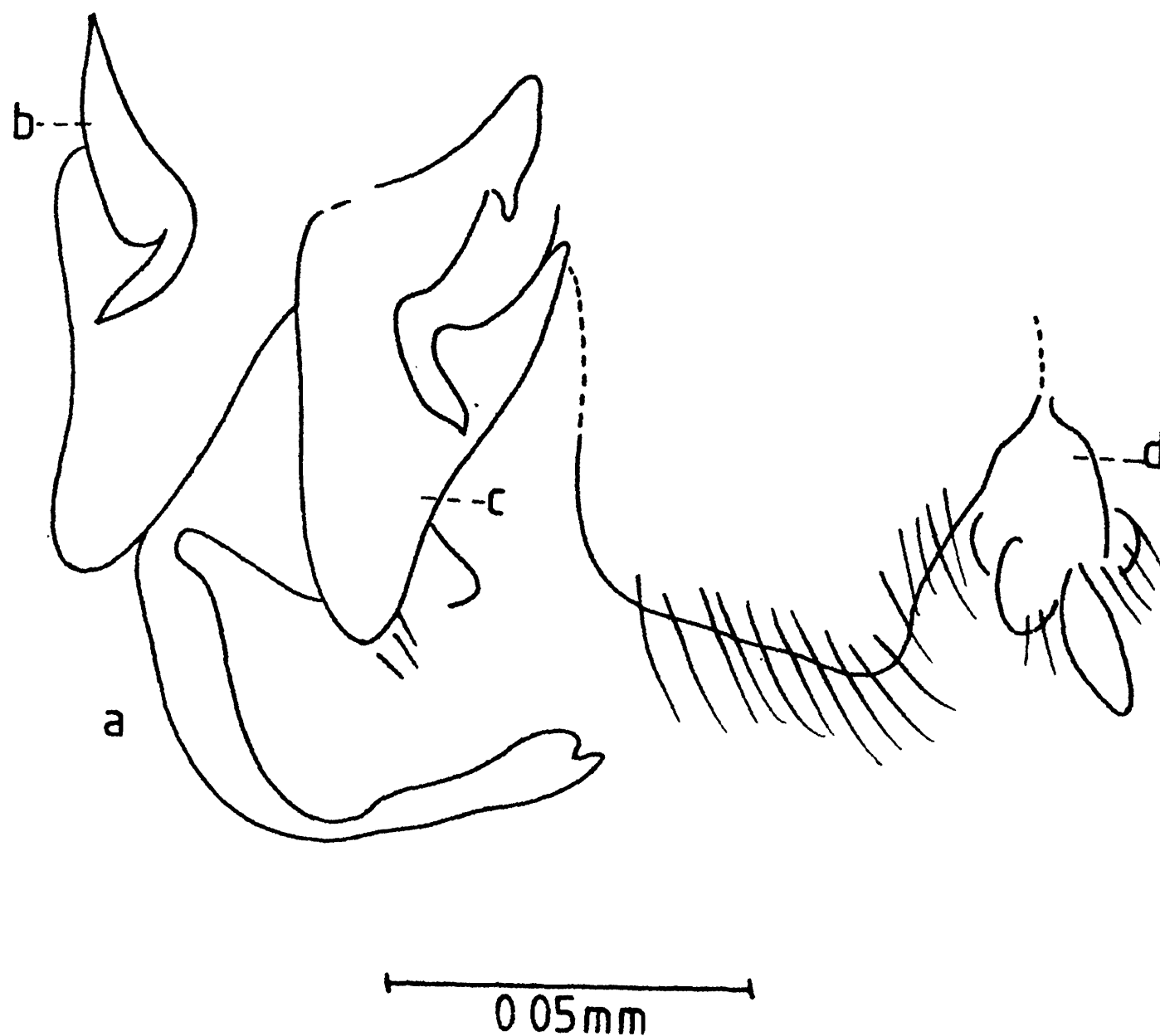


Fig. 24. *Magnentius clavatus* Pruthi. a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

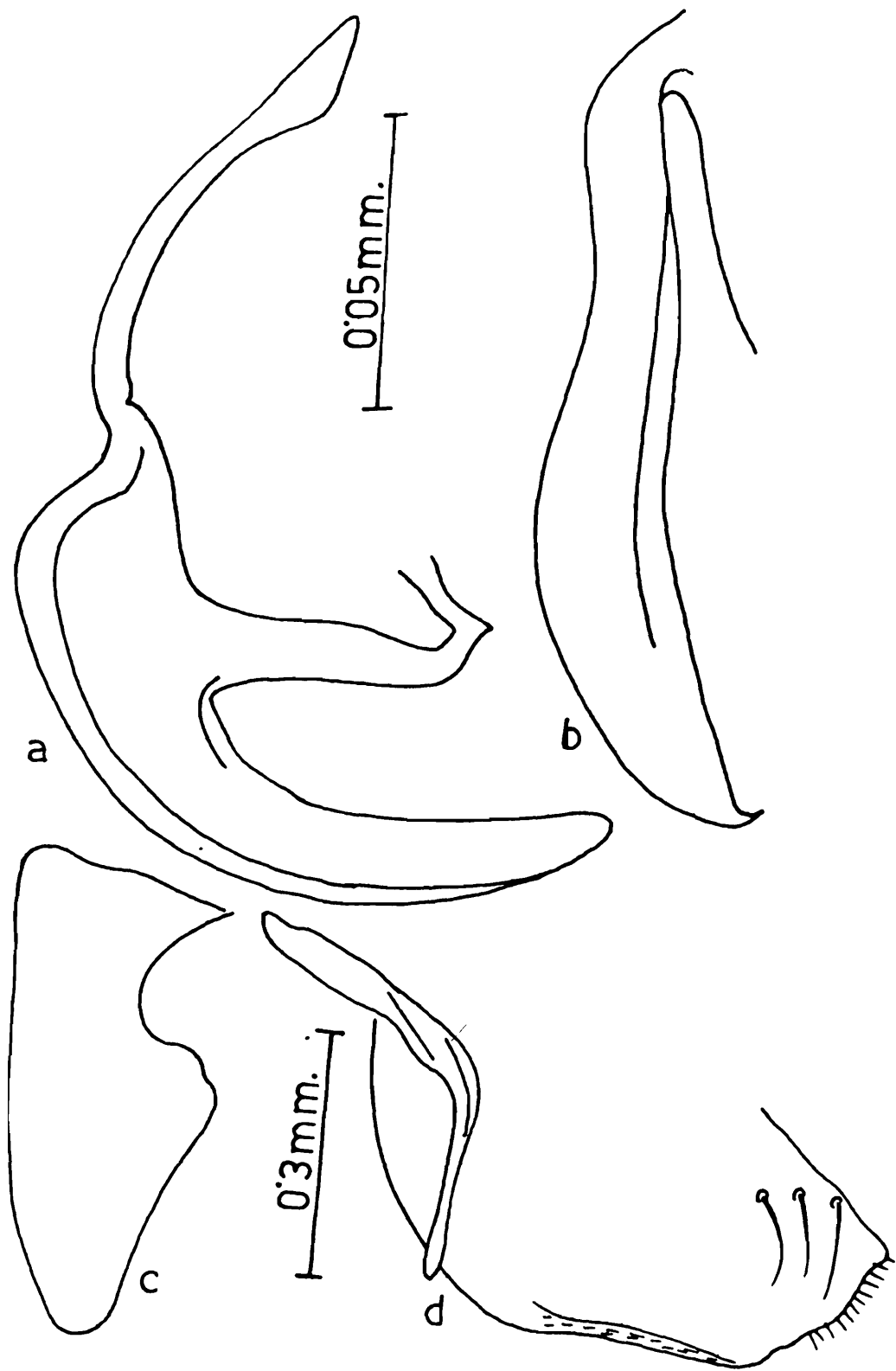


Fig. 25. *Tassus indicus* (Walker). a - Aedeagus; b Style; c Male plate; d Pygofer.

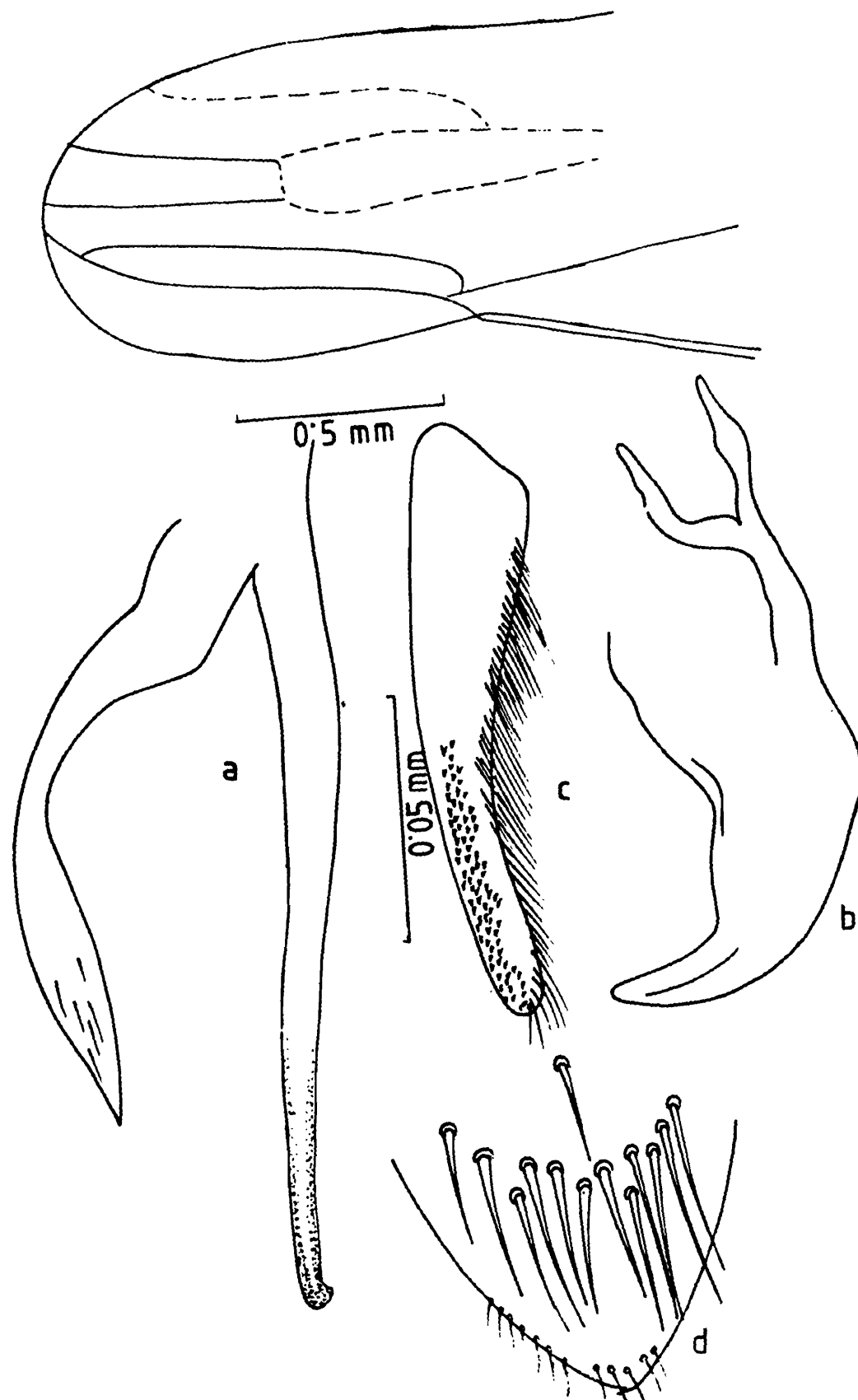


Fig. 26. *Krisna strigicollis* (Spinola). a - Aedeagus; b - Style; c - Male plate; d - Pygofer.

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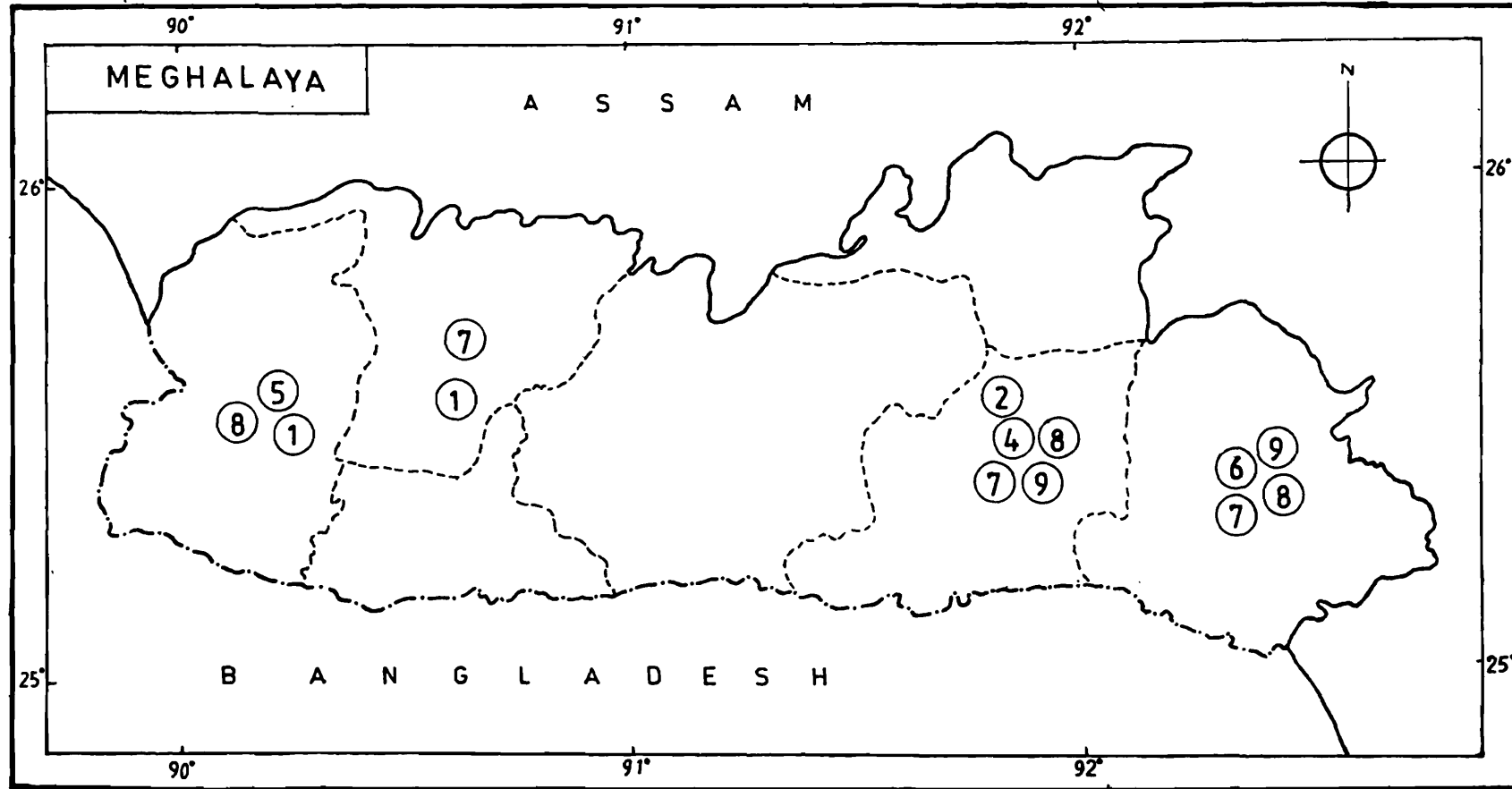
Table - 1. Distribution of Cicadellid species in different districts of Meghalaya

Name of species	WEST GARO HILLS	EAST GARO HILLS	SOUTH GARO HILLS	WEST KHASI HILLS	EAST KHASI HILLS	JAINTIA HILLS	RI-BHOI
1. <i>Bothrogonia ferruginea</i> Fabricius	+	+	-	-	-	-	-
2. <i>Bothrogonia indistincta</i> (Walker)	-				+	-	-
3. <i>Bothrogonia leopardina</i> (Distant)	+			-	-	-	-
4. <i>Cicadella spectra</i> (Distant)	-		-		+	-	-
5. <i>Cofana mimica</i> (Distant)	+	-	-		-	-	-
6. <i>Kolla qanessa</i> Distant	-		-	-	-	+	-
7. <i>Kolla insignis</i> Distant	-	+	-	-	+	+	-
8. <i>Kolla opponens</i> (Walker)	+	-	-	-	+	+	-
9. <i>Kolla unimaculata</i> Signoret	+	-	-		+	+	-
10. <i>Tetiigella bellona</i> China & Fannah	-	-	-	-	+		-
11. <i>Penthimia melanocephala</i> Motsch.	-	-	-	-	+	+	-
12. <i>Penthimia noctua</i> Distant	-	+	-	-	-	-	-
13. <i>Ledra dilatata</i> Walker	+	-	-	-	-	-	-
14. <i>Petaloccephala confusa</i> Distant	-	-	-	+	-	-	-
15. <i>Petaloccephala latifrons</i> Walker	-	-	-	-	+	-	-
16. <i>Tituria assamensis</i> Distant	+	-	-		-	-	-
17. <i>Tituria planata</i> Fabricius	-	-	-	-	-	+	-
18. <i>Moonia albivitta</i> Distant	+	-	-	-	-	-	-
19. <i>Moonia variabilis</i> Distant	-	-	-	-	-	+	
20. <i>Nirvana pallida</i> Melichar	+	-	-		-	-	-
21. <i>Gurawa vexillum</i> Distant	-	-	-	-	-	+	-
22. <i>Parabolocratus albomaculatus</i> (Distant)	-	-	-		-	+	-
23. <i>Arya rotunda</i> Pruthi		-	-	-	-	+	-

Table - 1. Distribution of Cicadellid species in different districts of Meghalaya.

Name of species	WEST GARO HILLS	EAST GARO HILLS	SOUTH GARO HILLS	WEST KHASI HILLS	EAST KHASI HILLS	JAINTIA HILLS	RI-BHOI
24. <i>Balclutha viridis</i> Pruthi					+		
25. <i>Cicadula maculata</i> Pruthi				-	+	+	
26. <i>Dio facialis</i> Distant					+		
27. <i>Eutettix phycitis</i> Distant					+		
28. <i>Exitianus nanus</i> (Distant)					+	+	
29. <i>Exitianus indicus</i> (Distant)					+	+	
30. <i>Goniagnathus punctifer</i> Walker		+					
31. <i>Nephotettix nigropicta</i> (Stal)	-					+	
32. <i>Nephotettix virescens</i> (Fabricius)					+		
33. <i>Recilia dorsalis</i> (de Motschulsky)						+	
34. <i>Thomsonilla porrecta</i> Walker	+				+		
35. <i>Magnentius claavetus</i> Pruthi			-		+		
36. <i>Nehela violacea</i> Distant	-				+		
37. <i>Jassus indicus</i> (Lethierry)					+		
38. <i>Krishna strigicollis</i> (Spinola)					+		

MAP-1: DISTRIBUTION OF CICADELLID SPECIES (NO. 1-9):HEMIPTERA

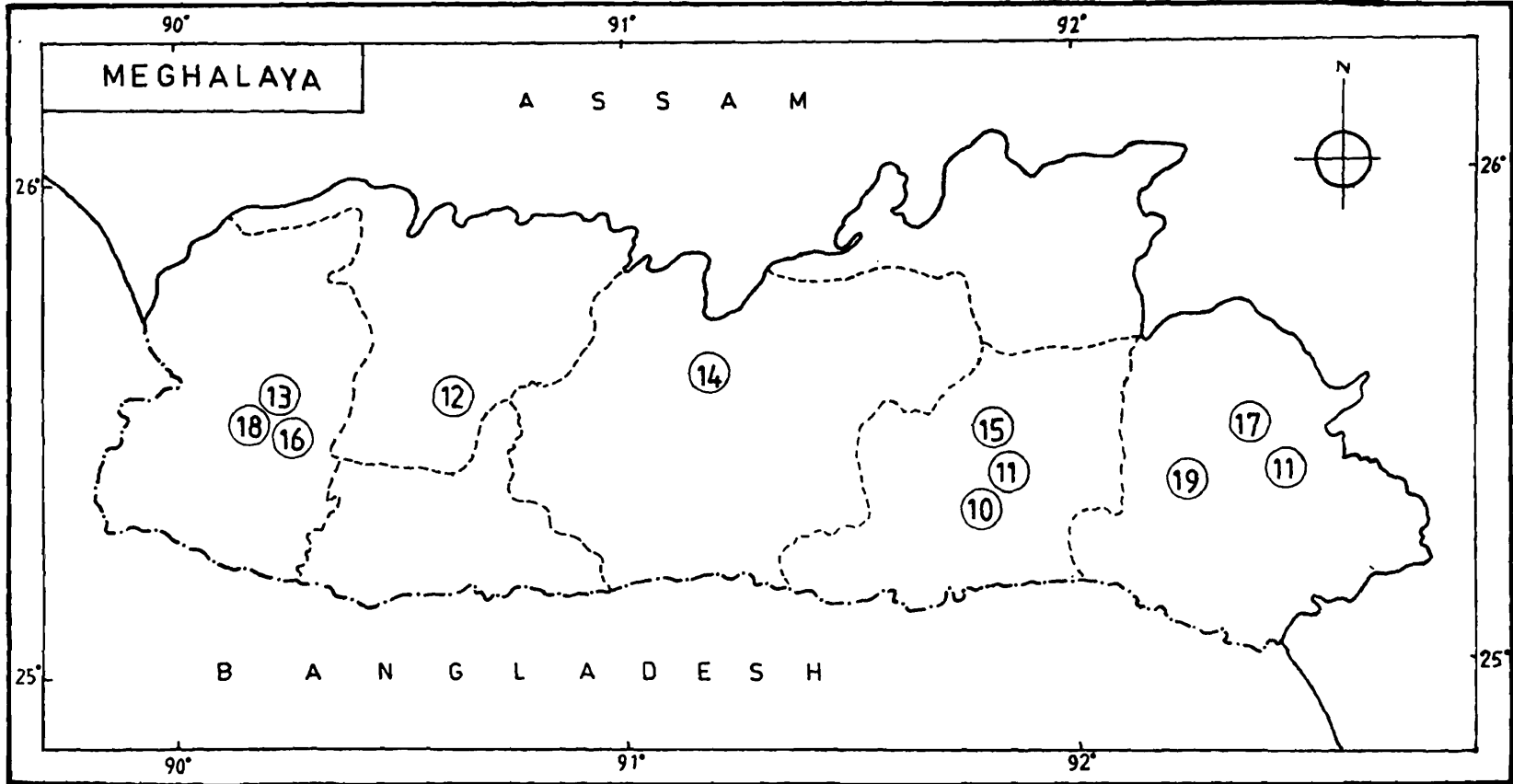


- ① Bothrogonia ferruginea Fabricius
- ② Bothrogonia indistincta (Walker)
- ③ Bothrogonia leopardina (Distant)

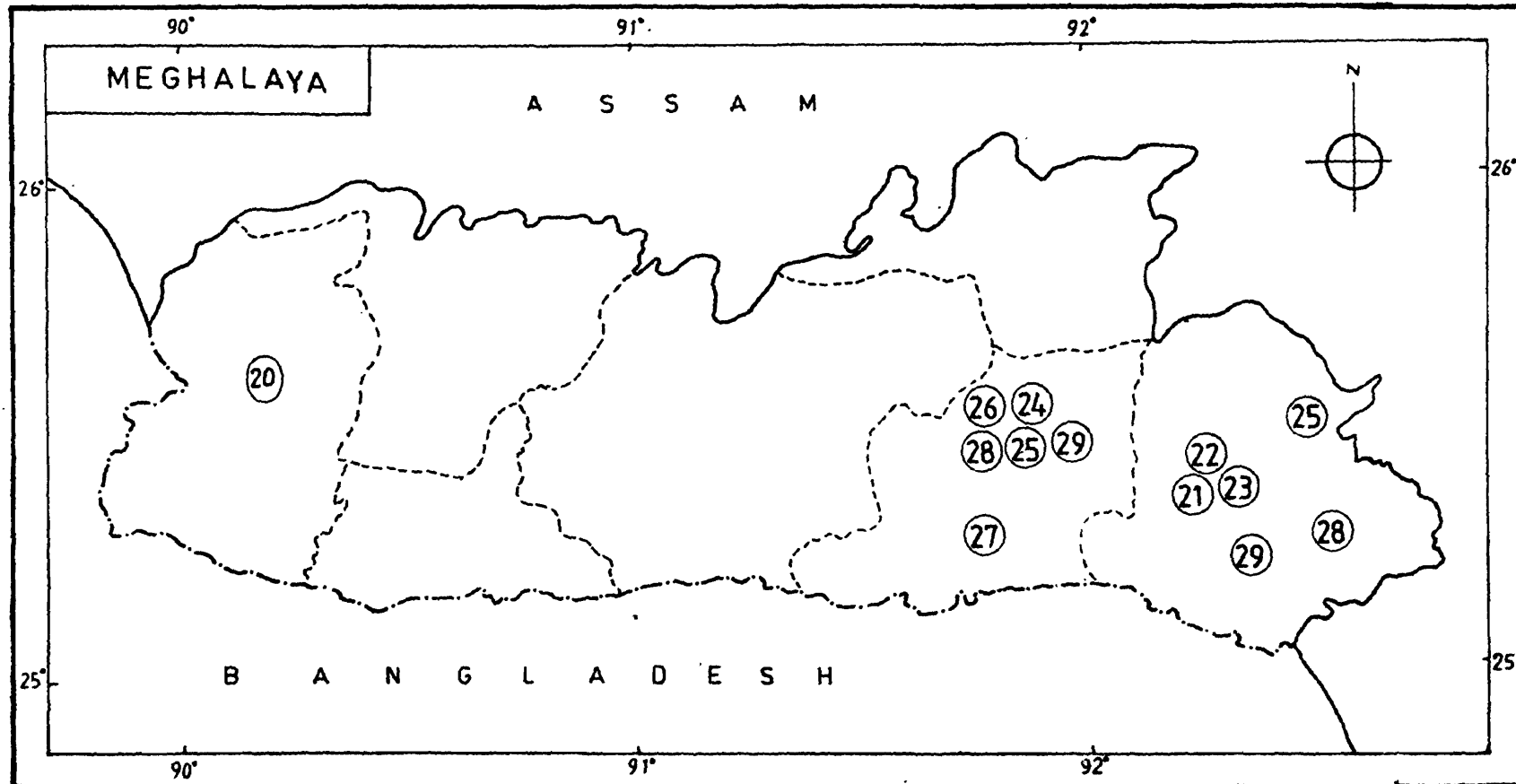
- ④ Cicadella spectra (Distant)
- ⑤ Cofana mimica (Distant)
- ⑥ Kolla ganisha Distant

- ⑦ Kolla insignis Distant
- ⑧ Kolla opponens (Walker)
- ⑨ Kolla unimaculata Signoret

MAP-2: DISTRIBUTION OF CICADELLID SPECIES(NO. 10-19):HEMIPTERA

⑩ Tettigella bellona China & Fennah⑪ Penthimlia melanocephala Matsch⑫ Penthimlia noctua Distant⑬ Ledra dilatata Walker⑭ Petalocephala confusa Distant⑮ P. latifrons Walker⑯ Tituria assamensis Distant⑰ T. planata Fabricius⑱ Nioonia albivitta Distant⑲ Moonia variabilis Distant

MAP.-3. DISTRIBUTION OF CICADELLID SPECIES (NO. 20 - 29) HEMIPTERA

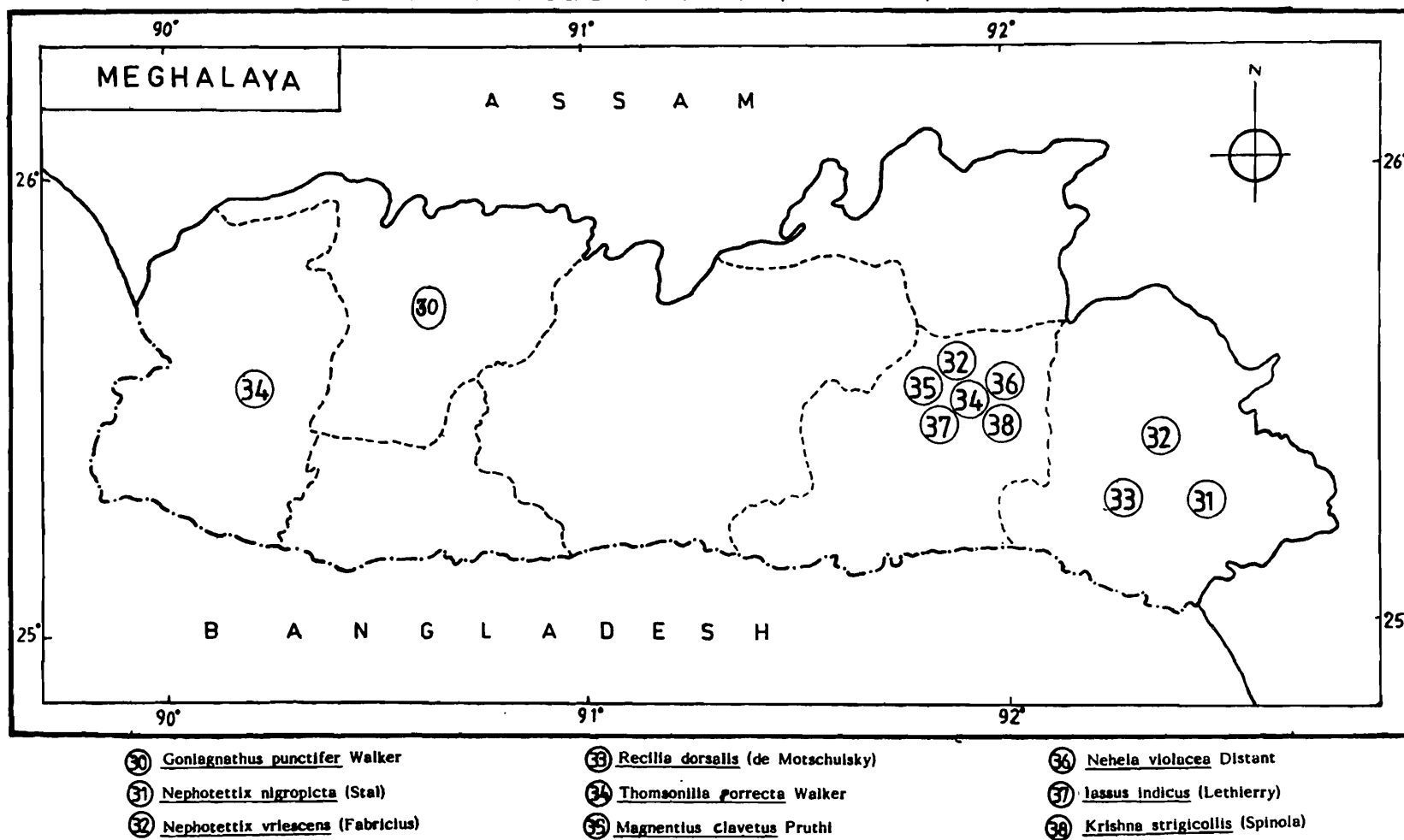


- ②① Nirvana pallida Melichar
- ②② Gurawa exillum Distant
- ②③ Parabolocratus albomaculatus (Distant)

- ②④ Arya rotunda Pruthi
- ②⑤ Balclutha viridis Pruthi
- ②⑥ Cicadula maculata Pruthi

- ②⑦ Dio facialis Distant
- ②⑧ Eutettix phycitis Distant
- ②⑨ Exitianus nanus (Distant)
- ②⑩ Exitianus indicus (Distant)

MAP.-4: DISTRIBUTION OF CICADELLID SPECIES (NO. 30 - 38) : HEMIPTERA



INSECTA : HEMIPTERA : HOMOPTERA : MEMBRACIDAE

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INTRODUCTION

The tree hoppers are members of the family Membracidae (Auchenorrhyncha : Homoptera) and constitute one of the largest families in the order Hemiptera. The group is economically important. They are considered close to Leaf hoppers (Cicadellidae) from which they differ in having great development of the pronotum, particularly its pronotal process. These insects can be diagnosed by ocelli placed between the eyes, antennae inserted in front of head and between eyes, pronotum prolonged backward into a hood or process of variable length and structure. They suck the plant sap with the help of their piercing and sucking type of mouth parts.

In the recent years treehoppers have been gaining importance as pests of economically important plants, often causing direct damage by desapping them.

The information available on Membracid fauna of Meghalaya is fragmentary. No attempt was made earlier to explore the group from the state which is endowed with lush vegetation, diverse climatic conditions, heterogenous physiological nature and rich fauna.

Zoological Survey of India has undertaken a series of faunistic surveys in the state of Meghalaya. During this project, quite a large number of hemipterous specimens including the family Membracidae have been brought by different survey parties of Zoological Survey of India.

The present work is an attempt to provide a comprehensive account of the family Membracidae from Meghalaya. It is based on the recent collections made by different party members and also the old collections represented in Zoological Survey of India.

A perusal of literature reveals that altogether 8 species in 6 genera of Membracidae are so far known from Meghalaya (Atkinson 1885; Distant 1908, 1916; Funkhouser 1927, 1951; Wu 1935; Goding 1950; Mathur 1953).

In India a little over 200 species belonging to about 45 genera are known through the works of Buckton 1903; Paiva 1919; Funkhouser 1922; Dover 1932; Goding 1934, 1939; Evans 1948; Menon and Das 1958; Metcalf and Wade 1965; Ananthasubramanian and Ananthakrishnan 1975; Datta *et al.* 1978; Ghosh *et al.* 1986.

The present contribution is the first consolidated account of 19 species belonging to 11 genera from Meghalaya. Of these, 11 species marked (*) are hitherto reported for the first time from the State. The account deals with a brief note on earlier investigations, diagnosis of each species, keys to

taxa, new locality record and literature references. Maps showing distribution of the above species examined from various districts of Meghalaya have been incorporated in the paper.

The classification of the family has been mainly adopted after Distant (1908, 1916), Metcalf and Wade (1965) and Ananthasubramanian and Ananthakrishnan (1975).

All the material examined is in the National collection at Zoological Survey of India, Calcutta.

Classified list of Species from Meghalaya State

Family	MEMBRACIDAE
Subfamily	CENTROTINAE Spinola, 1850
Tribe	Hypsaucheniini Distant
Genus I	<i>Hypsauchenia</i> Germ, 1835
1.	<i>Hypsauchenia hardwickii</i> (Kirby)
2.	<i>H. subfusca</i> Buckton
Genus II	<i>Hypsolyrium</i> Schmidt, 1926
3.	<i>Hypsolyrium kempi</i> (Distant)
4.	<i>H. uncinata</i> (Stal)
Tribe	Micreunini Distant
Genus III	<i>Leptobelus</i> Stal, 1866
5.	<i>Leptobelus dama</i> (Germ.)
6.	<i>L. gazella</i> (Fairm.)
Tribe	Leptocentrini Distant
Genus IV	<i>Indicopleustes</i> Distant, 1908
7.	<i>Indicopleustes obortus</i> Distant
Genus V	<i>Leptocentrus</i> Stal, 1866
8.	<i>Leptocentrus bajulans</i> Distant
9.	<i>L. leucaspis</i> (Walker)
10.	<i>L. mephistopheles</i> Buckton
Genus VI	<i>Nilautama</i> Distant, 1908
11.	<i>Nilautama typica</i> Distant
Tribe	Centrotypini Haupt
Genus VII	<i>Centrotypus</i> Stal, 1866
12.	<i>Centrotypus assamensis</i> (Fairm.)
Tribe	Centrotini Goding

Genus VIII *Anchon* Buckton, 1903

13. *Anchon brevis* Distant

Genus IX *Tricentrus* Stal, 1866

14. *Tricentrus gibbosulus* (Walker)

15. *T. selenus* (Buckton)

Tribe Gargarini Distant

Genus X *Gargara* Amyot and Serville 1843

16. *Gargara affinis* Distant

17. *G. mixta* (Buckton)

18. *G. robusta* Distant

Subfamily DARTHULINAE Metcalf, 1929

Genus XI *Darthula* Krik, 1900

19. *Darthula hardwicki* (Gray)

Key to the subfamilies of the family Membracidae

- 1(2) Abdomen never possesses apical process; tegmina membranous with its veins never raised; scutellum with its apex generally excavate or broadly sinuate, the apical angles acute..... Centrotinae
- 2(1) Abdomen provided with a long apical process about as long as the whole body, covered with long bristly hairs, with a strong triangular tubercle at base; tegmina coriaceous, densely and reticulately veined, which are raised & prominent; scutellum triangular apically subacute..... Darthulinae

Subfamily CENTROTINAE

Key to the tribes of the subfamily Centrotinae

- 1(2) Pronotum without any lateral process..... 3
- 2(1) Pronotum containing both the lateral processes 5
- 3(4) Posterior pronotal process produced upward in a compressed process generally curved backward with its apex bilobed..... Hypsaucheniini
- 4(3) Posterior pronotal process never produced upward & not apically bilobed Gargarini
- 5(6) Wings with 4 apical areas 7
- 6(5) Wings not with 4 apical areas 9
- 7(8) Scutellum longer than broad, apically acuminate Micreunini
- 8(7) Scutellum nearly as long as broad, apically broad and sinuate or truncate Leptocentrini

9(10) Wings with 5 apical areas Centrotypini

10(9) Wings with 3 apical areas Centrotini

Tribe Hypsaucheniini

Genus I *Hypsauchenia* Germar

1835. *Hypsauchenia* Germar, *Silb. Rev. Ent.* 3 : 230.

Key to the species of the genus *Hypsauchenia*

1(2) The posterior process of the pronotum more elevated from the scutellum; the apical lobes of the dorsal pronotal process broader covering a circular space at the base *hardwickii*

2(1) The posterior process of the pronotum is more nearer to the scutellum, the apical lobes of the dorsal process narrower and more elongate, while the space separating them at base is ovate *subfusca*.

1. *Hypsauchenia hardwickii* (Kirby)

1829. *Centrotus hardwickii* Kirby, *A. M. N. H.*, 2 : 21.

1846. *Hypsauchenia hardwickii* : Fairm, *Ann. Soc. Ent. Fr.*, 3 : 520.

Material examined : 1 ex., above Tura, West Garo hills, 15.vii.-30.vii. 1917, S. Kemp coll.

Diagnostic characters : Piceous, pronotum granulose; its discal process bilobed and their apices with a slight slender projections, nearly reaching the tegminal apices; tegmina for about two thirds broadly & laterally punctate.

Length : 7-8 mm

Distribution : India : Meghalaya (West Garo hills), Assam, Nagaland, Sikkim, West Bengal; Elsewhere : Burma; Colombia; Georgia; Nepal; Pegu.

Remarks : This is a common East Himalayan species.

2. *Hypsauchenia subfusca* Buckton

1903. *Hypsauchenia subfusca* Buckton, *Mon. Membrac.* : 211.

1951. *Hypsauchenia subfusca* : Funk. *Genera Insectorum* : 214.

Material examined : 1 ex., Cherrapunjee, East Khasi hills, 10.xi.1965, B. K. Tikadar, coll.

Diagnostic characters : The subapical angular elevation to the posterior process is narrower and more acute than *H. subfusca*.

Length : 7-8 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam; Elsewhere : Sikkim; Nepal.

Genus II *Hypsolyrium* Schmidt

1926. *Hypsolyrium* Schmidt, *Fauna Buruana, Homoptera Treubia*, 7 : 22.

Key to the species of the genus *Hypsolyrium*

- 1(2) Anterior pronotal process more perpendicularly elevated, the concave elevation of the posterior process shorter and more abruptly raised *kempi*
- 2(1) Anterior pronotal process bending a little forward and then elevated, the concave elevation of the posterior process longer and less raised *uncinata*

3. *Hypsolyrium kempi* (Distant)

1916. *Hysauchenia kempi* Distant, *Fauna Brit. India*, 6 : 148.

1950. *Hypsolyrium kempi* : Goding, *J. N. Y. ent. Soc.*, 58 : 256.

Material examined : 1 ex., Cherapunjee, East Khasi hills, 28.x.1914, S. W. Kemp coll.

Diagnostic characters : Pronotum longly produced upwards, its apex subacute and directed backward, behind this it is inwardly lobately produced, its central ridge finely serrated; a small white spot on tegminal margin near apex of the posterior pronotal process.

Length : 8 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam; Elsewhere : Burma.

4. *Hypsolyrium uncinata* (Stal)

1869. *Hysauchenia uncinata* Stal, *Ofv. Vet.-Ak. Forh* : 283.

1950. *Hypsolyrium uncinata* : Goding, *J. N. Y. ent. Soc.*, 58 : 256.

Material examined : 3 exs., Cherrapunjee, East Khasi hills, 10.xi.1965, B. K. Tikadar coll.

Diagnostic characters : The dorsal process of the pronotum posteriorly sublobate, acuminate and recurved at the apex; tegmina moderately, densely reticulate behind middle.

Length : 8 mm.

Distribution : India : Meghalaya (East Khasi hills), West Bengal; Elsewhere : Nepal.

Tribe Micreunini

Genus III: *Leptobelus* Stal

1866. *Leptobelus* Stal, *Mem. Afr.* 4 : 86.

Key to the species of the genus *Leptobelus*

- 1(2) Lateral pronotal processes seen from behind more prominently recurved than when viewed in front, their apices acute, the posterior process curved and a little undulated *dama*
- 2(1) Lateral pronotal processes wide, recurved, tricarinate, posterior process almost straight
..... *gazella*

5. *Leptobelus dama* (Germar)

1835. *Centrotus dama* Germar, *Silb. Rev. Ent.* 3 : 258.

1866. *Leptobelus dama* : Stal, *Ent. Ztg.* 10 : 386.

1953. *Leptobelus dama* : Haupt, *Akad. Verlag. Gecst and Portig K. G.* 104 : 14.

Material examined : 1 ex., Jakrom, West Garo hills, 25.iii.81, K. P. Singh coll; 1 ex., Shillong, East Garo hills, 11.iv.72, S. Biswas coll.

Diagnostic characters : Head, scutellum and pronotum black; tegmina pale bronzy, the base black, thickly and coarsely punctate followed by a large transverse dull ochraceous spot; scutellum beyond the cretaceous base finely and thickly punctate.

Length : 9.5 mm; width : Lateral pronotal. process 5 mm.

Distribution : India : Meghalaya (West Garo hills, East Garo hills); Elsewhere : Borneo; Java; Palawan; Philippine islands; Sumatra; Taraislands.

6. *Leptobelus gazella* (Fairm)

1846. *Centrotus gella* Fairm, *Ann. Soc. Ent. Fr.* : 510.

1953. *Leptobelus gazella* : Stal, *Berl. Ent. Zeitschr.*, 10 : 386.

1953. *Leptobelus gazella* : Mathur, *Indian Forest leaflet* (Ent.) 121(3) : 154.

Material examined : 1 ex., Shillong, East Khasi hills, 1972, S. Biswas coll.

Diagnostic characters : Head, pronotum, scutellum indigo black; tegmina brownish ochraceous dark castaneous at base; apical area distinctly wrinkled; scutellum elongate, more or less white at base pronotum finely and palely pilose.

Length : 8-10 mm; width lateral pronotal process 6 mm.

Distribution : Meghalaya (East Khasi hills); Assam, Nagaland; Elsewhere : Burma; China; Java; Ruby mines; Sumatra.

Tribe Leptocentrini

Key to the genera of the tribe Leptocentrini

- 1(2) Posterior pronotal process impinging on scutellum near its apex.....*Indicopleustes*
- 2(1) Posterior pronotal process remote from scutellum 3
- 3(4) Posterior pronotal process curved at base and then obliquely directed downward, its apex touching or nearly touching or sometimes passing the posterior angle of inner tegminal margin*Leptocentrus*
- 4(3) Posterior pronotal process straight, not curved at base, not directed downward, its apex remote from tegmina and scarcely reaching posterior angle of inner tegminal margin
.....*Nilautama*

Genus IV *Indicopleustes* Distant

1908. *Indicopleustes* Distant, *Fauna Brit. India*, 4 : 25.

7. *Indicopleustes obortus* (Distant)

1916. *Leptocentrus obortus* Distant, *Fauna Brit. India*, 6:154.

Material examined : 7 exs., Tura, West Garo hills, 7.x.1917, M. S. Kemp coll.

Diagnostic characters : Pronotum black, coarsely punctate, longly and palely pilose, the lateral angles strongly produced, sub-horizontally but a little upwardly extended, the apical area carinate, the apices obliquely narrowed and terminally acute; the posterior process moderately slender, raised at base, horizontally and straightly produced, its apex subacute and passing the posterior angle of the inner tegminal margin.

Length : 7 mm. Width lateral Pronotal process 5 mm.

Distribution : India : Meghalaya (West Garo hills); Elsewhere : Burma; Borneo; Malaya; Moulmein; Singapore ; Sumatra.

Genus V *Leptocentrus* Stal

1866. *Leptocentrus* Stal. *Hem. Afr.*, 4 : 87.

Key to the species of the genus *Leptocentrus*

- 1(2) Posterior pronotal process remote from the tegmina, legs brownish ochraceous, tegmina pale bronzy, pronotum thickly and coarsely punctate, longly pale pilose..... *bajulans*
- 2(1) Posterior pronotal process touching the apex of the inner margin of tegmina, pronotum not pilose 3
- 3(4) Pronotum black, the lateral pronotal process long and slender, tegmina shining ochraceous, legs piceous, dorsum with white tomentose patches *leucaspis*
- 4(3) Pronotum brown, the lateral pronotal process not much slender, tegmina hyaline, legs very pale ochraceous, dorsum without tomentose patches *mephistopheles*

8. *Leptocentrus bajulans* Dist.

1916. *Leptocentrus bajulans* Dist., *Fauna Brit. India*, 6 : 155.

1975. *Leptocentrus bajulans* : Ananthasubramanian and Ananthakrishnan, *Rec. Zool. Surv. India*, 68 : 192.

Material examined : 1 ex., Tura, West Garo hills, 15.vi.1917, S. W. Kemp coll.

Diagnostic characters : Head pronotum black, palely pilose legs brownish ochraceous, femora a little darker, tegmina pale bronzy, lateral pronotal processes strongly carinate, their apices strongly recurved and acute; posterior pronotal process remote from tegmina, strongly tricarinate, its apex subacute and passing the posterior angle of the tegmina.

Length : 6-6.5 mm. width : lateral pronotal process, 4-4.5 mm.

Distribution : India : Meghalaya (West Garo hills), Kerala, Maharashtra, West Bengal; Elsewhere : Bangladesh; Burma; Malaya; Siam.

9. *Leptocentrus leucaspis* (Walk)

1858. *Centrotus leucaspis* Walk., *List. Hom. Suppl.* : 158.

1903. *Leptocentrus leucaspis* : Buckt., *Mongri. Membrac.* : 235.

1986. *Leptocentrus leucaspis* : Ghosh, Biswas & Das, *Rec. Zool. Surv. India*, 83 (1 & 2) : 102.

Material examined : 1 ex., Garam Pani, Jowai, Jaintia hills, 19.ix.1979, P. T. Cherian and C. Radhakrishnan coll.

Diagnostic characters : The lateral transverse process slender centrally carinate above, somewhat strongly recurved; the posterior process tricarinate above recurved from near base and touching the apex of the interior margin of tegmina which are punctate at base.

Length : 7-9 mm. width lateral pronotal process 4.5 to 7 mm.

Distribution : India ; Meghalaya (Jaintia hills); Elsewhere : Burma; Java; Philippine; Sri Lanka; Singapore.

10. *Leptocentrus mephistopheles* Buckton

1903. *Leptocentrus mephistopheles* Buckt., *Mongr. Membrac.* : 235.

1951. *Leptocentrus mephistopheles* Funk. *Genera Insectorum* : 228.

Material examined : 1 ex., Tura, West Garo hills, 15. vii.-30.vii.1917, S. W. Kemp coll.

Diagnostic characters : The dorsum is lacking any white tomentose patch; the abdomen of the male is stout and ringed and the posterior pronotal process is shorter and rather more curved.

Length : 8 mm. width lateral pronotal. process 4.5 to 7 mm.

Distribution : India : Meghalaya (West Garo hills), Karnataka, Sikkim, Uttar Pradesh.

Genus VI *Nilautama* Distant

1908. *Nilautama*, Distant, *Fauna Brit. India, Rhynchota*, 4 : 32.

11. *Nilautama typica* Distant

1908. *Nilautama typica* Distant, *Fauna Brit. India. Rhynchota*, 4 : 32.

1963. *Nilautama typica* : Metcalf & Wade, *General catalogue of Homoptera Sec* : 187.

Material examined : 3 exs., Charikuty, East Garo hills, 4.xi.1973, S. Biswas coll : 4 exs., Tura (1, 200-1-500 ft), West Garo hills, 15.vi.-15.vii. 17, coll.

Diagnostic characters : Posterior pronotal process tricarinate, apex acutely narrowed and directed upward, transverse process as seen from above broad, carinate behind middle, apex roundly truncate and a little recurved, as seen in front narrow and obliquely upwardly divergent, tegmina bronzy brown with costal area broadly black.

Length : 7 mm.; width lateral pronotal process 4.5 mm.

Distribution : India : Meghalaya (East Garo hills, West Garo hills), Elsewhere : Tenasserim, Myitta.

Tribe Centrotypini Genus VII *Centrotypus* Stal 1866

1866. *Centrotypus* Stal, *Hem. Afr.*, 4 : 88.

12. *Centrotypus assamensis* (Fairm)

1846. *Centrotus assamensis* Fairm., *Ann. Soc. Ent. Fr.* : 517.

1869. *Centrotypus assamensis* : Stal, *Ofv. Vet. Ak. Forh.* : 286.

1963. *Centrotypus assamensis* : Metcalf & Wade, *General Catalogue of Homoptera Membracoidea Sec I* : 196.

Material examined : 1 ex., Tura (1,200-1,500 ft), West Garo hills, 15.vi.-15.viii. 1917 coll. ?

Diagnostic characters : Pronotum dark, indigo blue, coarsely punctate; legs, body beneath, thickly shortly palely pilose; tegmina pale ochraceous; lateral transverse processes broad but less dilated than *C. flexuosus* and with a distinct anterior as well as a posterior carination more convexly oblique and subacute apically than *C. flexuosus*.

Length : 10 to 11 mm width; lateral. Pronotal. processes 8-9.5 mm.

Distribution : India : Meghalaya (West Garo hills); Assam, Sikkim, Tamil Nadu; Elsewhere : Burma; Combodia; Malacca; Malay Peninsula; Siam; Tenasserim; Mita.

Tribe Centrotini

Key to the genera of the tribe Centrotini

- 1(2) Posterior pronotal process rising obliquely direct near base of pronotum and then rectangularly direct to near posterior angle of inner margin of tegmina..... **Anchon**
- 2(1) Posterior pronotal process moderately short and impinging on scutellum and tegmina.....
..... **Tricentrus**

Genus VIII **Anchon** Buckt.

1903. *Anchon* Buckt. *Monogr. Membrac.* : 214.

13. **Anchon brevis** Distant

1908. *Anchon brevis* Distant, *Fauna Brit. India*, 4 : 52.

1963. *Anchon brevis* : Metcalf & Wade, *General catalogue of Homoptera Membracoidea*, Sec. 1 : 439.

Material examined : 2 ex., Charikuty, East Gar hills, 4.xi.1973, S. Biswas coll.

Diagnostic characters : Pronotal lateral processes as seen from above broad, somewhat flat, as viewed from the front much narrowed, more recurved, their apices appearing biangulate; posterior process very short, curved not extending beyond apex of clavus.

Length : 5 mm width lateral pronotal process 3.5 mm.

Distribution : India : Meghalaya (East Garo hills); Elsewhere : Sri Lanka.

Genus IX **Tricentrus** Stal, 1866

1860. *Tricentrus* Stal, *Hem. Afr.* 4 : 89.

Key to the species of the genus **Tricentrus**

- 1(2) Head and pronotum black; posterior process short, robust, raised, lateral pronotal process short, broad, slightly upturned, the anterior margin rounded, posterior margin obliquely straight, apex obtusely acute and slightly recurved, tegmina pale, bronzy brown
..... **gibbosulus**
- 2(1) Head and pronotum ochraceous or bronzy brown pilose; extreme apex of the anterior lateral pronotal process, anteriorly a little ampliate and rounded, apices subacute, tegmina pale ochraceous.....**selenus**

14. *Tricentrus gibbosulus* (Walker)1858. *Centrotus gibbosulus* Walker, *Ins. Saund., Hom.*, 4 : 80.1886. *Tricentrus gibbosulus* : Atkins, *J. A. S. B.* 4 : 198.

Material examined : 2 exs., Cherrapunjee, East Khasi hills, 27.vii.1979, coll. P. T. Cherian and C. Radhakrishnan.

Diagnostic characters : Legs piceous, tibiae, tarsi apices of femora testaceous; tegmina bronzy brown base piceous black, posterior process short robust raised, centrally and laterally carinate, the apex not quite reaching posterior angle of inner tegminal margin.

Length : 5 mm; width of lateral pronotal process 3.5 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Tamil Nadu, Uttar Pradesh, West Bengal; Elsewhere : Borneo; China; Malay Peninsula; Singapore; Sumatra.

15. *Tricentrus selenus* (Buckton)1903. *Centrotus selenus* Buckton, *Monogr. Membrac.* : 247.1908. *Tricentrus selenus* : Distant, *Fauna Brit. India*, 4 : 57.

Material examined : 1 ex., Keghabya, Shillong, East Khasi hills 21.iii.91, B. C. Das and party coll.

Diagnostic characters : Head pronotum dark ochraceous, pilose; the lateral pronotal processes as seen from above moderately broad, anteriorly little amplified and rounded, apice subacute, broadly carinate near middle; posterior process robust, tricarinate, sides oblique apex about reaching the posterior angle of inner margin.

Length : 5 mm. width lateral pronotal process 3.5 mm.

Distribution : India : Meghalaya (East Khasi hills), Elsewhere : Tenasserim, Myitta.

Tribe Gargarini

Genus X *Gargara* Amy. and Serv.

1843. *Gargara* Amy. and Serv., *Hem.* : 537.Key to the species of the genus *Gargara*

- 1(2) Pronotum thickly, palely pilose, tegmina greyish semiopaque; legs ochraceous, coxae and bases of femora piceous..... *mixta*
- 2(1) Pronotum thickly and somewhat coarsely punctate tegmina subhyaline, femore black, their apices and the tibiae and tarsi castaneous..... 3
- 3(4) Pronotum black; tegmina black at base, a pale brownish transverse spot on apical margin near end of clavus and also the extreme apical margin, in some specimens..... *robusta*
- 4(3) Pronotum purplish-brown, tegmina without the apical marginal spots, the base purplish brown not black; posterior process a little longer and more laterally compressed..... *affinis*

16. *Gargara affinis* Distant1908. *Gargara affinis* Distant, *Fauna Brit. India*, 4 : 61.1951. *Gargara affinis* Funk. *Genera Insectorum*; 261.

Material examined : 1 ex.; Nehura Park, Barapani, East Khasi hills, A. K. Sanyal coll.

Diagnostic characters : The pronotum palely pilose and central carination to pronotum is very fine and obscure; other characters are like *G. robusta*.

Length : 4 mm., Lateral pronotal angle 2 mm.

Distribution : India : Meghalaya (East Khasi hills), Karnataka, Maharashtra, Tamil Nadu, Elsewhere : Borneo; Burma; Myitta; Philippines; Tenasserim.

17. *Gargara mixta* (Buckton)

1903. *Maerops mixta* Buckton, *Monogr. Membrac.*, : 257.

1908. *Gargara mixta* : Distant, *Fauna Brit. India*. 4 : 65.

1986. *Gargara mixta* : Ghosh, Biswas and Das, 83 (1 & 2) : 108.

Material examined : 1 ex., Umtihar, East Khasi hills, 6.iv.91, S. K. Saha and party coll.

Diagnostic characters : Body beneath and face piceous; legs ochraceous; coxae and bases of femora piceous; tegmina greyish semiopaque; pronotum with lateral angles angularly prominent but not produced, posterior process robust gradually narrowing to apex, impinging on scutellum and tegmina and about reaching the posterior angle of inner margin of tegmina.

Length : 5 mm. Width of lateral pronotal angle 2.5 to 3 mm.

Distribution : India : Meghalaya (East Khasi hills), Bihar, Maharashtra, Tamil Nadu; Elsewhere : Borneo; Burma; China; Sri Lanka.

18. *Gargara robusta* Dist.

1908. *Gargara robusta* Distant, *Fauna Brit. India*, 4 : 61.

1986. *Gargara robusta* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, 83 (1&2) : 109.

Material examined : 1 ex., Pynsula, East Khasi hills 11.xi.1991, R. C. Basu coll; 1 ex., Nongstion, West Khasi hills, 22.ix.1988, A. R. Lahiri and party coll., 2 exs., Umran, Ri Bhoi, 1.v.1991, S. K. Saha and party coll.

Diagnostic characters : Pronotum thickly and coarsely punctate, head, pronotum, femora, body beneath black; tegmina sybhyaline black at base, in some specimens beyond the middle there are some transverse fuscous markings; the posterior process short, robust, only just passing the apex of the claval area.

Length : 3.5 mm with pronotal angle 2 mm.

Distribution : India : Meghalaya (East Khasi hills, West Khasi hills, Ri-Bhoi), Uttar Pradesh, West Bengal, Elsewhere : Ganguey; Borneo.

Subfamily DARTHULINAE

Genus XI *Darthula* Krikaldy

1900. *Darthula*, Krik, *Entomologist* : 242.

19. *Darthula hardwicki* (Gray)

1832. *Darthula hardwicki*, Gray, *Anim. Kingd. Ins.* 2 : 261.

1908. *Darthula hardwicki* : Distant, *Fauna Brit. India*, 4 : 78.

Material examined : 2 exs., Lumparing, Shillong, East Khasi hills, 16.vii.1973. R. S. Giri coll; 1 ex., Mawplong, East Khasi hills, 2.iv.1981, M. R. Rynth coll.; 4 exs., Motinagar Shillong East Khasi hills, 19.vi.1978, M. S. Jyrwa coll.; 3 exs., above Tura 3,900 ft.

Diagnostic characters : Tegmina piceous brown; with its venation testaceous; pronotum piceous brown, finely punctate, the central carination laminately raised, posterior process of the abdomen, piceous or piceous brown with long bristly hairs; the tegmina reticulately veined, the veins raised and prominent.

Length : Excluding posterior process 12 to 17 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Nagaland, Sikkim, West Bengal; Elsewhere : Africa; Burma; China; Nepal; Yunnan.

Remarks : Tail raised to perpendicular position when irritated. The specimens recorded from Tura were found sitting on clutch of eggs.

* A list of Membracid species so far recorded from the State of Meghalaya

- * 1. *Anchon brevis* Distant
- * 2. *Centrotypus assamensis* (Fairm)
- ** 3. *C. flexuosus* Fabr.
- 4. *Darthula hardwicki* (Gray)
- * 5. *Gargara affinis* Distant
- * 6. *G. mixta* (Buckton)
- * 7. *G. robusta* Distant
- * 8. *Hypsauchenia hardwicki* Kirby
- * 9. *H. subfusca* Buckton
- * 10. *Hypsolyrium kempfi* (Distant)
- * 11. *H. uncinata* (Stal)
- 12. *Indicopleustes obortus* Distant
- 13. *Leptobelus dama* (Germ.)
- 14. *L. gazella* (Fairm.)
- 15. *Leptocentrus bajulans* Distant
- * 16. *L. leucaspis* (Walker)
- 17. *L. mephistopheles* buckton
- * 18. *Nilautama typica* Distant
- 19. *Tricentrus gibbosulus* (Walker)
- * 20. *T. selenus* (Buckton)

- ** This species has not been included in the present study due to the nonavailability of the material
- * First record from Meghalaya.

SUMMARY

The paper deals with 20 species belonging to 11 genera under two subfamilies. 11 species are hitherto reported for the first time from Meghalaya. Diagnosis of each species, keys to various taxa have been provided. Necessary literature references have been cited. Distribution of each species is given. Maps showing distribution of the species within the State have been incorporated.

ACKNOWLEDGEMENT

The authors are grateful to the Director, Zoological Survey of India, Calcutta for laboratory facilities. Sincere thanks are due to Dr. S. K. Bhattacharya, Scientist 'SG' and Dr. S. K. Tandon, Scientist 'SF' for numerous courtesies.

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Table - 1. Distribution of Membracid species in different districts of Meghalaya.

Name of species	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	JAINTIA HILLS
1. <i>Hypsauchenia hardwickii</i> (Kirby)		+					+
2. <i>Hypsauchenia subfusca</i> Buckton				+			+
3. <i>Hypsolyrium kempii</i> (Distant)		-		+			
4. <i>Hypsolyrium uncinata</i> (Stal)		-	-	+			-
5. <i>Leptobelus dama</i> (Germar)	+	+	-				-
6. <i>Leptobelus gazella</i> (Fairm)	-		-	+		-	-
7. <i>Indicopleuistes obortus</i> (Distant)		+		-		-	-
8. <i>Leptocentrus bajulans</i> Dist.	-	+			-	-	-
9. <i>Leptocentrus leucaspis</i> (Walk.)			-		-	-	+
10. <i>Leptocentrus mephistopheles</i> Buckt.		+	-	-			-
11. <i>Nilautama typica</i> Distant	+	+	-		-	-	-
12. <i>Centrotypus assamensis</i> (Fairm)	-	+	-	-	-	-	-
13. <i>Anchon brevis</i> Distant	+		-	-	-		-
14. <i>Tricentrus gibbosulus</i> (Walker)	-		-	+	-	-	-
15. <i>Tricentrus selenus</i> (Buckton)	-	-	-	+	-	-	-
16. <i>Gargara affinis</i> Distant		-	-	+	-	-	-
17. <i>Gargara mixta</i> (Buckton)				+	-	-	-
18. <i>Gargara robusta</i> Dist.		-	-	+	+	+	-
19. <i>Darthula hardwicki</i> (Gray)	-	+	-	+	-	-	-

Goding, F. W. 1939. The old world Membracidae *J. N. Y. ent. Soc.*, **47**:315-349.

Goding, F. W. 1950. Old world Membracidae, *J. N. Y. ent. Soc.*, **58** : 117-129.

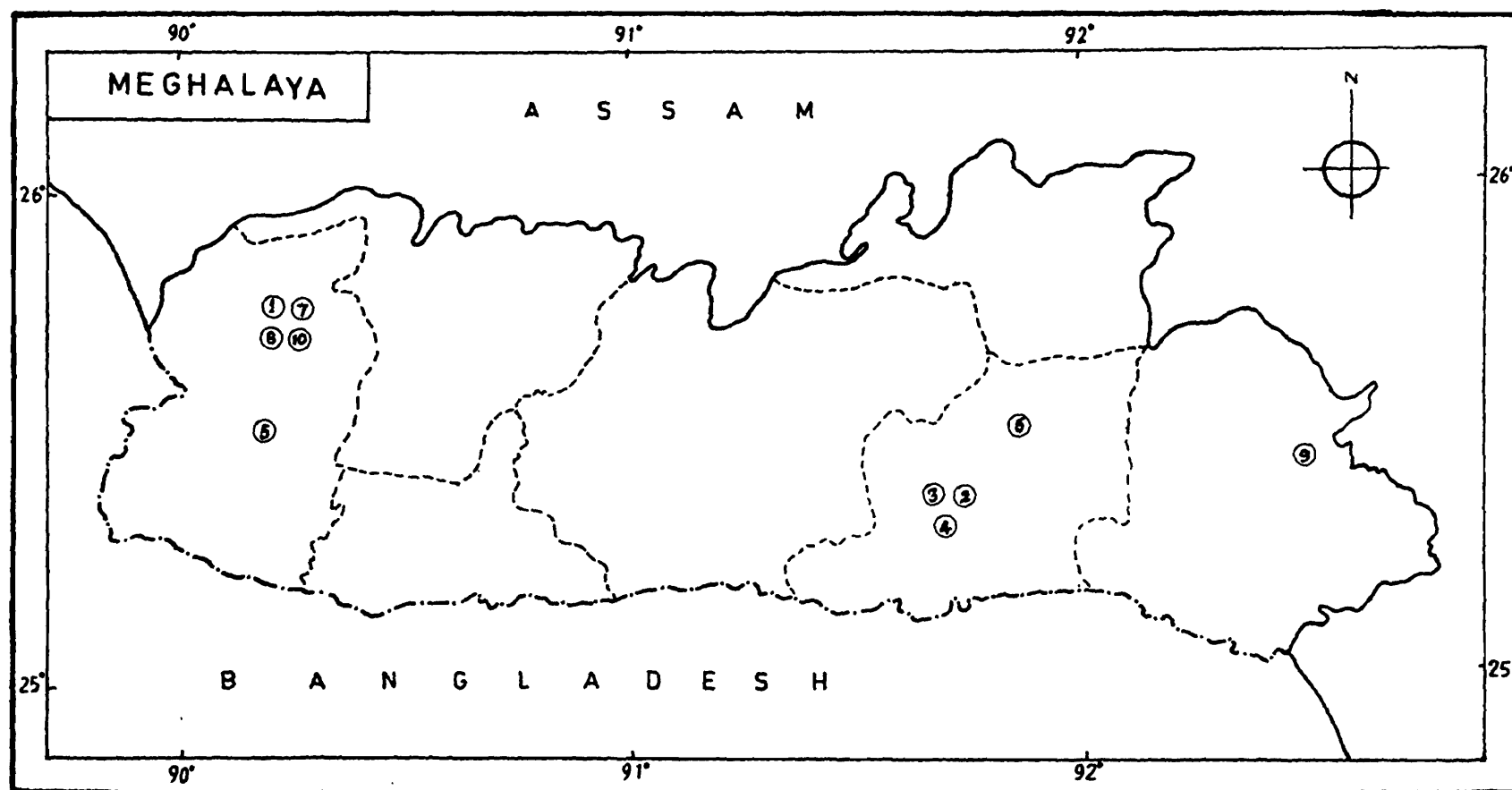
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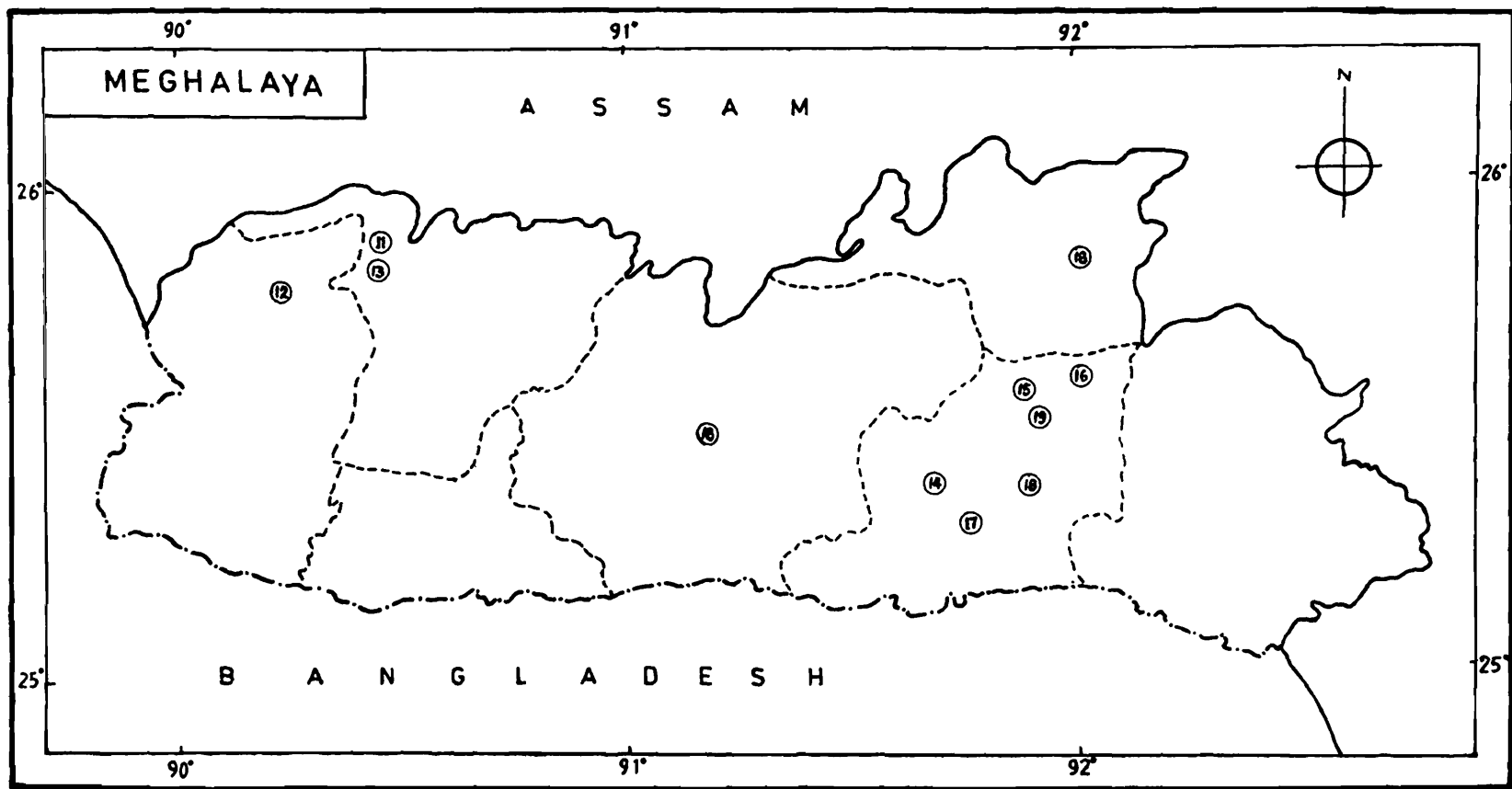
Paiva, C. A. 1919. Rhynchota from the Garo hills, Assam. *Rec. Indian Mus.* **16**:349-372.

Map-1 DISTRIBUTION OF MEMBRACID SPECIES (1-10) (HEMIPTERA)



1. *Hypsauchenia hardwickii* (Kirby) 2. *Hypsauchenia subfusca* Buckton 3. *Hypsolyrium kempi* (Distant) 4. *Hypsolyrium uncinata* (Stal)
 5. *Leptobelus dama* (Germar) 6. *Leptobelus gazella* (Fairm) 7. *Indicopleustes abortus* (Distant) 8. *Leptocentrus bajulans* Distant
 9. *Leptocentrus leucaspis* (Walker) 10. *Leptocentrus mephistopheles* (Buckton)

Map-II DISTRIBUTION OF MEMBRACID SPECIES (11-19) (HEMIPTERA)



11. *Nilautama typica* Distant 12. *Centrotypus assamensis* (Fairm) 13. *Anchon brevis* Distant 14. *Tricentrus gibbosulus* (Walker) 15. *Tricentrus selenus* (Buckton)
 16. *Gargara affinis* Distant 17. *Gargara mixta* (Buckton) 18. *Gargara robusta* Distant 19. *Darthula hardwicki* (Gray)

INSECTA : HOMOPTERA : PSYLLIDAE

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INTRODUCTION

The Psyllids usually called as Jumping lice are small homopteran insects which suck plant sap. As a result, various damage symptoms are seen in plant. These insects are Phytophagous in both larval and matured stages. They also act as vectors of bacterial and plant viral diseases. Secretion of honey dew through specialised wax gland pores is characteristic of this insect. Usually five nymphal stages are seen in the life cycle of Psyllids.

Psyllids are more common in forests and over 100 species are on record on about 95 species of trees and other vegetations growing in the forest.

Our knowledge of Indian Psyllidae dates back to Lithierry (1890), Kieffer (1905), Lefroy (1909), Crawford (1912), Ramakrishna Ayyar (1924). However, outstanding contributions have been made in the recent years by Mathur (1975) who dealt with 101 species from the Indian subcontinent. Besides, Kandasamy (1986) added 23 species to the earlier list while studying South Indian psyllids. Bhanotar *et al.* (1971) and Lahiri and Biswas (1979) described one new genus and species each from Calcutta and Shillong respectively. Later, Lahiri and Biswas (1990) described two new species and recorded one species for the first time from Meghalaya. Thus, a total of 126 species of Psyllids are so far known from India.

Very little is known about the psyllid fauna of Meghalaya. Out of 14 species of Psyllids so far known from Meghalaya two species, *Phacopteron lentigenosum* Buckton and *Pauropsylla beelsoni* Laing are hitherto reported for the first time from Meghalaya. The present work is an attempt to provide an account of these 14 species belonging to 9 genera of the family Psyllidae from Meghalaya. The paper is based on the material collected by Survey parties of Zoological Survey of India. It is also supplemented by the material deposited in the National Zoological Collections at Zoological Survey of India, Calcutta.

The account deals with a brief note on earlier investigations, keys to taxa, diagnosis, geographical distribution of each species, new locality record (marked*) and literature references.

The classification of the family has been mainly adopted after Crawford (1914) and Mathur (1975).

Morphological characters

The family Psyllidae is characterised by two pairs of membranous wings (Fig. 1, 2C) normally held in stegopterous manner, ten- segmented antennae (Fig. 2B), 3 ocelli widely placed on the

vertex (Fig. 2A), thickened hind femora, (Fig. 2E) and uniformly dimerous tarsi terminating in two equal claws, the venation is simple and exhibits relatively few marked deviations among various genera. The most striking feature in the forewing is the presence of a principal basal vein formed by the fusion of the stems of R, M and Cu (Fig. i). The venation in the hind wing is extremely simple.

Method of Collection and slide preparation

For collections, a sweeping net and a sucking tube (aspirator) are used for capturing the adults. The collected psyllids are killed by placing them in a cyanide bottle and preserved in specimen tubes (15 cm x 5 cm) containing alcohol. The natural colour of the adults is noted before changing them into permanent preservation tubes with 70% ethyl alcohol. A part of each collection is mounted on card points or pinned with micropins on pith, and the rest is preserved in alcohol in small vials. The field data are maintained. For study of finer details of each part of both sexes and nymphal stages of each species, the following method is adopted :- Soak the material in KOH for 8-10 hours, boil in water bath for sometime till the specimen is clear, wash in distilled water, transfer in glacial acetic acid to dissolve organic matter, if any. Wash again in distilled water, dehydrate in alcohol and stain in eosin. Clear in clove oil and the specimen is dissected. The dissected parts are mounted in balsam and examined under the microscope.

SYSTEMATIC ACCOUNT

Subfamily	1. Pauropsyllinae
Genus	1. <i>Pauropsylla</i> Rubsaamen
	1.* <i>Pauropsylla beelsoni</i> Laing
Genus	2. <i>Paurocephala</i> Crawford
	2. <i>Paurocephala reticulata</i> Mathur
Genus	3. <i>Phacopteron</i> Buckton
	3.* <i>Phacopteron lentiginosum</i> Buckton
Subfamily	2. Ciriacreminae
Genus	4. <i>Cecidopsylla</i> Kieffer
	4. <i>Cecidopsylla schimae</i> Kieffer
Subfamily	3. Psyllinae
Genus	5. <i>Arytaina</i> Foerster
	5. <i>Arytaina fasciata</i> Laing
Genus	6. <i>Cryptotrioza</i> Lahiri and Biswas
	6. <i>Cryptotrioza mathuri</i> Lahiri and Biswas
Genus	7. <i>Euphyllura</i> Schwarz
	7. <i>Euphyllura eastopi</i> Mathur

- Genus 8. *Psylla* Geoffroy
 8. *Psylla murrayi* Mathur
 9. *P. quadrimaculata* Mathur
 10. *P. shillongensis* Lahiri and Biswas
 11. *P. simlae* Complex
 12. *P. viburni* Loew
- Subfamily 4. Triozinae
- Genus 9. *Trioza* Foerster
 13. *Trioza gigantea curta* Mathur
 14. *T. heptaphleuruma* Lahiri and Biswas

Key to the subfamilies of Psyllidae

1. Genae not covering frons; genal cones not produced into conical processes Pauropsyllinae
 Genae covering frons and usually produced into conical processes.....2
2. Forewings with more than two marginal cells, the additional cells being formed by branching or radial sector and cross veins; head deeply cleft Ciracrteminae
 - Forewings with only usual two marginal cells; radial sector not branched and without any cross vein; head not cleft.....3
3. Basal tarsal segment of hind legs with two black claw-like apical spines at apex; radius, media and cubitus from basal vein not diverging at same point; wings usually not angulate at apex Psyllinae
 Basal tarsal segment of hind legs without clawlike spines; radius, media and cubitus usually diverging at same point from basal vein but media and cubitus with a common cubital petiole; wings usually angulate at apex..... Triozinae

1. Subfamily Pauropsyllinae

Key to genera

1. Head not as wide as thorax, frons large, prominently visible; genae absent; eyes globose; wings narrowly or broadly rounded at apex; first marginal cell narrow and long, often maculated..... *Paurocephala*
 Head as wide as or narrower than throx; frons visible as a small sclerite; genae conical; eyes hemispherical; wings broadly rounded; first marginal cell wide, rarely maculate 2
2. Head as wide as thorax; forewings broadly rounded, cross veins absent; pterostigma often present, non maculate..... *Pauropsylla*
 Head narrower than thorax; forewings rhomboidal, cross vein present; pterostigma absent, maculate..... *Phacopteron*

Genus 1. *Paurocephala* Crawford

1913. *Paurocephala* Crawford, *Philipp. J. Sci.*, **8**(4) : 293 294. Type species : *Paurocephala psylloptera* Crawford

1. *Paurocephala reticulata* Mathur

1975. *Paurocephala reticulata* Mathur, *Psyllidae of the Indian Subcontinent*, Indian Council of Agric. Res. New Delhi : 102-105.

Diagnosis : The species is chiefly characterised by head being slightly broader than thorax, moderately depexed, finely rugulose-reticulate. Also, forewings broad and subsquare at apex.

Length : Male 2.02 mm and Female 32.30 mm.

Material examined : 1 female and 1 male, Meghalaya : Dist. Khasi Hills : Shillong, Risa Colony; 15.iv.1977.

Distribution : India : Meghalaya, (Khasi Hills, Shillong).

Genus 2. *Pauropsylla* Rubaamen

1899. *Pauropsylla* Rubaamen, *Ent. Nachr. Berlin*, **25** : 262. Type species : *Pauropsylla udei* Rubaamen.

2. **Pauropsylla beelsoni* Laing

1930. *Pauropsylla beelsoni* Laing, *Indian Forest Res.*, **14**(8) : 36- 37.
 1941. *Pauropsylla beelsoni* Beeson, *Forest Insects* : 777 -778.
 1975. *Pauropsylla beelsoni* : Mathur, *Psyllidae of the Indian Subcontinent*, Indian Council of Agric. Res. New Delhi : 73.

Diagnosis : Head with median suture; forewings large and narrowly rounded at apex; cubital petiole almost obsolete; radial sector flexed towards costal margin.

Length : 2.3 mm (male) and 2.52 mm. (female).

Material examined : 1 alate female, India : Meghalaya, Dist. East Khasi Hills, Mawphlong, coll. G. Subba Rao, (ZSI lot No. 61/76).

Distribution : India : Meghalaya (Khasi Hills, Mawphlong), Uttar Pradesh.

Remarks : This is the first record of this species from the state of Meghalaya.

Genus 3. *Phacopteron* Buckton

1894. *Phacopteron* Buckton, *Indian Mus. Notes*, **3**(5) : 18 - 19. Type species : *Phacopteron lentiginosum* Buckton

3. **Phacopteron lentiginosum* Buckton

1894. *Phacopteron lentiginosum* Buckton, *Indian Mus. Notes*, **3**(5) : 18 19.
 1975. *Phacopteron lentiginosum* : Mathur, *Psyllidae of the Indian Subcontinent*, Indian Council of Agric. Res. New Delhi : 119.
 1986. *Phacopteron lentiginosum* : Kandasamy, *Rec. zool. Surv. India Occ. Paper No.* **84** : 66.

Diagnosis : Head small strongly deflexed, about as broad as prothorax, finely rugulose, the arch m+2 coalesces radial sector, cubital petiole more than half as long as radius, cells unequal, first marginal cell very small, 2nd cell quadrangular.

Length : Male 3.5 mm., Female 4.3 mm.

Material examined : Alate females, India : Meghalaya, Mawphlong; (ZSI lot No. 143).

Distribution : India : Meghalaya (Mawphlong), Bihar, Karnataka, Kerala, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal.

Remarks : The species forms galls on leaves (Kandasamy, 1986).

2. Subfamily Ciriacreminae

Key to genera

1. Radial sector large and much deflexed, terminating below apex of wing *Cecidopsylla*
 Radial sector small and terminatting upto costa; fore wings without pterostigma; Head bi-
 rosted in appearance *Mesohomatoma*

Genus 4. *Cecidopsylla* Kieffer

1905. *Cecidopsylla* Kieffer, *Ann. Soc. Sci. Bruxelles* : 160-161 Type species : *Cecidopsylla schimae* Kieffer

4. *Cecidopsylla schimae* Kieffer

1905. *Cecidopsylla schimae* Kieffer, *Ann. Soc. Sci. Bruxelles* : 165 167.

1975. *Cecidopsylla schimae* : Mathur, *Psyllidae of the Indian Subcontinent*. Indian Council of Agric. Res. : 126.

Diagnosis : Head nearly as broad as thorax, somewhat deflexed, about twice as broad as long, finely rugulose, with two foveal impression near posterior margin which is strongly arcuate, anterior margin deeply emarginate in centre; front ocellus not visible from above, rostrum long, protruding between legs, thorax, strongly arched, finely rugulose; scutellum subquadrate, slightly broader than long; hind tibiae with a prominent basal spur and two thooth-like spines at apex; fore wings long, hyaline with narrow brown band, hind wings also quite long; costal margin armed with a few simple and hooked setae.

Length : Male 2.19 mm. and Female 2.52 mm.

Material examined : 1 Female on *Schima wallichii*, India : Meghalaya : Dist. E. Khasi Hills, Risa colony, Shillong; 15.iv.1977.

Distribution : India : Meghalaya (Shillong), West Bengal.

3. Subfamily Psyllinae

Key to genera of Psyllinae

1. Radius and Media fused at base forming a long petiole *Cryptotrioza*
 Radius and Media not as above 2

2. Fore wing distinctly rhomboidal, usually thickened and opaque; Genae produced into two transverse contiguous lobes **Euphyllura**
Forewing elongate opaque, not strongly rhomboidal; Genal cones not as above, usually hyaline or subhyaline, rarely opaque 3
3. Pleural suture of prothorax extend upto middle of lateral extremity of pronotum; antennae usually very short, seldom long; male proctiger simple **Arytaina**
Pleural suture of prothorax extend obliquely to posterior part of lateral extremity of pronotum; antennae rather longer **Psylla**

Genus 5. **Arytaina** Foerster

1848. *Arytaina* Foerster, *Verh. naturw-ver. preuss. Rheinl.*, 5 : 67. Type species : *Arytaina genistae* Foerster.

5. **Arytaina fasciata** Laing

1930. *Arytaina fasciata* Laing, *Indian Forest Rec.*, 4(7) : 43 - 44.
1975. *Arytaina fasciata* : Mathur, *Psyllidae of the Indian Subcontinent*. Indian Council of Agric. Res. New Delhi : 177.

Diagnosis : Body small but robust. Head nearly as broad as or broader than thorax, vertex somewhat flat; antennae much longer and more slender; scutellum pale yellowish brown, tegmen semihyaline with two well defined transverse brown bands and another brown sub-apical area occupying from costa to radial cell; veins more or less spotted with black, wings hyaline.

Length : Male 1.75 mm.

Material examined : 1 Female and 1 Male. India : Meghalaya : East Khasi Hills. Okland Road, Shillong; 24.vi.1976; coll. A.R. Lahiri.

Distribution : India : Meghalaya (Shillong), Sind Valley.

Genus 6. **Cryptotrioza** Lahiri and Biswas

1979. *Cryptotrioza* Lahiri & Biswas, *Bull. zool. Surv. India*, 2(1) : 63-64. Type species : *Cryptotrioza mathuri* Lahiri & Biswas

6. **Cryptotrioza mathuri** Lahiri & Biswas

1979. *Cryptotrioza mathuri* Lahiri & Biswas, *Bull. zool. Surv. India*, 2(1) : 63 - 64.

Diagnosis : Body robust. Head smaller than thorax and covered with finely pubescent, subquadrate, medially depressed, its posterior margin arcuate; genal cones large with long setae. Antennae long pubescent. Hind tibiae with thick black tooth at apex and basal tooth usually present. Fore wings hyaline.

Material examined : 1 ex., India : Meghalaya : East Khasi Hills, Shillong, Risha colony. coll. S. Biswas.

Distribution : India : Meghalaya (Shillong).

Genus 7. **Euphyllura** Foerster

1848. *Euphyllura* Foerster, *Verh. naturh ver preuss. Rheinl.*, 3 : 93. Type species : *Euphyllura phillyrae* Foerster

7. *Euphyllura eastopi* Mathur

1973. *Euphyllura eastopi* Mathur, *Oriental Ins.*, 7(4) : 519.

1979. *Euphyllura eastopi* : Lahiri and Biswas, *Bull. zool. Sur. India*, 2(1) : 61 - 67.

Diagnosis : Head strongly deflexed, as broad as thorax, vertex large; pronotum extending far down laterad; hind tibiae without basal spur, with small, black, spines at apex; 2nd marginal cell long and elongate.

Length : Male 1.74 mm., Female 1.76 mm.

Material examined : 1 Male, 1 Female, on unidentified host plant, India : Meghalaya : East Khasi Hills, Okland Road, Shillong; 24.vi.1976, coll. A.R. Lahiri.

Distribution : India : Meghalaya (Shillong), Himachal Pradesh.

Remarks : According to Lahiri and Biswas (1979) the nymphs cause heavy infestation on young foliage and yield produce sticky whitish, wooly secretion on the back surface of leaf.

Genus 8. *Psylla* Geoffroy

1762. *Psylla* Geoffroy, *Histoire Abregeades Insects*, 1 : 482. Type species : *Psylla alni* Geoffroy

Key to species of *Psylla*

1. Forewings maculated..... *quadrimaculata*
- Forewings hyaline or with flavus tinge, transparent..... 2
2. Hind tibiae without basal spur, genal cones thick and notched; pterostigma long *murrayi*
- Hind tibiae with a basal spur 3
3. 4 apical spines on hind tibiae; hind femora almost as long as hind tibiae..... *shillongensis*
- 5 apical spines on hind tibiae; hind femora usually shorter than hind tibiae 4
4. Vertex strongly rounded; genal cones thick and approximate *simlae*
- Vertex not rounded; genal cones rather divergent; marginal cell longer than 2nd *viburni*

8. *Psylla murrayi* Mathur

1935. *Psylla murrayi* Mathur, *Indian Forest Rec.*, 1(2) : 62 - 63.

1975. *Psylla murrayi* Mathur, *Psyllidae of the Indian subcontinent* : 268.

1979. *Psylla murrayi* : Lahiri and Biswas, *Bull. zool. Surv. India*, 2(1) : 61 - 67.

Diagnosis : Head broader than thorax, finely rugulose, vertex about two and a half times as broad as long, genal cone small and thick, slightly smaller than vertex, notched and weakly impressed near about middle; antennae long and slender; hind tibiae without basal spur, with five black tooth-like spines at apex; tarsal joint robust, proximal joint of metatarsus with two claw-like spines; pterostigma long, radius longer than cubital petiole, fore wings hyaline, transparent.

Material examined : Several exs. Male and Female adults reared from nymphs, ex. *Citrus acida* Korels, *C. aurangium* L. *C. medica* L. Meghalaya : East Khasi Hills, Risha Colony, Shillong III-X. 1978.

Distribution : India : Meghalaya (Shillong), Uttar Pradesh.

Remarks : Lahiri and Biswas (1980) studied the nature of infection of the species on citrus plants caused by *P. murrayi* at Shillong "in relation to host difference, seasonal change and outburst of other biological agents, either competitor or even actual enemy of the psyllid fly"

9. *Psylla quadrimaculata* Mathur

1975. *Psylla quadrimaculata* Mathur, *Psyllidae of Indian subcontinent* : 268.

Diagnosis : Body slender. Head nearly as broad as thorax, strongly deflected, scatterly pubescent, finely rugulose; vertex broader than long; disc shallowly depressed near middle; genal cone large and robust; antennae long and slender; hind tibiae with a strong basal spur, with five black tooth-like spines at apex; basal tarsal segments with two claw-like black spines at apex; Pterostigma long and prominent; radius about twice as long as cubital petiole; forewings transparent.

Material examined : 1 Male and 1 Female, Meghalaya, Mawphlong, February March, 1969, coll. B. Datta.

Distribution : India : Meghalaya (Mawphlong), Assam, West Bengal.

10. *Psylla shillongensis* Lahiri & Biswas

1990. *Psylla shillongensis* Lahiri & Biswas, *Rec. zool. Surv. India*, **86**(3 & 4) : 487.

Diagnosis : Body robust. Head large, moderately deflexed, genal cones covered with pubescence; vertex twice as broad as long; antennae long and more slender; scutellum small, postscutellum of matathorax moderately large; hind femur almost as long as hind tibia; hind tibiae with a moderately large basal spur and four black tooth-like spines at apex; Forewings hyaline transparent, thickly beset with minute points.

Material examined : 1 Male : India : Meghalaya : East Khasi Hills, Shillong, 15.v.1978, coll. S. Biswas.

Distribution : India : Meghalaya (East Khasi Hills).

11. *Psylla simlae* Complex Mathur

1990. *Psylla simlae* Complex Mathur : Lahiri and Biswas, *Rec. zool. Surv. India*, **86**(3 & 4) : 489.

Diagnosis : Body long. Head large and almost as broad as thorax, deflexed and with fine pubescence and rugulose; vertex much broader than long, genal cones large with black stripe at edges of genae; antennae long and slender; scutellum narrowly transverse, its anterior margin somewhat straight, with prominent antero-lateral angle; hind femur with three to six setae at apex; hind tibiae with small basal spur and four black apical spines on one side and one on other side; fore wing hyaline, membrane beset with minute points; hind wings large, costal margin with a few simple hooked setae.

Material examined : 7 Males and 4 Females, India : Meghalaya : East Khasi Hills, Shillong, ex. *Bauhinia purpurea*, 25.vii.1978, coll. A.R. Lahiri.

Distribution : India : Meghalaya (East Khasi Hills); Assam, Uttar Pradesh.

12. *Psylla viburni* Loew

1876. *Psylla viburni* Loew, *Verh-zool-bot. Ges Wien Bd.*, **26** : 194-196.

1975. *Psylla viburni*, Mathur, *Psyllidae of the Indian subcontinent* : 288.

Diagnosis : Body robust. Head as broad as thorax; finely pubescent and strongly rugulose; vertex broader than long; genal cones large, almost as long as vertex, pubescent, broad at base and at apex, subacute; 1st basal segment of antenna robust; hind tibiae with a small basal spur and with five long, stout black spines at apex; hind tarsi with two stout black spines at apex; pterostigma long and narrow; cubital petiole smaller than radius; forewings transparent.

Material examined : 1 Female, on *Salix* sp., India : Meghalaya : East Khasi Hills, Shillong; 23.vii.1977, coll. A.R. Lahiri.

Distribution : India : Meghalaya : (East Khasi Hills); Himachal Pradesh. Elsewhere : Central Europe, Honshu; Kyshu; Austrial France; Rumania; and Manolache.

4. Subfamily Triozinae

Genus 9. *Trioza* Foerster

1848. *Trioza* Foerster, *Verh. naturh. ver. Preuss. Rheinl.*, **3** : 67. Type species : *Trioza urticae*

Key to species of *Trioza*

1. Genal cones short, about 0.33 times as long as vertex; Radial sector short, curved to costa and extends atmost upto the base of 2nd marginal cell..... *heptaphleuruma*
- Genal cones large, about 0.75 times as long as vertex; Radial sector long, appreciably deflexed and extends almost upto the end of 2nd marginal cell *gigantea*

13. *Trioza gigantea curta* Mathur

1975. *Trioza gigantea curta* Mathur, *Psyllidae of the Indian subcontinent* : 375.

1979. *Trioza gigantea curta* Mathur : Lahiri and Biswas, *Bull. zool. Surv. India*, **2**(1) : 66.

Diagnosis : Body large, covered with long brown pubescence; head broad and much broader than thorax, bearing sparse pubescence; vertex large and broad; its posterior margin strongly arcuate, a foreal impression present on its disc; antennae long; hind tibiae with large basal spur; apical region robust with three stout spines; pterostigma long; forewing large, hyaline.

Material examined : 4 males, 6 Females, on *Schima wallichii*, India : Meghalaya : E. Khasi Hills, Risha Colony, Shillong, 15 and 18.iv.1977, coll. A.R. Lahiri and S. Biswas.

Distribution : India : Meghalaya (East Khasi Hills), Sikkim, West Bengal.

14. *Trioza heptaphleuruma* Lahiri & Biswas

1990. *Trioza heptaphleuruma* Lahiri & Biswas, *Rec. zool. Surv. India*, **86**(3 & 4) : 490.

Diagnosis : Head large with pubescence and long setae; vertex twice as long as broad, finely rugulose; antennae long and slender; thorax large sparsely pubescent with long hairs; scutellum small, broadened anteriorly with prominent anterolateral angles; femora shorter than tibiae, hind tibiae with three weak basal spur; forewing long, transparent, hyaline; hind wing much smaller than forewings, membrane uniformly beset with minute points.

Material examined : 2 Males and 3 Females; India : Meghalaya; Shillong, 15.iv.1978, coll. S. Biswas.

Distribution : India : Meghalaya (East Khasi Hills).

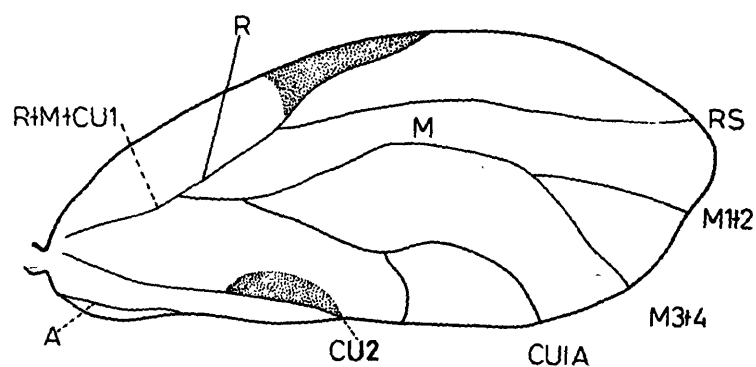


Fig.1

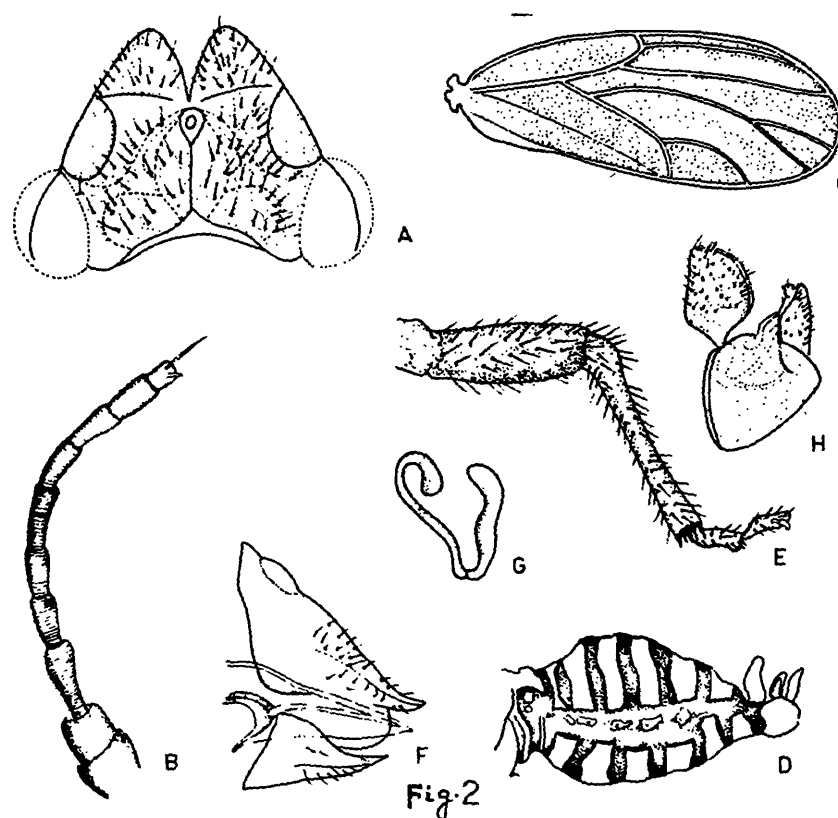
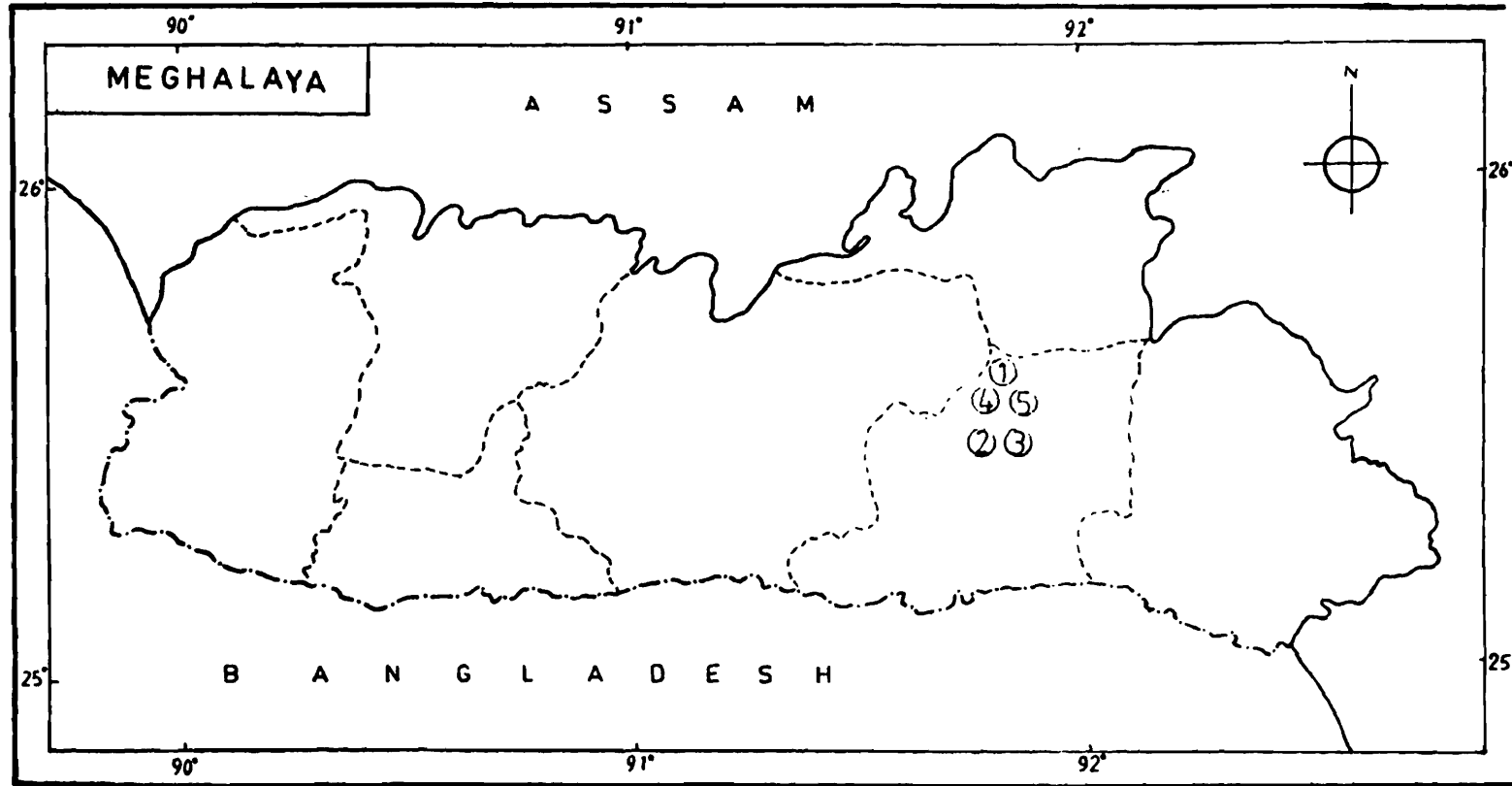


Fig-2

Fig. 1 : Generalised wing venation of psyllid : A - Anal Vein; Cu - Cubitus; M - Media ; R - Radius; Rs - Radial Sector

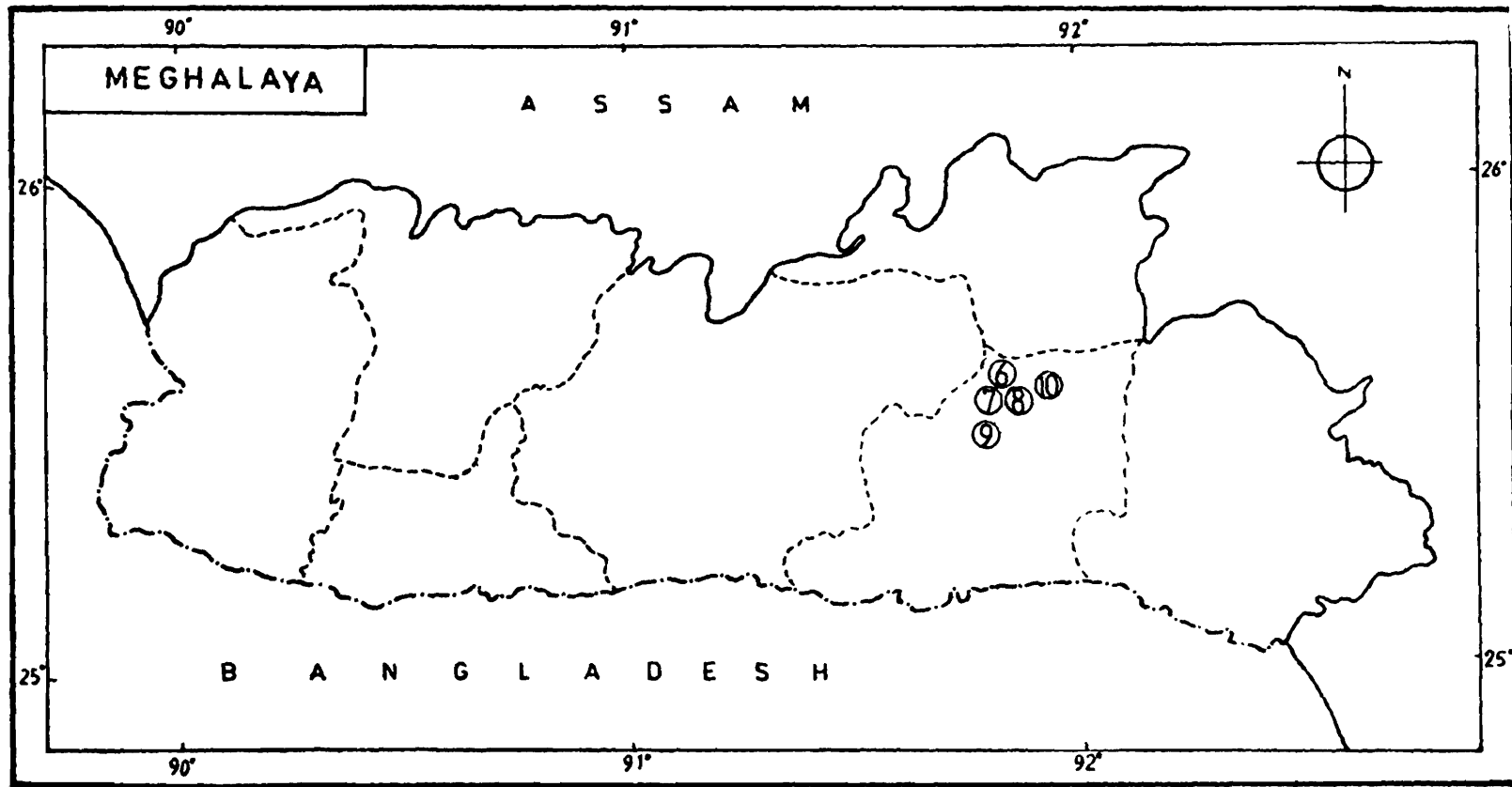
Fig. 2. : Structural features of a generalised adult Psyllid : A - Head; B - Antennae; C - Fore Wing; D - Male abdomen; E - Hind leg; F - Female genitalia; G - Aedeagus : H - Male genitalia (Entire).

Map - I DISTRIBUTION OF PSYLLID SPECIES (1 - 5) [HEMIPTERA]



1. <u>Paurocephala reticulata</u> Crawford	3. <u>Phacopteron lentiginosum</u> Buckton
2. <u>Pauropsylla beelsoni</u> Laing	4. <u>Cecidopsylla schimae</u> Kleffer
5. <u>Arytaina fasciata</u> Laing	

Map - II. DISTRIBUTION OF PSYLLID SPECIES (6 - 10) [HEMIPTERA]



6. Cryptotrioza mathuri Lahiri and Biswas

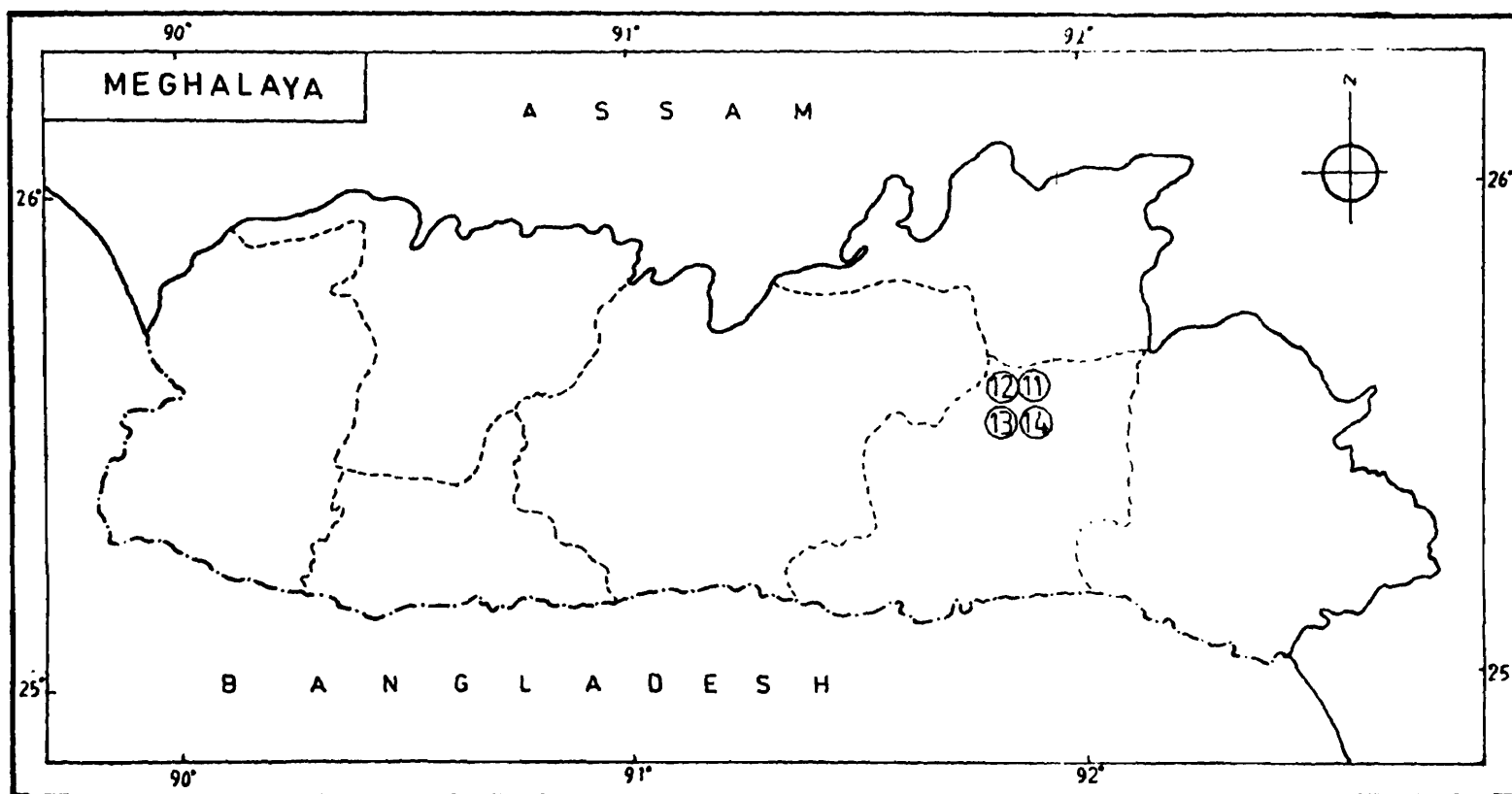
8. Psylla murrayi Mathur

7. Euphyllura eastopi Mathur

9. Psylla quadrimaculata Mathur

10. Psylla shillongensis Lahiri and Biswas

Map -III. DISTRIBUTION OF PSYLLID SPECIES (11 - 14) [HEMIPTERA]



11. Psylla simlae Complex Mathur

12. Psylla viburni Loew

13. Trioza gigantea curta Mathur

14. Trioza heptaphleura Lahiri & Biswas

Table -1. Distribution of Psyllid species in different districts of Meghalaya.

Name of the species	WEST GARO HILLS	EAST GARO HILLS	SOUTH GARO HILLS	WEST KHASI HILLS	EAST KHASI HILLS	JAINTIA HILLS	RI-BHOI
	1	2	3	4	5	6	7
1. <i>Paurocephala reticulata</i> Crawford					+	-	
2. <i>Pauropsylla beelsoni</i> Laing					+		
3. <i>Phacopteron lentiginosum</i> Buckton	-	-	-		+	-	-
4. <i>Cecidopsylla schimae</i> Kieffer		-			+	-	-
5. <i>Arytaina fasciata</i> Laing				-	+	-	
6. <i>Cryptotrioza mathuri</i> Lahiri and Biswas		-			+	-	
7. <i>Euphyllura eastopi</i> Mathur		-			+	-	-
8. <i>Psylla murrayi</i> Mathur		-			+	-	
9. <i>Psylla quadrimaculata</i> Mathur					+		
10. <i>Psylla shillongensis</i> Lahiri and Biswas				-	+	-	-
11. <i>Psylla simlae</i> Complex Mathur	-				+	-	
12. <i>Psylla viburni</i> Loew					+		
13. <i>Trioza gigantea curta</i> Mathur					+	-	
14. <i>Trioza hetaphleurnma</i> Lahiri and Biswas					+		

SUMMARY

The paper deals with the Psyllidae fauna of Meghalaya, India. Altogether 14 species/Subspecies under 9 genera belonging to 5 subfamilies are treated in the text. Two species viz, *Phacopteron lentigenosum* Buckton and *P. beelsoni* Laing have been recorded for the first time from the state of Meghalaya. The keys for identification of subfamilies, tribes, genera, species and subspecies are provided.

ACKNOWLEDGEMENT

The authors are grateful to Dr. A.K. Ghosh, Director, Zoological Survey of India, Calcutta for providing laboratory facilities and encouragement. They also express gratitude to Dr. J.R.B. Alfred, Addl. Director and Chief Co-ordinator, State Fauna Series, State of Meghalaya; Dr. S.K. Tandon and Dr. R.K. Varshney, Joint Directors for numerous courtesies. Grateful thanks are also due to Dr. J.K. Jonathan, Scientist -SF for his constructive suggestions.

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INSECTA : HEMIPTERA : HOMOPTERA : APHIDIDAE

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INTRODUCTION

Aphids or plant lice are soft bodied phytophagous homopteran insects. They are remarkable for their complicated life cycle and ability for transmitting many plant viral diseases. The aphids enjoy more or less cosmopolitan distribution and are found in abundance in places having temperate climate.

Out of estimated world fauna of over 4,000 species of aphids, about 787 species belonging to 211 genera are known from Indian region (Ghosh, A. K. 1989). Thus, the Indian aphids constitute 20% of the global fauna. Compilation of available data also reveals that over 1200 species of plants belonging to nearly 700 genera and 175 families are infested by these aphids in India. As a result of thorough investigation on this group, quite an appreciable number of publications are made on Indian aphids but for limitation of space only some important contributions are given below :

Barlow (1890), Buckton (1893-98), Cotes (1893), Fletcher (1914), van der Goot (1916-1917), Das (1918), George (1925-1928), Krishnamurthy (1928, 1930), Deshpande (1930), Ayyar (1937), Ullah (1940), Behura (1963, 1965), Verma (1965-74), David and his associates (1972-recent), Chakrabarti and Quednau (1976), Raychaudhuri, D. N. and his collaborators (1956-1983), Basu, R. C. and Raychaudhuri (1980), Ghosh, A. K. (1974-1994), Stary and Ghosh, A. K. (1983), Ghosh, L. K. (1986, 1989), Ghosh, A. K. and Quednau 1990; Ghosh, L. K. and Basu 1993.

The Aphididae of Meghalaya are known through the works of Cotes 1896; van der Goot 1916; Raychaudhuri, D. N. and Ghosh, A. K. 1964; Ghosh, A. K. 1969a, 1969b; Ghosh, A. K. and Raychaudhuri, D. N. 1962a, 1962b; Hille Ris Lambers 1966; Ghosh, A. K. 1969, 1974; Ghosh, A. K., Basu, R. C. and Raychaudhuri, D. N. 1970; Basu, R. C. (Ph.D. Thesis, University of Calcutta).

A perusal of literature reveals that altogether 232 species/subspecies of aphids belonging to 105 genera in seven subfamilies are so far known from the State of Meghalaya. The present contribution is an attempt to provide a comprehensive account of the above aphid fauna from Meghalaya. It deals with a brief note on earlier investigations; keys to subfamilies, tribes, subtribes, genera species/subspecies; literature reference, geographical distribution of each species both within India and in abroad and also endemism. The taxonomic keys, however, presented here are essentially for identification of Aphididae of Meghalaya and it may not work for aphids not represented in this region. The taxonomic nomenclature of the listed genera and species has mostly been adopted from Eastop and Hille Ris Lambers (1976), Raychaudhuri, D. N. (*ed.* 1980), Ghosh, A. K. (1980, 1982, 1984, 1988, 1993), Ghosh, A. K. and Quednau (1990).

A critical analysis of the aphid fauna of Meghalaya reveals that it constitutes about 30% of the total species known from India, 23% of the species from the Oriental and 5.8% of the species from the

world aphid fauna. Of the 233 species so far known from the State, 7% are endemic in origin. The find of sexual forms in the area hints at the possibility of completion of holocyclic for some of these species, although anholocyclic type of life cycle is shown by majority of the aphid species found in Meghalaya. The material were examined chiefly from the collections in Entomology Laboratory (C. U. Colls : R. C. Basu, H. Banerjee etc.), Department of Zoology, University of Calcutta and also from the collections represented in the Zoological Survey of India (ZSI Coll., NZC).

ABBREVIATION USED

The following abbreviations have been used in the text :

Alata(e) : Alate viviparous female(s); Apter(a)e : Apterous viviparous female(s); a.s. : Antennal segment; b.d. : Basal diameter of antennal segment III; C.U. : Department of Zoology, University of Calcutta; F.T.C. : First tarsal chaetotaxy; ht2 : Second joint of hind tarsus; N.Z.C. : National Zoological Collection, Zoological Survey of India; p.t. : Processus terminalis; u.r.s. : Ultimate rostral segment; X : Times as long as; Z.S.I. : Zoological Survey of India.

SYSTEMATIC CONTENTS

Subfamily	I. Anoeciinae
Tribe	Aiceonini
Genus	1. <i>Aiceona</i> Takahashi
	1. <i>A. robustiseta</i> Ghosh and Raychaudhuri
Subfamily	II. Aphidinae
Tribe	Aphidini
Subtribe	Aphidina
Genus	2. <i>Aphis</i> Linnaeus
	2. <i>Aphis citricola</i> Patch
	3. <i>A. craccivora</i> Koch
	4. <i>A. fabae solanella</i> Theobald
	5. <i>A. gossypii</i> Glover
	6. <i>A. kurosawai</i> Takahashi
	7. <i>A. longisetosa</i> Basu
	8. <i>A. nasturtii</i> Kaltenbach
	9. <i>A. nerii</i> Boyer de Fonscolombe
	10. <i>A. polygonaceae</i> Matsumura
	11. <i>A. punicae</i> Passerini
Genus	3. <i>Toxoptera</i> Koch

12. *Toxoptera anrantii* Boyer de Fonscolombe
13. *T. citricidus* (Kirkaldy)
14. *T. odinae* (van der Goot)
- Subtribe Rhopalosiphina
- Genus 4. *Hyalopterus* Koch
 15. *Hyalopterus atriplicis* (Linnaeus)
 16. *Hyalopterus pruni* (Geoffroy)
- Genus 5. *Hysteroneura* Davis
 17. *Hysteroneura setariae* (Thomas)
- Genus 6. *Melanaphis* van der Goot
 18. *Melanaphis arundinariae* (Takahashi)
 19. *M. donacis* (Passerini)
 20. *M. meghalayensis meghalayensis* Raychaudhuri & Banerjee
 21. *Melanaphis sacchari* (Zehntner)
- Genus 7. *Rhopalosiphum* (Koch)
 22. *Rhopalosiphum maidis* (Fitch)
 23. *R. nymphaeae* (Linnaeus)
 24. *R. padi* (Linnaeus)
 25. *R. rufiabdominalis* (Sasaki)
 26. *R. yoksumi* Ghosh, Banerjee and Raychaudhuri
- Genus 8. *Schizaphis* Börner
 27. *Schizaphis graminum* (Rondani)
 28. *S. punjabipyri* (Das)
 29. *S. rotundiventris* (Signoret)
- Tribe MACROSIPHINI
- Genus 9. *Acutosiphon* Basu, Ghosh and Raychaudhuri
 30. *Acutosiphon obliquoris* Basu, Ghosh and Raychaudhuri
- Genus 10. *Acyrtosiphon* Mordvilko
 31. *Acyrtosiphon pisum* (Harris)
- Genus 11. *Akkaia* Takahashi
 32. *Akkaia bengalensis* Basu
- Genus 12. *Amphorophora* Buckton

33. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu
- Genus 13. *Anthracosiphoniella* Basu
34. *Anthracosiphoniella maculatum* Basu
- Genus 14. *Aulacorthum* Mordvilko
35. *Aulacorthum cornaceae* Ghosh
36. *A. dasi* Ghosh, Basu and Raychaudhuri
37. *A. magnoliae* (Essig and Kuwana)
38. *A. nipponicum* (Essig and Kuwana)
39. *A. rhamni* Ghosh, Ghosh and Raychaudhuri
40. *A. scirpi* van der Goot
41. *A. solani* (Kaltenbach)
- Genus 15. *Brachycaudus* van der Goot
42. *Brachycaudus hilichrysi* (Kaltenbach)
43. *Brachycaudus persicaecola* (Boisduval)
- Genus 16. *Brevicorne* Linnaeus
44. *Brevicoryne brassicae* (Linnaeus)
- Genus 17. *Capitophorus* van der Goot
45. *Capitophorus archangelskii* Nevsky
46. *Capitophorus carduinus* (Walker)
47. *C. elaeagni* (del Guercio)
48. *C. formosartemisiae* (Takahashi)
49. *C. hippophaes javanicus* Hille Ris Lambers
50. *C. h. mitegoni* Eastop
51. *C. indicus* Ghosh and Raychaudhuri
52. *C. meghalayensis* Basu and Raychaudhuri
53. *C. vernoniae* Ghosh and Raychaudhuri
- Genus 18. *Cavariella* del Guercio
54. *Carariella araliae* Takahashi
55. *C. aegopodii* (Scopoli)
56. *C. biswasi* Ghosh, Basu and Raychaudhuri
57. *C. salicicola* (Matsumura)

- Genus 19. *Chaetomyzus* Ghosh and Raychaudhuri
58. *Chaetomyzus rhododendri* Ghosh and Raychaudhuri
- Genus 20. *Coloradoa* Wilson
59. *Coloradoa rufomaculata* (Wilson)
- Genus 21. *Cryptomyzus* Oestlund
60. *Cryptomyzus taoi* Hille Ris Lambers
- Genus 22. *Cryptosiphum* Buckton
61. *Cryptosiphum artemisiae* Buckton
- Genus 23. *Dactynotus* Rafinesque
62. *D. sonchi* (Linnaeus)
63. *D. tanacetii indica* Ghosh
64. *D. (Uromelan) compositae* Theobald
- Genus 24. *Diphorodon* Börner
65. *Diphorodon cannabii* (Passerini)
- Genus 25. *Dysaphis* Börner
66. *Dysaphis pyri* (Boyer de Fonscolombe)
- Genus 26. *Hayhurstia* del Guercio
67. *Hayhurstia atriplicis* (Linnaeus)
- Genus 27. *Hyadaphis* Kirkaldy
68. *Hyadaphis coriandri* (Das)
- Genus 28. *Hyperomyzus* Börner
69. *Hyperomyzus carduellinus* (Theobald)
- Genus 29. *Indumasonaphis* Raychaudhuri, Ghosh and Basu
70. *Indumasonaphis inulae* (Ghosh & Raychaudhuri)
- Genus 30. *Liosomaphis* Walker
71. *Liosomaphis himalayensis* Basu
- Genus 31. *Lipaphis* Mordvilko
72. *Lipaphis erysimi* Kaltenbach
- Genus 32. *Macromyzus* Takahashi
73. *Macromyzus woodwardi* Takahashi
- Genus 33. *Macrosiphoniella* del Guercio
74. *Macrosiphoniella formosartemisiae* Takahashi

75. *M. matsumurana* Ghosh, Basu and Raychaudhuri
 76. *M. pseudoartemisiae* Shinji
 77. *M. sanborni* (Gillette)
 78. *M. spinipes* Basu
 79. *M. yomogifoliae* (Shinji)
- Genus 34. ***Macrosiphum*** Passerini
 80. *Macrosiphum (Macrosiphum) aulacorhoides* David, Narayanan and Rajasingh
 81. *M. (M.) pachysiphon* Hille Ris Lambers
 82. *M. (M.) rosae* Linnaeus
 83. *M. (M.) spinipes* (Basu)
 84. *M. (M.) spinipes rhododendri* (Ghosh, Basu and Raychaudhuri)
 85. *M. (M.) spinotibium* Ghosh, Ghosh and Raychaudhuri
 86. *M. (Sitobion) africanum* Hille Ris Lambers
 87. *M. (S.) avenae* (Fabricius)
 88. *M. (S.) fagopyri* Ghosh & Raychaudhuri
 89. *M. (S.) ibarae* Matsumura
 90. *M. (S.) indicum* (Basu)
 91. *M. (S.) luteum* (Buckton)
 92. *M. (S.) mimosae* Ghosh, Basu and Raychaudhuri
 93. *M. (S.) miscanthi* (Takahashi)
 94. *M. (S.) plectranthi* Ghosh, Ghosh & Raychaudhuri
 95. *M. (S.) rosaeiformis* (Das)
 96. *M. (S.) sikkimensis* Ghosh & Raychaudhuri
 97. *M. (S.) smilacifoliae* (Takahashi)
 98. *M. (S.) takahashii* Eastop
- Genus 35. ***Matsumuraja*** schumacher
 99. *Matsumuraja capitophoroides* Hille Ris Lambers
- Genus 36. ***Metaphorodon*** Takahashi
 100. *Metaphorodon polygoni* (van der Goot)
- Genus 37. ***Metopolophium*** Mordvilko
 101. *Metopolophium (Metopolophium) euryae* (Takahashi)

- Genus 38. *Micromyzodium* David
102. *Micromyzodium filicium* David
- Genus 39. *Micromyzus* van der Goot
103. *Micromyzus kalimpongensis* Basu
104. *M. mawphlangensis* Ghosh
105. *Micromyzus* sp.
- Genus 40. *Myzus* Passerini
106. *Myzus ascalonicus* Doncaster
107. *M. brevisiphon* Basu
108. *M. cerasi* (Fabricius)
109. *M. cymballariellus* Stroyan
110. *M. dycei* Carver
111. *M. indicus* Basu & Raychaudhuri
112. *M. meghalayensis* Basu & Raychaudhuri
113. *M. monoji* Basu & Raychaudhuri
114. *M. obtusirostris* David, Narayanan & Rajasingh
115. *M. ornatus* Laing
116. *M. persicae* (Sulzer)
117. *M. siegesbeckicola* Strand
- Genus 41. *Neohyalomyzus* Basu, Ghosh & Raychaudhuri
118. *Neohyalomyzus raoi* (Hille Ris Lambers)
- Genus 42. *Neomegouropsis* Ghosh, Basu & Raychaudhuri
119. *Neomegouropsis cajanae* Ghosh & Raychaudhuri
- Genus 43. *Neomyzus* van der Goot
120. *Neomyzus (Neomyzus) circumflexus* Buckton
121. *N. (N.) primulum* Ghosh, Banerjee & Raychaudhuri
- Genus 44. *Ovatus* van der Goot
122. *Ovatus minutus* van der Goot
- Genus 45. *Paczoskia* Mordvilko
123. *Paczoskia budhium* Banerjee, Ghosh & Raychaudhuri
- Genus 46. *Pentalonia* Coquerel
124. *Pentalonia nigronervosa* Coquerel

- Genus 47. *Perillaphis* Takahashi
 125. *Perillaphis perillae* (Shinji)
- Genus 48. *Pleotrichophorus* Börner
 126. *Pleotrichophorus chrysanthemi* (Theobald)
- Genus 49. *Pseudoacyrthosiphon* Ghosh and Raychaudhuri
 127. *Pseudoacyrthosiphon* (P.) *holsti* Takahashi
- Genus 50. *Rhodobium* Hille Ris Lambers
 128. *Rhodobium porosum* (Sanderson)
- Genus 51. *Rhopalosiphoninus* Baker
 129. *Rhopalosiphoninus latysiphon* (Davidson)
- Genus 52. *Scleromyzus* Basu, Ghosh & Raychaudhuri
 130. *Scleromyzus corylopsis* (Basu, Ghosh & Raychaudhuri)
- Genus 53. *Semiaphis* van der Goot
 131. *Semiaphis heraclei* (Takahashi)
- Genus 54. *Shinjia* Takahashi
 132. *Shinjia pteridifoliae* (Shinji)
- Genus 55. *Sinomegoura* Takahashi
 133. *Sinomegoura citricola* (van der Goot)
 134. *S. photinae* (Takahashi)
 135. *S. pyri* Ghosh and Raychaudhuri
 136. *S. rhododendri* (Takahashi)
- Genus 56. *Subovatomyzus* Basu
 137. *Subovatomyzus leucosceptri* Basu
- Genus 57. *Tricaudatus* Tao
 138. *Tricaudatus polygoni* (Narzikulov)
- Genus 58. *Trichosiphonaphis* Takahashi
 139. *Trichosiphonaphis gerbarae* Ghosh & Raychaudhuri
 140. *T. lonicerae* (Uye)
- Genus 59. *Tuberocephalus* Shinji
 141. *Tuberocephalus sasaki* (Matsumura)
- Genus 60. *Vesiculaphis* del Guercio
 142. *Vesiculaphis kuwanis* Ghosh, Basu & Raychaudhuri

143. *V. pieridis* Basu
144. *V. verbasci* Chowdhuri, Basu, Chakrabarti & Raychaudhuri
- Genus 61. *Xenomyzus* Aizenberg
145. *X. scabripes* Basu, Ghosh & Raychaudhuri
- Subfamily III. Drepanosiphinae
- Genus 62. *Betacallis* Matsumura
146. *Betacallis prunicola* Basu, Ghosh & Raychaudhuri
147. *B. querciphaga* Basu, Ghosh & Raychaudhuri
- Genus 63. *Clethrobius* Mordvilko
148. *Clethrobius dryobius* Chakrabarti & Raychaudhuri
- Genus 64. *Machailaphis* Takahashi
149. *Machailaphis machili* (Takahashi)
- Genus 65. *Mesocallis* Matsumura
150. *Mesocallis alnicola* Ghosh
- Genus 66. *Neobetulaphis* Basu
151. *Neobetulaphis immaculata* Ghosh
- Genus 67. *Shivaphis* Das
152. *Shivaphis celti* Das
- Genus 68. *Subtakecallis* Raychaudhuri and Pal
153. *Subtakacallis pilosus* (David, Rajasingh & Narayanan)
- Genus 69. *Takacallis* Matsumura
154. *Takecallis arundinariae* (Essig)
- Genus 70. *Taoia* Quednau
155. *Taoia indica* (Ghosh & Raychaudhuri)
- Genus 71. *Tinocallis* Matsumura
156. *Tinocallis magnoliae* Ghosh and Raychaudhuri
- Genus 72. *Tinocalloides* Basu
157. *Tinocalloides montanus* Basu
- Genus 73. *Tuberculatus* Mordvilko
158. *Tuberculatus indicus* Ghosh
159. *T. nervatus* Chakrabarti & Raychaudhuri
160. *T. paiki* Hille Ris Lambers

Subfamily IV Greenideinae

Tribe Cervaphidini

Genus 74. *Cervaphis* van der Goot161. *Cervaphis quercus* Takahashi162. *C. schouteniae* van der GootGenus 75. *Schoutedenia* Rubsaamen163. *Schoutedenia emblica* (Patel and Kulkarni)164. *S. ralumensis* RubsaamenGenus 76. *Sumatraphis* Takahashi165. *Sumatraphis celti* Takahashi

Tribe Greenideini

Genus 77. *Allotrichosiphum* Takahashi166. *Allotrichosiphum assamense* Raychaudhuri, Ghosh, Banerjee and GhoshGenus 78. *Brevitrichosiphon* Raychaudhuri *et al.*167. *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh, Banerjee and GhoshGenus 79. *Eutrichosiphum* Essig & Kuwana168. *Eutrichosiphum alnicola* Basu169. *E. assamense* Ghosh, Basu & Raychaudhuri170. *E. blackmanum* Agarwala and Ghosh171. *E. dubium* (van der Goot)172. *E. flavum* Takahashi173. *Eutrichosiphum khasyanum* (Ghosh & Raychaudhuri)174. *E. makii* Raychaudhuri and Chatterjee175. *E. neotattakanum* Agarwala and Ghosh176. *E. pseudopasaniae* Szelegiewicz177. *E. pyri* Chakrabarti, Ghosh and Raychaudhuri178. *E. rameshi* (Raychaudhuri, Chatterjee and Raychaudhuri)179. *E. raychaudhurii* Ghosh180. *E. russellae* (Ghosh, Ghosh and Raychaudhuri)181. *E. sankari* Raychaudhuri, Ghosh, Banerjee and Ghosh

182. *E. sensoriatum* (Ghosh)
 183. *E. subinoyi* Raychaudhuri, Ghosh, Banerjee and Ghosh
 184. *E. tattakanum* (Takahashi)
- Genus 80. ***Greenidea*** Schouteden
 185. *Greenidea* (*Greenidea*) *artocarpi* (Westwood)
 186. *G. (G.) decaspermi* Takahashi
 187. *G. (G.) himansui* Raychaudhuri, Ghosh, Banerjee and Ghosh
 188. *G. (G.) longicornis* (Ghosh and Raychaudhuri)
 189. *G. (G.) lonirostris* Basu
 190. *G. (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri
 191. *G. (Trichosiphum) bucktonis* Ghosh, Basu and Raychaudhuri
 192. *Greenidea (Trichosiphum) camelliae* Agarwala and Ghosh
 193. *G. (T.) formosana formosana* (Maki)
 194. *G. (T.) prunicola* Ghosh, Banerjee & Raychaudhuri
 195. *G. (T.) quercicola* Basu, Ghosh & Raychaudhuri
 196. *G. (T.) sikkimensis* Raychaudhuri, Ghosh, Banerjee and Ghosh
- Genus 81. ***Greenideoida*** van der Goot
 197. *Greenideoida (Neogreenidea) bengalensis* Raychaudhuri and Chatterjee
 198. *Greenideoida (Paragreenideoida) ceyloniae* van der Goot
 199. *G. (Pentatrichosiphon) luteum* (Basu)
- Genus 82. ***Mollitrichosiphum*** Suenaga
 200. *Mollitrichosiphum (Mollitrichosiphon) tenuicorpus* Okajima
 201. *M. (M.) montanum* (van der Goot)
 202. *M. (M.) rhusae* Ghosh
- Subfamily V. Hormaphidinae
 Tribe Cerataphidini
 Genus 83. ***Aleurodaphis*** van der Goot
 203. *Aleurodaphis blumeae* van der Goot
- Genus 84. ***Astegopteryx*** Karsch
 204. *Astegopteryx bambusae* (Buckton)

- Genus 85. *Ceratovacuna* Zehntner
 205. *Ceratovacuna perglandulosa* Basu, Ghosh & Raychaudhuri
 206. *C. silvestri* (Takahashi)
 207. *C. spinulosa* Ghosh and Raychaudhuri
- Genus 86. *Glyphinaphis* van der Goot
 208. *Glyphinaphis bambusae* van der Goot
- Genus 87. *Pseudoregma* Doncaster
 209. *Pseudoregma alexanderi* (Takahashi)
 210. *P. bucktoni* Ghosh, Pal and Raychaudhuri
 211. *P. panicola* (Takahashi)
- Genus 88. *Tuberaphis* Takahashi
 212. *Tuberaphis loranthe* (van der Goot)
- Tribe *Nipponaphidni*
- Genus 89. *Neothoracaphis* Takahashi
 213. *Neothoracaphis sutepensis* (Takahashi)
- Genus 90. *Nipponaphis* Pergande
 214. *Nipponaphis* (*Pseudonipponaphis*) *himalayensis* Ghosh & Raychaudhuri
 215. *N. (P.) machiliphaga* Takahashi
- Genus 91. *Indonipponaphis* Ghosh and Raychaudhuri
 216. *Indonipponaphis tuberculata* Ghosh & Raychaudhuri
- Genus 92. *Metanipponaphis* Takahashi
 217. *Metanipponaphis assamensis* Ghosh & Raychaudhuri
 218. *M. echinata* Ghosh
- Genus 93. *Sinonipponaphis* Tao
 219. *Sinonipponaphis monzeni* (Takahashi)
- Genus 94. *Thoracaphis* van der Goot
 220. *Thoracaphis quercifoliae* Ghosh
- Subfamily VI. Lachninae
 Tribe Cinarini
 Subtribe Cinarina
 Genus 95. *Cinara* Curtis

221. *Cinara atrotibialis* David & Rajasingh

Subtribe Eulachnina

Genus 96. *Eulachnus* del Guercio

222. *Eulachnus thunbergii* Wilson

Tribe Lachnini

Genus 97. *Lachnus* Burmeister

223. *Lachnus tropicalis* (van der Goot)

Genus 98. *Longistigma*

224. *Longistigma liquidambarus* (Takahashi)

Genus 99. *Maculolachnus* Gaumont

225. *Maculolachnus rubi* Ghosh and Raychaudhuri

Genus 100. *Nippolachnus* Matsumura

226. *Nippolachnus bengalensis* Basu & Hille Ris Lambers

227. *N. piri* (Matsumura)

Genus 101. *Pyrolachnus* Basu and Hille Ris Lambers

228. *Pyrolachnus piri* (Buckton)

Genus 102. *Tuberolachnus* Mordvilko

229. *Tuberolachnus salignus* (Gmelin)

Subfamily VII. Pemphiginae

Tribe Eriosomatini

Genus 103. *Eriosoma* Leach

230. *Eriosoma lanigerum* (Hausmann)

Tribe Pemphigini

Genus 104. *Prociphilus* Koch

231. *Prociphilus osmanthae* Essig & Kuwana

Tribe Fordini

Genus 105. *Geoica* Hartig

232. *Geoica lucifuga* (Zehntner)

MORPHOLOGY AND TERMINOLOGY

Body of an aphid is normally of three regions viz. head, thorax and abdomen but fusion may take place between head and prothorax or may be various types of fusion of abdominal segments. The head

bears a flat or convex frons, with or without lateral frontal tubercles which when present may be smooth, rugose, spinulose and parallel, converging. Eyes are normally of large and compound but in apterae of some group of aphids eyes may be represented by triommatidia. Paired lateral and dorsal tubercles may be present on head, thoracic and abdominal segments and ocular tubercles present on eyes of alatae. Antennae usually consists of two short basal segments and a flagellum of 1-4 segments; the penultimate segment bears a primary rhinarium at the distal end and in the last antennal segment consist of 'base' and slender apical part, called 'processus terminalis'; secondary rhinarium may vary in shape, size and number and may be variably present on segment III, IV and sometimes on base of segment VI in alatae, and on antennal segment III of Apterae in some Aphididae. Rostrum consists of 5 segments, last segment being usually small and fused with 4th segment, combined structure is known as 'Ultimate rostral segment' which bears variable number of accessory hairs besides a tuft of 6 primary hairs at apex. Thorax is composed of pro-, meso- and meta-thorax, the first may fuse with the head, the others may variably fuse among themselves and abdomen. Mesothorax in apterae possesses mid-thoracic furca. Legs consists of usually 5 joints, sometimes coxae and trochanters may be fused. Tarsi and usually 2-segmented and the small first tarsal joint bears 2-7 ventral hairs, in some groups dorsal hairs may also be present. Second tarsal joint usually bears dorso and lateroapical hairs and a pair of terminal claws; empodial hairs present between the claws (Fig. 1). Forewing possesses stigma, a straight or curved radial sector, simple, once or twice forked media besides anal and cubital veins; hind wings usually smaller than forewing, bears 2 oblique veins which may be reduced to 1 or may even be absent. Abdomen consists of 9 segments, each of the segments 1-7 usually bears a pair of spiracle. Lateral abdominal tubercles usually present on 1st and 7th tergite, those on 2nd - 6th may be variably present; abdominal segment 5 or 6 usually bears a pair of siphunculi, of various shapes and characters, however in some Aphididae, siphunculi are absent. Subanal plate situated ventral to cauda, modification of terminal abdominal segment. Cauda may be of various shapes and bears 2 to many hairs.

The males are usually alate but smaller in size than alate viviparous females, exhibit sclerotic claspers and bears many secondary rhinaria on antennal segment III, IV, V and sometimes also on VI. The oviparous females are usually apterous and possess numerous pseudosensoria on hind tibiae which are distinctly swollen than those of apterous viviparous females. Female genitalia with rudimentary gonapophyses, vulva etc.

MATERIAL AND METHODS

HABITAT : Aphids usually feed in colony on the succulent leaves, stems, foliages, fruits and occasionally form galls inside which they multiply. Sometimes the aphids are found in underground stems and roots. The association of ants and presence of predators like coccinellid beetles are commonly met with.

COLLECTION : The following are the various methods of collecting aphids :

- i) Aphids are generally removed from their host plants with a soft brush soaked in alcohol and fixed either in 96% alcohol or in fluid consisting of 2 vols. of 96% alcohol and 1 vol. of lactic acid.

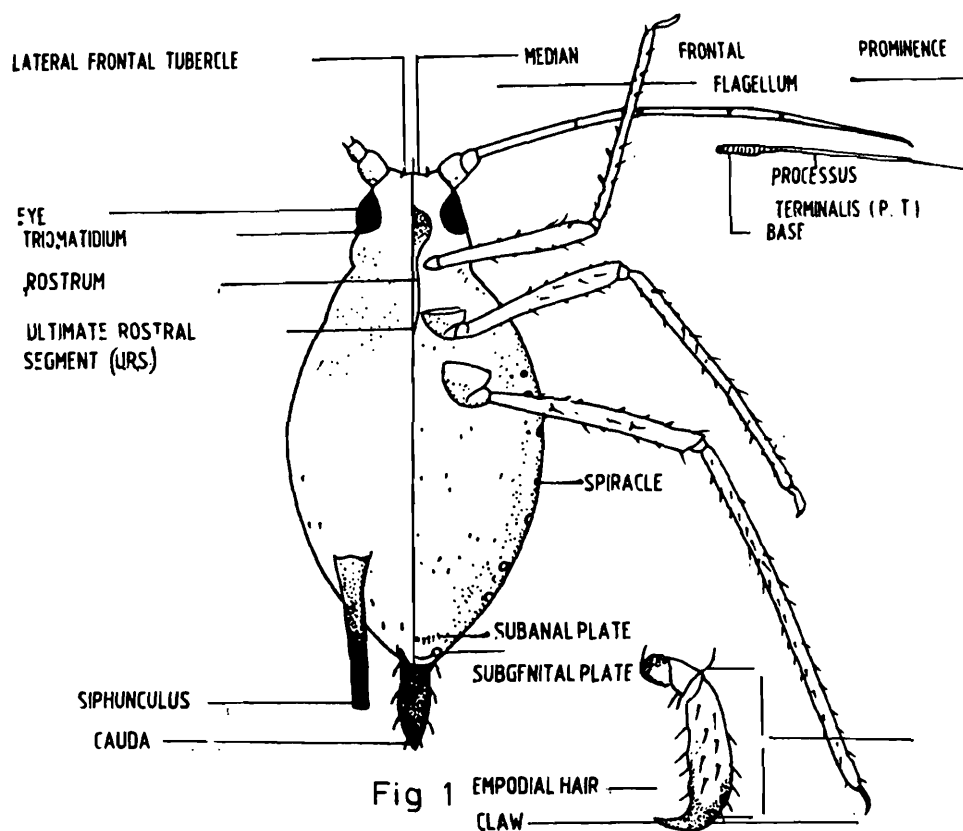


Fig. 1. Typical apterous viviparous female

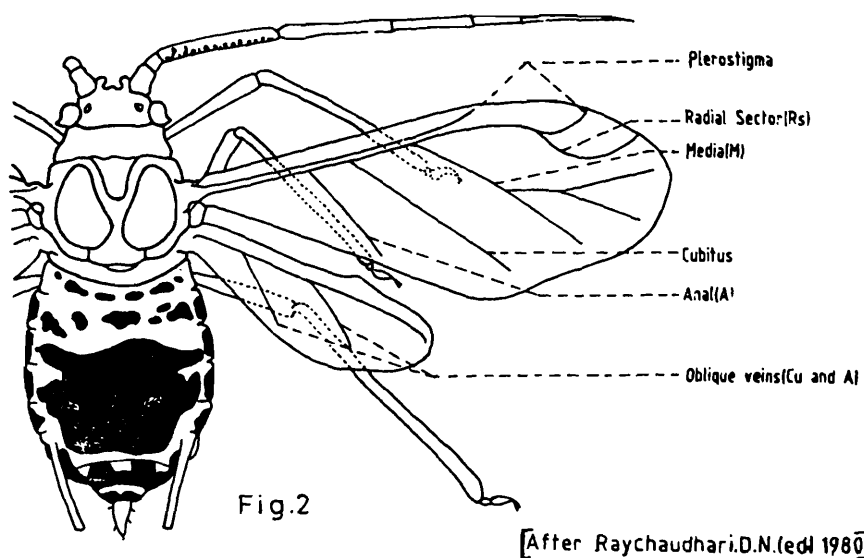


Fig. 2. Typical Alate viviparous female

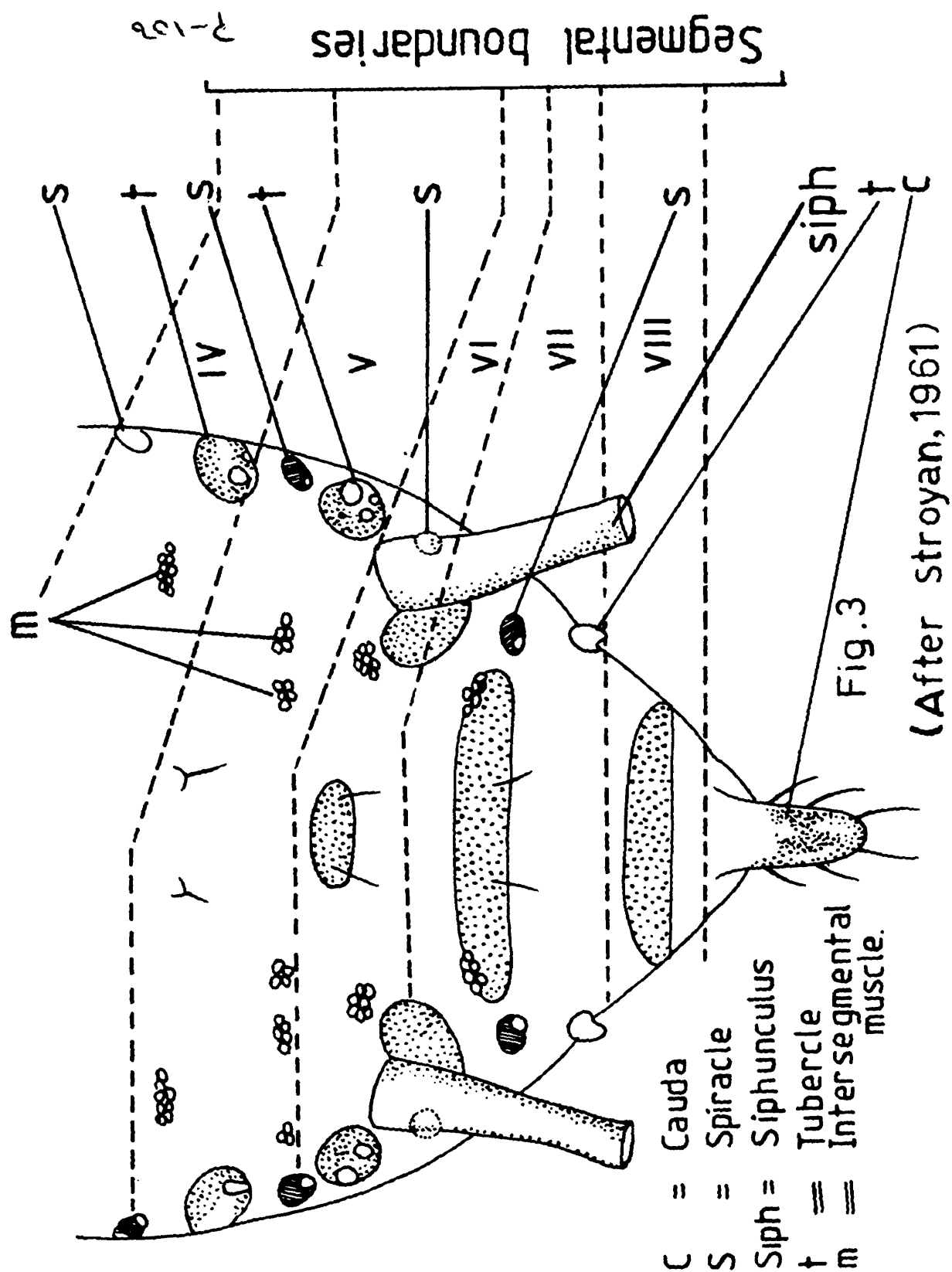


Fig. 3. Posterior segments of abdomen of apterous viviparous female

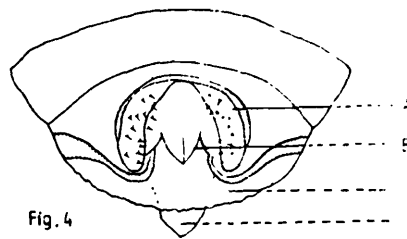


Fig. 4

- A Opercula
- B Penis (After Cottier, 1953)
- C Analplate
- D Cauda

Fig. 4. Typical male genitalia

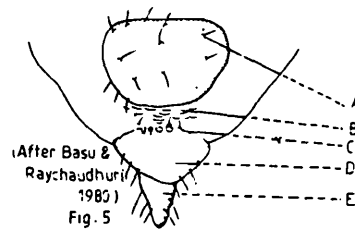


Fig. 5
Typical female genitalia of apterous
oviparous female of *Aphis* L.

- A-Genital or subgenital plate
- B-Genital pore or vulva
- C-Rudimentary gonapophyses
- D-Anal plate E-Cauda

Fig. 5. Typical female genitalia



Fig: 6

P - Pseudosensoria

Fig. 6. Hind tibia showing pseudosensoria in apterous oviparous female

- ii) A sheet of strong paper on a thin board is put under the host plant which is shaken gently, the aphids will then fall upon the substratum. Then the insects are collected and preserved in a suitable fluid. A part of an infested plant sample is also collected into tubes and the aphids are transferred into 96% alcohol.
- iii) Another technique is to collect the aphids alive in a rather wide glass tube with a portion of the host plant. In this method, it is often possible to get more material in better condition because nymphs can be reared to adulthood and more alatae can be obtained than by picking directly.
- iv) More sophisticated method may be adopted by using tubes of standard width that can be fitted to an exhaustor, and thereby the aphids are sucked in from the threshing broad. This acts very quickly and the aphids are not damaged by handling. But the sample should not be large. (In fact, the procedure is followed by every European worker.)
- v) However, the best method of collecting aphids in the field is to collect them alive along with their respective host plants. The portion of each infested plant along with the aphids is then placed in an expanded plastic bag or in tubes or in tins plugged with cotton. The advantage lies here in the fact that it may be possible to have winged specimens that come out within a day or two from the original sample containing both the immature forms and wingless adults. As a result, desirable number of apterous and winged adults along with different stages of nymphs may be collected for study.

Apart from this, appropriate colour notes, nature of damage to plant, site of infestation, attendant ants or predators, parasites, if any, may be accurately recorded in the laboratory. Data for each sample may be kept separately in the field note book and each container should bear a label.

- vi) Regarding the collection of root aphids digging method is adopted. This is generally done by following the external symptoms of the host plants, the roots of which are liable to be infested by the plant lice, or by observing the association of ants that act as an index in helping the collector to locate the site of infestation in a plant. The rest of the procedure is to be followed as mentioned in the preceding technique.

YELLOW PAN TRAP METHOD : This is a device meant for collecting winged aphids specially of migratory habit. This method consists of a yellow coloured tray containing only water. The tray is kept at suitable place of varied altitudes where there is a passage of free air current. While flying at certain heights, winged aphids are attracted perhaps by yellow colour and fall on water. These aphids are then collected and preserved in 70% alcohol. This process is maintained at every 24 hours. The water is preferably changed after each catch.

LIGHT TRAP : This method of aphid collection is not so effective as in aforesaid methods.

PRESERVATION : The best way of preserving aphids is to put them in the fluid consisting of 2 vols. of 95% alcohol and 1 vol. of 75% lactic acid. Lactophenol also plays an important role in preservation. In this process the live aphids are placed directly into vials containing the clearing fluid made of saturated solution the lactic acid with clear phenol crystals. In this solution, the aphids the

aphids are generally cleared within a few hours or days. In lactophenol the aphid material may be kept for up to 3 years without ill effects.

LABELLING : A specimen carries no meaning at all; if it is not properly labelled so far as systematic studies are concerned. While labelling the following points should be noted.

Name of the host plant and location on host :

Locality : (Name, District, State and if necessary, latitudes, longitude and altitude).

Date of collection :

Collector :

It is also desirable to maintain a field note book to record all the necessary details in regard to host plant, colouration, nature of damage to plants, site of infestation, presence of ant/predator etc. and other peculiarities, if any. A herbarium should also be made so as to record the correct plant sample.

TRANSPORATION : The aphid specimens which are collected in the field, should be put into a tube containing fluid of 95% alcohol and 75% lactic acid. While sending the material from the field to the laboratory, if it takes much time to reach, from field to the laboratory there is every possibility of damage of specimens owing to the frequent agitation. Due to obvious reasons, lactic acid is mixed with alcohol because it not only keeps the specimens soft but also checks damage of the appendages and maintains the orientation of chaetotaxy which are of paramount importance in aphid taxonomy.

The labels should be inserted in each tube which is closed with wet cotton plug. Similar label should also be provided outside each tube. Care should be taken that no trace of air remain inside the tube. The tubes, thus labelled, are placed in another container of 90% alcohol. Now, it is ready for postal transit after necessary packing.

MOUNTING : The aphids preserved in alcohol are to be cleared for mounting and permanent storage on slides. For this purpose aphids are washed in alcohol and boiled in a water bath for 5-7 minutes; after carefully decanting off the alcohol, 10% KOH is added to the tube and specimens are boiled for 3-5 minutes for clearing. After removing the KOH, the specimens are boiled in Chloral phenol solution (saturated) for about 10 minutes. After clearing, the specimens may be mounted in Berlese medium which is composed of Chloral hydrate 20 gm., Gum accacia (powdered) 12 gm., Glycerine 12 C.C. and distilled water 40 C.C. Eastop and van Emden (1972) may be consulted as to collection, preservation and mounting techniques.

SYSTEMATIC ACCOUNT

Key to the subfamilies

- 1(2) First tarsal segments always with more than 7 ventral hairs and sometimes with a pair of dorsal hairs; head usually with a median longitudinal suture Lachninae
- 2(1) First tarsal segments with at most 7 ventral hairs; head may or may not have a median suture 3

- 3(4) Siphunculus usually elongated and densely hairy, if short and truncate then without any hair but with a pair of dorsal processii arising from abdominal tergite 7..... Grenideinae
- 4(3) Siphunculus of various shapes, if elongate then usually without hairs..... 5
- 5(6) Empodial hair always fine; subanal plate never indented or bilobed; head and pronotum usually separate..... 7
- 6(5) Empodial hair flattened or fine; subanal plate usually indented or bilobed, if entire then body usually with wax gland plates; head and pronotum usually entire..... 9
- 7(8) Siphunculus usually elongate; cauda longer than broad; p.t. usually longer than base of last antennal segment..... Aphidinae
- 8(7) Siphunculus cone-shaped; cauda broader than long; p.t. always shorter than base of last antennal segment..... Anoeciinae
- 9(10) Eyes in all morphs large or sometimes 3 faceted (then head fused with prothorax and processus terminalis very short); siphunculus truncate, elongate or clavate or ring-like, never absent, variably imbricated or reticulated; wax gland plate may be present but usually absent, body and appendages without dorsal hairs Drepanosiphinae
- 10(9) Eyes in apterae always 3-faceted, siphunculi truncate, cone shaped, ring-like or absent; wax gland plate usually present..... 11
- 11(12) Head in apterae free from pronotum, separate; frontal processii absent; antennae 5-6 segmented; dorsoapical hairs of second tarsal segments fine; cauda rounded..... Pemphiginae
- 12(11) Head in apterae fused with pronotum; apterae usually with a pair of frontal horns; antennae 2-5 segmented; dorsoapical hairs of second tarsal segments capitate; cauda weakly or distinctly knobbed or rounded..... Hormaphidinae

Subfamily I ANOECIINAE

Tribe AICEONINI

Genus 1. *Aiceona* Takahashi

1921. *Aiceona* Takahashi, R., *Spec. Rep. Formosa agric. Exp. Stn.*, 20 : 85.

Type species : *Aiceona actinodaphnis* Takahashi

Genus 1. *Aiceona* Takahashi

Body pale to pale brown. Antennae usually 6-segmented, with fine spinular imbrication on flagellum; processus terminalis 0.25 – 0.75 x as long as base of last antennal segment; primary and secondary rhinaria round to oval, protuberant, non ciliated; hairs on flagellum numerous, fine. Eyes of 3 facets in apterae, Rostrum hardly exceeding hind coxae, ultimate rostral segment of hind tarsus, with 2-8 accessory hairs. Mesothoracic furca with separated arms. Abdominal dorsum pale; alatae sometimes with dorsal segment sclerotic bands; dorsal hairs numerous, fine, marginal hairs usually in cluster; 7th and 8th tergites each with 12-16 hairs. Siphunculi on hair-bearing cone. Cauda broad, rounded with many fine hairs. Subanal plate entire. Subgenital plate not defined.

Legs pale, trochanters indistinctly fused with femora, dorsoapical hairs on second tarsal segments short, never exceeding length of claws, with acute apices; first tarsal segments with 5-8 hairs. Wings pale to fuscous, fore wings with pterostigma short, media twice-branched; hind wings with both obliques.

Sexuales alate. oviparous female without pseudosensoria on hind tibiae. Alate males may be without sclerites in abdomen, but with longer antennae fewer secondary rhinaria on III antennal segment, while 0-1 on other segments and with or without siphunculi, claspers with numerous hairs.

1. *Aiceona robustiseta* Ghosh and Raychaudhuri

1973. *Aiceona robustiseta* Ghosh, M.R. and Raychaudhuri, D.N. *Orient. Insects*, 7(4) : 553.

1988. *Aiceona robustiseta*; Ghosh, A.K. *The fauna of India and the adjacent countries, (Homoptera : Aphidoidea)* Part 4, Anoeciinae : 58.

Material examined : 10 apterae

Host plant and locality : Shangpung, Jaintia Hills, 6.xii.1975, C.U. Coll.

Distribution : India : Meghalaya (Jaintia Hills), West Bengal.

Subfamily II APHIDINAE

Key to the Tribes of the subfamily Aphidinae

- 1(2) Spiracles of abdominal segments 1 and 2 placed close together; lateral abdominal tubercles usually absent from segments 1 and 7 but variably present on abdominal segments 2-3 or completely absent; antennal tubercles often well developed Macrosiphini
- 2(1) Spiracles of abdominal segments 1 and 2 placed far apart; lateral abdominal tubercles present on segments 1 and 7, antennal tubercles usually not well-developed; antennae and body with normal hairs Aphidini

Tribe APHIDINI

Key to the Subtribes of the Tribe Aphidini

- 1(2) Lateral tubercles on abdominal segments 1 and 7 posterodorsal to the spiracles of those segments; frons with "rhopalosiphine" type of small projection just inner to the antennal sockets Rhopalosiphina
- 2(1) Lateral tubercles on abdominal segments 1 and 7 posteroventral to the spiracles of those segments; frons normal and without any projections as above Aphidina

Subtribe APHIDINA

Key to the genera of the Subtribe Aphidina

- 1(2) Hind tibiae with row of peg-like structures; lateroventral areas of abdominal segments 6 and 7 with rows of spinules forming inter connecting striae *Toxoptera*
- 2(1) Hind tibiae without such structures and rows of spinules absent *Aphis*

Genus 2. *Aphis* Linnaeus1758. *Aphis* Linnaeus, *Syst. Nat.*, (10th Ed.), 1 : 451.Type species : *Aphis sambuci* Linnaeus, 1758.Key to the species of *Aphis* Linnaeus**Apterae :**

- 1(2) u.r.s. stiletto-shaped..... *kurosawari*
 — u.r.s. may be of various shapes but never stiletto-shaped 3
- 3(4) First segment of hind tarsus usually with 3 hairs..... *nerii*
- 4(3) First segment of hind tarsus always with 2 hairs 5
- 5(6) 8th abdominal tergite with 3-8 hairs *fabaesolanella*
- 6(5) 8th abdominal tergite with only 2 hairs..... 7
- 7(8) Abdominal dorsum usually completely sclerotic..... *craccivora*
- 8(7) Abdominal dorsum pale and smooth..... 9
- 9(10) Hairs on posterior abdominal tergites longer, never less than 3 x b.d. *III*..... *longisetosa*
- 10(9) Hairs on posterior abdominal tergites shorter; about 0.5 – 1.8 x b.d. *III* 11
- 11(12) Siphunculi pale, smooth, dusky near apices; p.t. about 2.5 – 3.1 x base *IV*..... *punicae*
- 12(11) Siphunculi brown to blackish, imbricated..... 13
- 13(14) Longest hair on hind femora as long as or longer than its maximum width *citricola*
- 14(13) Longest hair on hind femora appreciably shorter than its maximum width 15
- 15(16) Second tarsal segment with only primary hairs..... *nasturtii*
- 16(15) Second tarsal segment with primary and secondary hairs..... 17
- 17(18) Hairs on 8th tergite much longer (at least 2 x b.d. *III*)..... *polygonaceae*
- 18(17) Hairs on 8th tergite shorter, hardly as long as b.d. *III*..... *gossypii*

Alatae :

- 1(4) Post-siphuncular sclerite absent though scattered sclerotic areas may be found around the stigmal pori and on other portions of the abdomen. p.t. shorter than antennal segment *III* and hardly twice as long as the base of segment *VI*, segment *III* with 4-5 secondary rhinaria distributed in a row along its entire length excepting the basal 0.3 portion, flagellum pale; cauda dark, elongate and bears 7-9 hairs..... *Aphis kurosawai* Takahashi
- 4(1) Post-siphuncular sclerites present either singly or in combination with other sclerites distributed on different portions of the abdomen. 5

- 5(6) u.r.s. shorter than h.t.2; p.t. about 2.2-2.5 times as long as the base of the segment, III antennal segment pale and with 4-5 circular secondary rhinaria in a row distributed on its entire length excepting basal 0.3 portion; dorsum of abdomen with irregularly arranged brownish sclerites; siphunculi and cauda black and the latter with about 6-8 hairs. *Aphis craccivora* Koch
- 6(5) u.r.s. longer than h.t.2..... 7
- 7(10) p.t. either subequal to or distinctly shorter than III antennal segment..... 8
- 8(9) p.t. subequal to III antennal segment and 2.1 - 2.3 times as long as the base of segment VI, segment III with 5-7 secondary rhinaria in a row distributed almost over its entire length; siphunculi brownish, about 4 - 4.5 times as long as its width at apex and nearly 1.5 times as long as pale cauda which bears 4-6 hairs. *Aphis gossypii* Glover
- 9(8) p.t. distinctly shorter than III antennal segment VI, segment III with 6-14 secondary rhinaria distributed on almost its entire length; siphunculi dark brownish, about 5-6 times as long as its width at apex and 1.8 to 1.9 times as long as cauda which bears 11-14 hairs *Aphis nerii* Boyer de Fonscolombe
- 10(7) p.t. longer than antennal segment III..... 11
- 11(12) Cauda with 15-18 hairs; antennal segment III with 8-20 secondary rhinaria distributed over its entire length, IV with 1-8 secondary rhinaria, p.t. 2.5 - 3.5 times as long as the base of the segment *Aphis fabae solanella* Theobald
- 12(11) Cauda with 4-12 hairs; antennal segment III with 4-8 secondary rhinaria, IV without any rhinaria, p.t. 2-2.8 times as long as base of segment VI 13
- 13(14) Femoral hairs of different lengths, shorter ones nearly equal to and longer ones about twice the basal diameter of antennal segment III which is with 6-8 secondary rhinaria; cauda with 9-11 hairs..... *Aphis citricola* v.d. Goot

2. *Aphis citricola* van der Goot

1912. *Aphis citricola* van der Goot, *Rec. Indian Mus.*, **13** : 175.

1990. *Aphis citricola* ; Ghosh, L. K., *Mem. Zool. Surv. India*, **17**(3) : 16.

Material examined : Numerous apterous, alatae and nymphs.

Host plant and locality : The insects were collected throughout the year from more than 70 plants under 31 natural orders from all the localities of survey. They were also collected in Y.P.T. during the months of January to May and again from August to December.

Biology : Greenish brown to brownish insects severely infest almost all the aerial parts of a plant body.

Distribution : India : Meghalaya (throughout) and almost all States in India. Elsewhere : Australia, Bhutan, Bermuda Island, China, Nepal, New Zealand, North America, Pakistan, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1972) reported apterous oviparous female from West Bengal as *Aphis spiraecola* Patch.

3. *Aphis craccivora* Koch

1854. *Aphis craccivora* Koch, *Die Pflanz, Aphiden.*, 1 : 124.

1962. *Aphis craccivora* Koch; Ghosh and Raychaudhuri, *J. Asiat. Soc. Beng.*, 4 : 101.

Material examined : Numerous apterae, alatae and nymphs.

Host plant and locality : Plants of natural orders Cucurbitaceae, Papilionaceae, Solanaceae and Umbelliferae are infested almost throughout year and in all localities of survey. They were also caught in Y.P.T. during the months of March, September and October.

Biology : Blackish brown insects severely infest all the acrial parts of the plants.

Distribution : India : Meghalaya (Throughout) and virtually cosmopolitan.

Remarks : *Aphis craccivora* Koch, commonly known as black aphid, attacks many plants and most often leguminous crops. It is a major pest of bean and cowpea. Leaves, stems and fruits of peas, beans are often severely infested and suffer heavy injury. It also infests a large number of ornamental plants, attacking leaves, flowers and other young growth and sometimes causing severe damage.

4. *Aphis fabae solanella* Theobald

1914. *Aphis fabae solanella* Theobald, *African Aphididae*, Pt. 1,4 : 325.

1961. *Aphis fabae solanella* Theobald; Eastop, *Aphididae of West Africa* : 42.

Material examined : Numerous apterae, alatae and nymphs.

Host plant and locality : Host plants of the natural orders Amaranthaceae, Compositae, Nyctaginaceae, Papilionaceae, Polygonaceae and Solanaceae are infested in almost all localities throughout the year. They were also collected in Y.P.T. on 23.12.1968, 2.2.1969, 8.2.1969 and 10.2.1969.

Biology : Blackish brown insects infest the growing shoots and both the surfaces of the leaves.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Assam, Himachal Pradesh, Sikkim, South India, Tripura, Uttar Pradesh. Elsewhere : Africa, Europe, Middle East.

5. *Aphis gossypii* Glover

1877. *Aphis gossypii* Glover, *Rep. Comm. agric. Oper. Dep.*, (1976) : 36.

1990. *Aphis gossypii* ; Ghosh, L.K., *Mem. zool. Surv. India*, 17(3) : 35.

Material examined : Many apterous, alate viviparous females and nymphs.

Host plant and locality : Collected from more than 70 plant species under 32 natural orders throughout the areas of survey, infestation occurring throughout the year, numerous alatae were also collected in Y.P.T. during the period from January to May and again from October to December.

Biology : Brownish to greenish brown insects infest all most all the acrial parts of the plant body.

Distribution : India : Meghalaya and all over India Elsewhere : Virtually cosmopolitan.

6. *Aphis kurosawai* Takahashi

1921. *Aphis kurosawai* Takahashi, *Aphididae of Formosa*, 1 : 53.

1990. *Aphis kurosawai* : Ghosh, L.K. *Mem. zool. Surv. India*, 17(3) : 41.

Material examined : Many apterous and alate viviparous females and nymphs.

Host plant and locality : *Artemisia* sp. (Compositae), Long round Road, 20.5. 1969; *Artemisia vulgaris* (Compositae), Umpling, 11.7.1969 and 26.7.1969.

Distribution : India : Meghalaya (Umpling), Assam, Manipur, Kashmir, Nagaland, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Japan, Nepal, Taiwan and Thailand.

Remarks : The species is one of the typical inhabitants of *Artemesia* spp. and characterised by stiletto-shaped ultimate rostral segment.

7. *Aphis longisetosa* Basu

1969. *Aphis longisetosa* Basu, A.N. *Orient. Insects*, 3(4) : 356.

1990. *Aphis longisetosa* : Ghosh, L.K. *Mem. zool. Surv India*, 17(3) : 45.

Material examined : Many apterous viviparous females and nymphs.

Host plants : *Rubus ellipticus* and *Rubus rosaefolia* (Rosaceae).

Distribution : India : Meghalaya : (Shillong), Arunachal Pradesh, Himachal Pradesh, Manipur, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Remarks : The species is characterised by its longer dorsal body hairs about 2.0 - 2.5 times as long as b.d. III.

8. *Aphis nasturtii* Kaltenbach [Fig. 18]

1843. *Aphis nasturtii* Kaltenbach, *Mongr. Fam. pflanz.*, 76.

1990. *Aphis nasturtii* : Ghosh, L.K. *Mem. zool. Surv India*, 17(3) : 45.

Material examined : Many apterous, viviparous females and nymphs.

Host plant and locality : Infested 17 host plants under 15 natural orders, during all the seasons and all the localities of survey. They were also collected in Y.P.T. during the period from January to February and again from September to October; oviparous females were collected from an unidentified host of Natural Order Rhamnaceae, Patharmukhrah on 18.12.1968 and males were collected in Y.P.T. on 26.1.1969 and 2.2.1969.

Biology : Greenish brown insects infest almost all the aerial parts of a plant body.

Distribution : India : Meghalaya (Patharmukhrah), Arunachal Pradesh, Haryana, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : America, Europe, Great Britain, Middle East, Nepal, Pakistan, Taiwan.

Remarks : So far only one alate male of this species has been known from India. Gleiss (1966) has given a detailed description of oviparac and sexuales from Germany.

9. *Aphis nerii* Boyer de Fonscolombe

1941. *Aphis nerii* Boyer de Fonscolombe, *Ann. Soc. ent. Fr.*, 10 : 179.

1990. *Aphis nerii* : Ghosh, L.K. *Mem. zool. Surv. India*, 17(3) : 48.

Material examined : Many apterae, and alatae and nymphs.

Host plant and locality : *Asclepias currasavica* (Asclepiadaceade), Umpling, 29.12.1968; *Nerium odorum* (Apocynaceae), Dhankheti, 30.7.1969; and vagrant alate on *Lycopersicum esculentum* (Solanaceae), Polo ground, 19.5.1969.

Biology : Brownish insects infest growing shoots and both the surfaces of the leaves.

Distribution : India : Meghalaya (Umpling, Dhankheti), West Bengal and all over India. Elsewhere : Cosmopolitan.

10. *Aphis polygonaceae* Matsumura

1917. *Aphis polygonaceae* Matsumura, *Journ. Coll. Agric. Tohoku Imp. Univ.*, 7 : 351.

1969. *Aphis polygonaceae*: Chowdhuri, A.N., Basu, R.C., Chakrabarti and Raychaudhuri, D.N. *Sci. Cult.*, 34 : 133-134.

1980. *Aphis polygonaceae*: Raychaudhuri, D.N. (ed.). Aphids of Northeast India and Bhutan. *The Zoological Society, Calcutta* : 1-521.

Material examined : 4 apterae and nymphs, on *Rumex* sp. Shillong, 5.1.1969, A.K. Ghosh.

Biology : The aphids were seen infesting the undersurface of the leaf.

Distribution : India : Meghalaya (Shillong), Himachal Pradesh. Elsewhere : Japan.

11. *Aphis punicae* Passerini

1863. *Aphis punicae* Passerini, *Arch. Zool. Asiat. Fisial.*, 2 : 46.

1957. *Aphis punicae* Passerini; Bodenheimer and Swirski, *Aphidoidea of Middle East* : 215.

1990. *Aphis punicae* Passerini; Ghosh, L.K., *Mem. zool. Surv. India*, 17(3) : 67.

Material examined : 2 apterae.

Host plant and locality : *Punica granatum* (Punicaceae), Umpling, 5.1.1969.

Biology : Greenish brown insects infest the undersurface of the leaves.

Distribution : India : Meghalaya (Umpling), and other parts of India. Elsewhere : East Africa, Southern Europe, France, Italy, Morocco, Pakistan, Spain, Switzerland and U.S.S.R.

Genus 3. *Toxoptera* Koch

1857. *Toxoptera* Koch, *Die pflanzen, Aphiden*, 3 : 253.

Type species : *Aphis aurantii* Boyer de Fonscolombe, 1841

Key to the species of genus *Toxoptera* Koch

- 1(2) Siphunculi much shorter, maximally about half as long as cauda; F.T.C. 3,3,2.....
.....*odinae* van der Goot
- 2(1) Siphunculi as long as or longer than cauda; F.T.C. 3,3,3 3
- 3(4) Longest hair on antennal segment III shorter than b.d. III, siphunculi sparsely imbricated;
cauda with 9-17 hairs *aurantii* (B.d.F)
- 4(3) Longest hair on antennal segment III as long as to 1.5 times as long as b.d. III: siphunculi
heavily imbricated, cauda with 25-36 hairs *citricidus* (Kirk.)

Alate viviparous female :

- 1(4) Body 5-10 times as long as siphunculi which are about 1.2-1.6 times as long as cauda; eighth abdominal tergite usually bears only 2 hairs; p.t. 3.5-5.2 times as long as the base of the segment, longest hair on III antennal segment less than twice as long as the basal diameter of the segment 2
- 2(3) Small insects, about 1.5 - 1.8 mm long; cauda with 8-16 hairs; III antennal segment except the very base, almost pale and bears 4-8 secondary rhinaria, IV antennal segment without any secondary rhinaria, longest hair on antennal segment III usually not longer than the basal diameter of the segment.....
..... *Toxoptera aurantii* (Boyer de Foscolombo)
- 3(2) Large insects, about 2.2 - 2.5 mm long; cauda with 20-35 hairs; III antennal segment except the very base, black and bears 8-20 secondary rhinaria, IV antennal segment with 0-5 secondary rhinaria, longest hair on III antennal segment always longer than the basal diameter of the segment..... *Toxoptera citricidus* (Kirkaldy)
- 4(1) Body 13-20 times as long as siphunculi which are about 0.5-0.7 times as long as cauda; eighth abdominal tergite bears 3-8 hairs; p.t. 2.5-3.2 times as long as the base of the segment, longest hair on III antennal segment never less than twice as long as basal diameter of the segment..... *Toxoptera odinae* (van der Goot)

12. *Toxoptera aurantii* (Boyer de Fonsolombe) [Fig. 19]

1841. *Aphis aurantii* Boyer de Fonscolombe, *Annals. Soc. ent. Fr.* **10** : 178.

1976. *Toxoptera aurantii* (Boyer de Fonsolombe); Mandal, Basu, R. C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(4) : 536.

Material examined : Numerous alatae and Nymphs.

Host plant and locality : Infest a wide range of host plants under different natural orders. Infestation can be noticed throughout the year in all localities of survey; they were also collected in Y.P.T. on 21.12.1968.

Biology : Blackish brown insects infest almost all the aerial parts of a plant body.

Distribution : All over India. Elsewhere : Virtually cosmopolitan.

13. *Toxoptera citricidus* (Kirkaldy)

1907. *Myzus citricidus* Kirkaldy, *Proc. Hawaii ent. Soc.*, **1** : 100.

1976. *Toxoptera citricidus* (Kirkaldy) : Mondal, Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(4) : 538.

Material examined : Numerous apterae, alatae and nymphs.

Host plant and locality : Infest mostly the plants of Natural order Rutaceae and Urticaceae but these insects have also been noticed on other Natural orders like Fagaceae, Passifloraceae and Tornstroemiaceae. Infestations occur almost all the year round and in all the localities of survey. They have also been collected in Y.P.T. during the months of January and February.

Biology : Dark brownish insects infest the growing shoots and both the surfaces of the leaves.

Distribution : India : Meghalaya (throughout), Orissa, South India. Elsewhere : Ethiopian region, Fiji, Hawaii, Japan, Java, Korea, Malayasia, Nepal, New Guinea, New South Wales, New Zealand, Philippines, Queensland, South Africa, South Australia, Sri Lanka, Sumatra, Taiwan, Thailand, Victoria and West Australia.

14. *Toxoptera odinae* (van der Goot)

1917. *Toxoptera odinea* van de Goot, *Contr. Faune Indes neerl.*, 1(3) : 113.

1976. *Toxoptera odinae* (van der Goot); Mondal, Basu, R.C. and Raychaudhuri, D.N., *Orient Insects*, 10(4) : 537.

Material examined : Many apterous, alate viviparous females and nymphs.

Host plant and locality : Plants of Natural order Rutaceae are generally infested. Infestation can be noticed all round the year in different corners of Shillong. They were also collected in Y.P.T. during December to January.

Biology : Blackish brown insects infest all the aerial parts of the plant.

Distribution : India : Meghalaya (Shillong), and all other parts of India. Elsewhere : China, Java, Malaysia, Nepal, Philippines, South America, Sri Lanka, Sumatra and Taiwan.

Subtribe Rhopalosiphina

Key to the genera of the Subtribe Rhopalosiphina

- 1(2) Siphunculus short, about 0.06 times as long as body..... ***Hyalopterus***
- 2(1) Siphunculus long, more than 0.07 times as long as body 3
- 3(4) Dorsum of abdomen with spinules arranged in polygons, each polygon enclosing a few spinules..... ***Rhopalosiphum***
- 4(3) Dorsum of abdomen without such spinules..... 5
- 5(6) Siphunculus short and thick; secondary rhinaria in alatae protuberant..... ***Melanaphis***
- 6(5) Siphunculus rather long; Secondary rhinaria in alatae normal 7
- 7(8) Cauda pale, medially constricted, usually with 4 medial hairs; alatae with Media of forewing twice-branched; hind wing with 1 oblique vein..... ***Hysteroneura***
- 8(7) Cauda not as above; alatae with Media of fore wings once-branched; hind wing with 2 oblique veins ***Schizaphis***

Genus 4. *Hyalopterus* Koch

1854. *Hyalopterus* Koch, *Die pfl. Aphiden*, 1 : 16.

Type species : *Aphis pruni* Geoffroy, 1762.

Key to the species of Hyalopterus Koch

Alate viviparous female :

- 1(2) U.r.s. narrow, 0.12 mm long; secondary rhinaria distributed on III antennal segment only; p.t. 2.2 - 3 times as long as the base of the segment; siphunculi 0.6 - 0.7 times as long as cauda *atriplicis*
- 2(1) U.r.s. broad, 0.09 mm long; secondary rhinaria distributed on a.s. III, IV and V, p.t. about 4 times as long as base of VI; siphunculi about 0.3 times as long as cauda *pruni*

15. *Hyalopterus atriplicis* (Linnaeus) [Fig. 20]

1761. *Aphis atriplicis* Linnaeus, *Fauna Succica* : 262.

1927. *Hyalopterus atriplicis* (Linnaeus); Theobald, *Aphididae of Great Britain*, 2 : 26.

Material examined : 1 aptera, 4 alatae and 1 nymph.

Host plant and locality : *Chenopodium* sp. (Chenopodiaceae), Happy Valley, 1.12.1969.

Biology : Brown specimens were collected from both the surfaces of the leaves.

Distribution : India : Meghalaya (Happy Valley); Assam, West Bengal, Uttar Pradesh. Elsewhere : Middle East, Europe, North America, Far East.

16. *Hyalopterus pruni* (Geoffroy)

1762. *Aphis pruni* Geoffroy, *Historie Abergée des Insectes oui Sc. trouvent aux Environs de Paris*, 1 : 497.

1980. *Hyalopterus pruni* (Geoffroy); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 60.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 1.9.1969.

Host plant : *Phragmites* sp, *Poa* sp. (Gramineae) and *Prunus* sp. (Rosaceae).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Manipur, Mysore, Nagaland, Tamil Nadu, Uttar Pradesh, West Bengal. Elsewhere : Africa, Afganistan, Cyprus, Iraq, Italy, Pakistan, Spain, United Kingdom and Yugoslavia.

Genus 5. *Hysteroneura* Davis

1919. *Hysteroneura* Davis, *Canad. Ent.*, 51 : 263.

Type species : *Siphonophora setariae* Thomas, 1878

17. *Hysteroneura setariae* (Thomas) [Fig. 21]

1878. *Siphonophora setariae* Thomas, *Bull. Ill. St. Lab. nat. Hist.*, 1(2) : 5

1980. *Hysteroneura setariae* (Thomas); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 61.

Material examined : 16 apterous and 8 alate viviparous females and 10 nymphs.

Host plant and locality : *Panicum plicatum* (Gramineae), Dhankheti, 26.8.1969; *Poa* sp. (Gramineae), Borapani, 12.8.1969, Jowai, 9.9.1969; *Prunus* sp. (Rosaceae), Nongrim Hill, 12.12.1968 (Oviparous forms along with viviparous ones); *Symplocos* sp. (Symplococaceae), Cherrapunji, 20.12.1968 and in Y.P.T. 22.12.1968.

Biology : Greenish to dark brownish forms infest the very growing shoots, under and upper surfaces of the leaves and the young growing curled leaves. Plants of N.O. Gramineae and Rosaceae are generally infested.

Distribution : India : Meghalaya (Borapani, Cerrapunji, Dhanketi, Nongrim Hills), and all over country. Elsewhere : Africa, America, China, Eastern Islands, Fiji, Hawaii, Japan, Korea, Malayasia, Nepal, New Guinea, Philippines, Solomon islands, Taiwan, Thailand and Vietnam.

Remarks : This species has been recorded from South India (David *et al.*, 1968) and has also been found in the north eastern states of India but so far the sexuales had not been reported from India, Palmer (1952) has given illustrations and short descriptions of the sexuales from U.S.A. under the name *Aphis setariae* Thomas.

Genus 6. *Melanaphis* van der Goot

1917. *Melanaphis* van der Goot, *Contr. Fauna Indes. Neeri.*, 1(3) : 60.

Type species : *Aphis bambusae* Fullaway, 1910.

Key to the species and subspecies of *Malanaphis*

- 1(2) Longest hair on midfemora longer than its middle width..... 3
- 2(1) Longest hair on mid femora shorter than its middle width..... 5
- 3(4) Marginal hair on anterior abdominal segments always less than 3, caudal hairs 8-10.....
..... *meghalayensis* *meghalayensis*
- 4(3) Marginal hair on anterior abdominal segments 3-5; cauda usually with 5-7 hairs.....a
..... *arundinariae*
- 5(6) Longest hair on anterior abdominal tergites always longer than b.d. III, cauda with 15-21 hairs..... *donacis*
- 6(5) Longest hair on anterior abdominal tergites shorter than or atmost as long as b.d. III; cauda usually with 9-17 hairs..... *sacchari*

18. *Melanaphis arundinariae* (Takahashi) [Fig. 22]

1937. *Aphis arundinariae* Takahashi, *Philipp. J. Sci.*, 63 : 12.

1962. *Melanaphis arundinariae* (Takahashi); Goa, *Plant Protec. Bull. Taiwan*, 4(3) : 106.

Material examined : Numerous apterae and 3 alatae.

Host plant and locality : *Bambusa* sp. (Gramineae), Nongrim Hill 16.12.1968, Cherrapunji, 21.12.1968, Mulki 4.2.1968, Dhankheti, 13.7.1969, Kench's trace, 30.7.1969.

Biology : Blackish brown insects were seen to infest the leaves, growing shoots and sometimes also the subarial region of host.

Distribution : India : Meghalaya (Shillong, Cherrapunji, Mulki, Dhankheti), West Bengal. Elsewhere : Far East.

Remarks : Specimens from Shillong have short siphunculi and cauda with more hair.

19. *Melanaphis donacis* (Passerini)1860. *Longiunguis donacis* Passerini, *Gli Afidi* : 309.1980. *Melanaphis donacis* (Passerini); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of N.E. India and Bhutan : 65.*Material examined* : 4 apterae, Shillong, 22.12.1968.*Host plant* : *Arundo donax* (Graminae)*Distribution* : India : Meghalaya (Shillong), Tamil Nadu. Elsewhere : Mediterranean region excepting Africa.20. *Melanaphis meghalayensis meghalayensis* Raychaudhuri and Banerjee1974. *Melanaphis meghalayensis meghalayensis* Raychaudhuri, D.N. and Banerjee, C., *Orient. Insects*, 8(3) : 376.1980. *Melanaphis meghalayensis meghalayensis*; Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan, 65.*Material examined* : Many apterae and nymphs. Kench's trace, 12.12.1968.*Host plant* : Unidentified Bamboo (Gramineae).*Distribution* : India : Meghalaya : (Kench's trace) and West Bengal.21. *Melanaphis sacchari* (Zehntner)1897. *Aphis sacchari* Zehntner, *Arch. Suikerind Ned. Ind.*, 5 : 551.1958. *Longiunguis sacchari* (Zehntner), Eastop, *Aphididae of East Africa* : 81.*Material examined* : Numerous apterae, alatae and nymphs.*Host plant and locality* : *Saccharum officinarum* (Gramineae), Nongrim Hill, 12.12.1968, Laitumkhrah, 16.12.1968, 26.12.1968, Kench's trace, 29.12.1968.*Biology* : Greenish Yellow insects infest growing shoots and lower portion of the stem besides both the surfaces of the leaves.*Distribution* : India : Meghalaya (Nongrim Hill, Kench's trace), widely distributed throughout the country. Elsewhere : Cosmopolitan.Genus 7 *Rhopalosiphum* Koch1854. *Rhopalosiphum* Koch, *Die pflanzen. Aphiden*, 1 : 23.*Type species* : *Aphis nymphaeae* Linnaeus, 1761.*Key to the species f genus Rhopalosiphum Koch**Apterous viviparous females* :1(2) Antennae 5-segmented; abdominal dorsum densely covered with long and fine hairs.....
.....*rufiabdominalis*

2(1) Antennae 6-segmented; abdominal dorsum not with such hairs..... 3

- 3(4) Processus terminalis about 2.5 times as long as base VI; body about 10-15 times as long as siphunculi *maidis*
- 4(3) Processus teeminalis never less than 3.9 times as long as base VI; body at the best 8.5 times than the siphunculi 5
- 5(6) Siphunculi distinctly swollen distally, dorsal abdominal hairs fine..... *nymphaeae*
- 6(5) Siphunculi rather cylindrical; dorsal abdominal hairs with blunt apices *padi*

Alate viviparous females :

- 1(2) Antennae 5-segmented; p.t. never less than 3.0 times as long as and may be upto about 7.0 times as long as base of segment V and 1.03-1.49 times as long as segment III.....
..... *rufiabdominalis*
- 2(1) Antennae 6-segmented 3
- 3(4) Processus terminalis about 1.70-2.38 times as long as base of segment VI and always shorter than segment III..... *maidis*
- 4(3) Processus terminalis never less than 3.0 times as long as and at most upto 5.23 times as long as base of segment VI and always longer than segment III..... 5
- 5(6) Siphunculi cylindrical, body about 8.53-8.91 times as long as siphunculi; processus terminalis about 4.62-5.23 times as long as base of segment VI, segment III with 14-19, IV with 1-9 and V with 1-6 secondary rhinaria; cauda 0.52-0.63 times as long as siphunculi.....
..... *padi*
- 6(5) Siphunculi with a basal cylindrical stem and a distal swollen portion; body about 5.59-7.95 times as long as siphunculi; processus terminalis about 3.45-3.88 times as long as base of segment VI; segment III with 14-27, IV with 0-6 and V with 2-8 secondary rhinaria.....
..... *nymphaeae*

22. *Rhopalosiphum maidis* (Fitch)

1856. *Aphis maidis* Fitch, *Trans. N.Y. agric. Soc.*, 15 : 531.

1980. *Rhopalosiphum maidis* (Fitch); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 69.

Material examined : 17 apterae, 6 alatae and 4 nymphs.

Host plant and locality : *Cardamine hirsuta* (Cruciferae), Laban, 29.1.1969; Grass (Gramineae), Kench's trace, 29.12.1968; *Hordeum vulgare* (Gramineae), Umpling, 29.12.1968; *Poa* sp. (Gramineae), Jowai, 29.7.1969; and *Zea mays* (Gramineae), Kench's trace, 8.12.1968.

Biology : Yellow to green specimens were collected from the upper and undersurfaces of the leaves surrounding the growing shoots and also from roots of the hosts. Sometimes ants were seen in association.

Distribution : Cosmopolitan.

23. *Rhopalosiphum nymphaeae* (Linnaeus) [Figs. 23, 24]

1761. *Aphis nymphaeae* Linnaeus, *Fauna Suecica*, 2 : 260.

1980. *Rhopalosiphum nymphaeae* (Linnaeus); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 69.

Material examined : 4 alate viviparae, 5 apterous oviparous females and 5 alate males.

Host plant and locality : *Prunus persica* (Rosaceae), Kench's trace, 12.12.1968; males from *Prunus persica* (Rosaceae) and *Curcuma longa* (Zingiberaceae), Shillong, 29.12.1968; oviparae and males from *Prunus* sp. (Rosaceae), Shillong, 12.12.1968.

Biology : Deep brown to blackish brown specimens were collected from the upper and undersurfaces of the leaves.

Distribution : Cosmopolitan.

Remarks : Theobald (1927) has given descriptions of males and oviparae from Europe and Richards (1960) also described the oviparae in detail from Canada.

24. *Rhopalosiphum padi* (Linnaeus)

1758. *Aphis padi* Linnaeus, *Syst. Nat.* (10th ed.) 1 : 45.

1980. *Rhopalosiphum padi* (Linnaeus) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 70.

Material examined : Many apterous and 3 alate viviparous females and nymphs.

Host plant and locality : Insects were seen to infest quite a few host plants of different natural orders. Infestation could be noticed all round the year and in all localities of survey. A few vagrant alatae were collected from some unusual hosts like *Adonostoma viscosum* (Compositae), *Lycopersicum esculantum* (Solanaceae), *Thunbergiana coccinea* (Acanthaceae).

Biology : Green to black specimens were collected from upper and under surfaces of the leaves.

Distribution : Cosmopolitan.

25. *Rhopalosiphum rufiabdominalis* (Sasaki)

1899. *Toxoptera rufiabdominalis* Sasaki, *Rep. Hokkaido agric. Exp. Sta.*, 17 : 202.

1980. *Rhopalosiphum rufiabdominalis* (Sasaki); Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 71.

Material examined : Many alatae viviparous females.

Host plant and locality : Quite a few hosts were noticed to be infested by alate forms only in the different localities of Shillong but during the year 2 alatae were collected in Y.P.T. in the months of December and February.

Biology : Blackish brown insects were collected from under and upper surfaces of the leaves.

Distribution : Cosmopolitan.

26. *Rhopalosiphum yoksumi* Ghosh, Banerjee and Raychaudhuri

1971. *Rhopalosiphum Yoksumi* Ghosh, Banerjee and Raychaudhuri, *Proc. zool. Soc., Calcutta*, **24** : 102.
 1980. *Rhopalosiphum Yoksumi* Ghosh, *et al.*, Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 71.

Material examined : 5 apterae and 2 alatae.

Host plant : Rasaceous and Gramineous plants. Shillong C.U. coll.

Distribution : India : Meghalaya and Sikkim.

Genus 8. *Schizaphis* Börner

1931. *Schizaphis* Börner, *Anz. Schadlingsk.*, **7** : 10.

Type species : *Aphis graminus* Rondani, 1847.

Key to species of *Schizaphis* Börner

- 1(2) Cauda somewhat pale, elongate; siphunculi never more than twice cauda..... *graminum*
 2(1) Cauda dark, constricted at about its middle and with a bulbous apex; siphunculi never less than twice cauda..... 3
 3(4) All dorsal abdominal hairs either long or on anterior tergite there may be some short and blunt hairs mixed with longer hairs..... *punjabipyri*
 4(3) Anterior tergal hairs on abdominal dorsum minute and blunt but hairs on 7th and 8th tergites much longer and conspicuous..... *rotundiventris*

27. *Schizaphis graminum* (Rondani)

1852. *Aphis graminum* Rondani, *Nouv. Ann. Sci. Nat., Bologna*, **6**(3) : 10.
 1980. *Schizaphis graminum* (Rondani); Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 72.

Material examined : 1 aptera only.

Host plant and locality : *Poa* sp. (Gramineae), Nongrim Hill, 25.1.1969.

Biology : Greenish brown insect was seen on the underface of the leaf.

Distribution : India : Meghalaya (Shillong); Assam, West Bengal, Uttar Pradesh. Elsewhere : Australia, Ceylon, Canada, Egypt, South Africa.

28. *Schizaphis punjabipyri* (Das)

1918. *Toxoptera punjabipyri* Das, *Mem. Indian Mus.*, **6**(4) : 198.
 1980. *Schizaphis punjabipyri* (Das) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 73.

Material examined : Many apterae, 11 alate males and many nymphs, Shillong, 25.1.1969.

Host plant : *Cynodon* sp. (Gramineae).

Distribution : India : Meghalaya (Shillong), Himachal Pradesh, West Bengal. Elsewhere : Pakistan.

29. *Schizaphis rotundiventris* (Signoret)

1860. *Schizaphis rotundiventris* Signoret (complete reference could not be traced).

1980. *Schizaphis rotundiventris* (Signoret); Raychaudhuri, D. N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 74.

Material examined : Many apterae and nymphs.

Host plant : *Cyperus* spp. (Cyperaceae).

Distribution : India : Meghalaya (Shillong), Assam. Elsewhere : Far East, Africa, Australia.

Remarks : Eastop (1966) suggested that there is a complex of races of *cyperi* and the oldest name for this complex is probably *Schizaphis rotundiventris* (Signoret).

Tribe MACROSIPHINI

Key to the genera of the Tribe Macrosiphini

- 1(2) Siphunculi with pore placed obliquely at the apical 1/3; antennae 5-segmented; cauda typically thumb-shaped, constricted at very base ***Acutosiphon***
- 2(1) Siphunculi variously shaped but never as above..... 3
- 3(4) Tarsi atrophied and without claws; F.T.C. 1,0,0; apterae without secondary rhinaria
..... ***Shinjia***
- 4(3) Tarsi normal and with claws; F.T.C. variable but never 1,0,0..... 5
- 5(6) Postsiphuncular abdominal segments with prominent supracaudal process..... 7
- 6(5) Supracaudal process absent..... 9
- 7(8) Only 8th abdominal tergite bears a hair bearing process ***Cavariella***
- 8(7) Each of tergites 7 & 8 with distinct process..... ***Tricaudatus***
- 9(10) Cauda not or hardly longer than wide at base 11
- 10(9) Cauda distinctly longer than wide at base 15
- 11(12) Siphunculi very short; cauda rather oval..... ***Cryptosiphum***
- 12(11) Siphunculi subcylindrical, longer than wide..... 13
- 13(14) Head with spinal tubercles; venter of head sparsely spinulose ***Dysaphis***
- 14(13) Head without such spinal tubercles; venter of head rather smooth siphunculi stout, somewhat conical, dorsal abdominal hairs at most twice as long as b.d. III..... ***Brachycaudus***
- 15(16) Spinules in transverse rows present on second tarsal segment 17
- 16(15) Spinules in transverse rows absent on second tarsal segment..... 19
- 17(18) Ultimate rostral segment with spinules in transverse rows; head with a median frontal prominence; hind tibiae of nymphs spinulose..... ***Pseudoacyrthosiphon***

- 18(17) Ultimate rostral segment without such spinules; siphunculi distinctly swollen; u.r.s. hairy; apterae with secondary rhinaria on antennal segment III, midthoracic furca stalked *Amphorophora*
- 19(20) Some of the secondary hairs on u.s.r. as long as or longer than primary hairs 21
- 20(19) Secondary hairs on u.r.s. usually much shorter than primary hairs 25
- 21(22) Ultimate rostral segment extends beyond 2nd abdominal segment, about twice as long as h.t. 2 and with many secondary hairs *Paczoskia*
- 22(21) Ultimate rostral segment rather shorter, almost upto 1.5 times as long as h.t. 2, with less secondary hairs 23
- 23(24) Siphunculi reticulated with isodiametrical cells; secondary rhinaria protuberant; dorsal abdominal hairs normal in shape *Macrosiphoniella*
- 24(23) Siphunculi not reticulated; secondary rhinaria not protuberant; dorsal abdominal hairs fan-shaped *Pleotrichophorus*
- 25(26) Siphunculi reticulated 27
- 26(25) Siphunculi not reticulated but sometimes a few interconnecting striae present near the apical flange 33
- 27(28) Apterae usually without secondary rhinaria; if however, such rhinaria present, dorsum of abdomen reticulated and F.T.C. 4,4,4; abdominal dorsum with hair-bearing tubercles on spinopleural area *Macromyzus*
- 28(27) Apterae without secondary rhinaria 29
- 29(30) Siphunculi reticulated with somewhat transversely elongate cells; head in apterae with spinules on dorsum *Perillaphis*
- 30(29) Siphunculi reticulated with isodiametrical cells 31
- 31(32) Secondary rhinaria on antennal segment III nonprotuberant; F.T.C. usually 3,3,3 rarely 4,4,4; abdominal dorsum without hair bearing sclerites *Macrosiphum*
- 32(31) Secondary rhinaria on antennal segment III protuberant; F.T.C. usually 5,5,5; abdominal dorsum usually with hair-bearing sclerites *Uroleucon*
- 33(34) Siphunculi warty 35
- 34(33) Siphunculi not warty 39
- 35(36) Siphunculi tapering to a point at apex and with an oblique pore situated much basad to apex *Acutosiphon*
- [see also 1(2)]
- 36(35) Siphunculi never as above 37
- 37(38) Primary rhinaria in apterae star-shaped, in alatae with finger-like processi; antennal tubercles high with a long finger-like projection; spiracular pores on 6th and 7th tergites longer than those on 1-5 tergites *Akkaia*

- 38(37) Primary rhinaria not as above; spiracular pores normal, spiracles on 6th and 7th segments not different from those on other abdominal segments; siphunculus slightly narrow at apex with apical pore..... *Vesiculaphis*
- 39(40) Dorsal abdominal hairs with apices like an opened fan; u.r.s. stiletto-shaped; apterae without secondary rhinaria, alatae with such rhinaria on antennal segment III, IV and sometimes also on V; siphunculi slightly clavate near apex..... *Coloradoa*
- 40(39) Dorsal abdominal hairs not as above..... 41
- 41(42) Dorsum of abdomen in apterae with a reticulate pattern..... 43
- 42(41) Dorsum of abdomen in apterae without such pattern..... 47
- 43(44) Siphunculi with a preapical circumcission; apterae with secondary rhinaria on antennal segment III..... *Sinomegoura*
- 44(43) Siphunculi without preapical circumcission; apterae usually without secondary rhinaria ... 45
- 45(46) Dorsal abdominal hairs in apterae with widely expanded apices; siphunculi puffed near apex and densely spinulose..... *Pentalonia*
- 46(45) Dorsal abdominal hairs in apterae short and blunt, not as above; siphunculi not with spinular imbrications..... *Micromyzus*
- 47(48) Head in apterae with processi either at middle or on lateral frontal tubercles..... 49
- 48(47) Head in apterae without such process 51
- 49(50) Head in apterae rugose; primary rhinaria nonciliated..... *Tuberocephalus*
- 50(49) Head in apterae densely warty dorsally and ventrally..... *Diphorodon*
- 51(52) Segment I usually with finger-like projection from the inner apex; apterae without secondary rhinaria..... 53
- 52(51) Segment I never with such projection..... 55
- 53(54) Primary rhinaria nonciliated; ocular tubercles indistinct; abdominal dorsum in apterae areolated with spinules..... *Tuberocephalus*
..... [see also 65(66)]
- 54(53) Primary rhinaria ciliated; ocular tubercles distinct; abdominal dorsum in apterae pale and smooth..... *Matsumuraja*
- 55(56) Apterae mostly with secondary rhinaria; sometimes antennal segment III in apterae incrassate near base and then secondary rhinaria may be absent..... 57
- 56(55) Apterae without secondary rhinaria..... 71
- 57(58) Dorsum of head in apterae covered with warts or spinules..... 59
- 58(57) Dorsum of head in apterae usually not as above but may be slightly wrinkled..... 63
- 59(60) Antennae shorter than body; siphunculi nearly cylindrical; postsiphuncular sclerites absent; dorsum of head in apterae with rounded..... *Indomyzus*

- 60(59) Antennae as long as or longer than body 61
- 61(62) Apterae with a horseshoe-shaped patch on abdominal dorsum; median frontal prominence in apterae absent..... *Neomyzus*
- 62(61) Apterae without such patch on abdominal dorsum; median frontal prominence low but distinct.....*Neomegouropsis*
- 63(64) Apterae without any median frontal prominence..... 65
- 64(63) Apterae with median frontal prominence..... 67
- 65(66) Frontal sinus usually 'V', shaped in apterae possessing secondary rhinaria restricted only near base of antennal segment III..... *Acyrtosiphon*
- 66(65) Frontal sinus not as above; secondary rhinaria in apterae distributed over basal 0.7 portion of antennal segment III; abdominal dorsum in apterae smooth, variably pigmented but always with a pale area in front of siphunculi.....*Impatientinum*
- 67(68) Dorsal body hairs thick with spatulate to capitate apices arising from strong tuberculate sockets *Cryptomyzus*
- 68(67) Dorsal body hairs never as above; siphunculi cylindrical or sub-cylindrical 69
- 69(70) Cauda bears 2-4 very short hairs near apex; wing veins slightly bordered or blackish.....
.....*Rhodobium*
- 70(69) Caudal hairs more or less of equal length; wing veins rather normal *Metopolophium*
- 71(72) Dorsum of head in apterae usually smooth or may be slightly wrinkled..... 73
- 72(71) Dorsum of head in apterae spinulose or warty..... 85
- 73(74) Dorsal abdominal hairs in apterae with distinct capitate apices *Capitophorus*
- 74(73) Dorsal abdominal hairs in apterae not with capitate apices..... 75
- 75(76) Siphunculi shorter than cauda..... 77
- 76(75) Siphunculi longer than cauda 81
- 77(78) Siphunculi barrel-shaped, dorsum of abdomen in apterae with pigmented transverse segmental bands; cauda triangular.....*Brevicoryne*
- 78(77) Siphunculi usually not barrel-shaped; if so, cauda not triangular..... 79
- 79(80) Mid-thoracic furca in apterae with separate arms; wing veins thick and bordered brown
..... *Semiaphis*
- 80(79) Mid-thoracic furca in apterae with a broad base.....*Hayhurstia*
- 81(82) Siphunculi with a distinct preapical circumssion; alatae with tuberculate secondary rhinaria; abdominal dorsum pale.....*Subovatomyzus*
- 82(81) Siphunculi without pre-apical circumssion..... 83

- 83(84) Mid-thoracic furca in apterae sessile; alatae with secondary rhinaria on antennal segment III, IV and some times also on V *Lipaphis*
- 84(83) Mid-thoracic furca in apterae with separate arms; Siphunculi distinctly clavate on about distal half *Loisomaphis*
- 85(86) Pore in siphunculi obliquely placed and siphunculi often with hairs..... 87
- 86(85) Pore in siphunculi not obliquely placed and Siphunculi without hairs..... 89
- 87(88) Siphunculi devoid of apical flange; dorsum of head in apterae spinulose and with median frontal prominence *Xenomyzus*
- 88(87) Siphunculi with distinct apical flange, hind wing with one oblique vein
..... *Tricosiphonaphis*
- 89(90) Median frontal prominence distinct in apterae..... 91
- 90(89) Median frontal prominence absent in apterae 93
- 91(92) Siphunculi without preapical circumcission; alatae with secondary rhinaria only on antennal segment III; primary rhinaria non-ciliated *Aulacorthum*
- 92(91) Siphunculi with preapical circumcission; alatae with secondary rhinaria on antennal segment III-V; primary rhinaria ciliated *Neohyalomyzus*
- 93(94) Antennal segment I in apterae with inner apices scabrous and strongly angulated inward; abdominal dorsum wrinkled; siphunculi swollen on the inner margin at about its middle.....
..... *Hyalomyzus*
- 94(93) Antennal segment III in apterae with inner apices neither scabrous nor angulated as above; abdominal dorsum usually smooth, without postsiphuncular sclerite..... 95
- 95(96) Alatae with secondary rhinaria somewhat protuberant; dorsum of abdomen in apterae completely pale or completely dark *Myzus*
- 96(95) Alatae with secondary rhinaria not protuberant; dorsum of abdomen in apterae with a broad horseshoe-shaped patch..... *Neomyzus*

Genus 9. *Acutosiphon* Basu, Ghosh and Raychaudhuri

1970. *Acutosiphon* Basu, Ghosh and Raychaudhuri, *Proc. zool. Soc. Calcutta*, **23** : 84.

Type species : *Acutosiphon obliquoris* Basu, R.C., Ghosh, A.K. and Raychaudhuri, D.N., 1970.

30. *Acutosiphon obliquoris* Basu R.C., Ghosh, A.K. and Raychaudhuri D.N. [Fig. 26]

1970. *Acutosiphon obliquoris* Basu and Raychaudhuri, A.K. and Raychaudhuri, D.N., *Proc. zool. Soc., Calcutta*, **23** : 84.

1976. *Acutosiphon obliquoris* : Ghosh, M.R., Basu R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(2) : 269.

Material examined : Many apterous and alate viviparous females, many alate males and nymphs.

Host plant and locality : *Cotula* sp. (Compositae), Cherrapunji, 3.6.1.69.

Biology : Dark brown specimens were collected from undersurface of the leaves.

Distribution : India : Meghalaya (Cherrapunji), Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Nepal, Pakistan.

Remarks : The genus was originally characterised by the presence of 5-segmented antennae but one apterous, all the alate viviparous females and alate males show 6-segmented antennae. The antennae of alate viviparous females are longer than those of the apterae little over 0.5 times as long as the body, III antennal segment of alatae with 27-30, IV with 12-17 and V with 1-4 secondary rhinaria, p.t. 0.8 times to as long as the base of the segment; the shape of the siphunculi is somewhat different in alate viviparous female and in males too where it is heavily warty broadest at base, narrowest at apex and with the pale oblique pore on the outer margin near apex, in alate 0.12 times or little less than 0.12 times as long as body. Wing venation normal. In males, segment III with 35-40, IV with 17-18, V with 8-9 protruding secondary rhinaria, p.t. equal in length to base of the segment, abdominal dorsum pale, with similar sclerotic pattern as in viviparous, venter spinulose; siphunculi dark brown to almost black, warty, 0.1 times as long as the body. Male genitalia with opercula and penis dark brown.

Genus 10. *Acyrtosiphon* Mordvilko

1914. *Acyrtosiphon* Mordvilko, *Fauna Russie*, 1 : 75.

Type species : *Aphis pisi* Kaltenbach, 1843 (= *Aphis pisum* Harris, 1776).

31. *Acyrtosiphon pisum* (Harris)

1776. *Aphis pisum* Harris, *Exposit English Insects*, London : 66.

1958. *Acyrtosiphon pisum* (Harris) : Basu, A.N. and Banerjee, S.N., *Indian Agriculturist*, 2(2) : 89

Material examined : 12 apterous, viviparous females and 2 nymphs.

Host plant and locality : *Pisum sativum* (papilionaceae) Nongrim Hill, 14.12.1968, 16.12.1968, 25.2.1969; *Solanum tuberosum* (Solanaceae), Patharmukrah, 3.3.1069.

Biology : Light green to greenish brown aphids were seen to infest mostly the growing shoots under and upper surfaces of the leaves.

Diagnosis : *Apterous viviparous females* : Antennae nearly as long as to longer than body, antennal segment 1 bearing 13-22 hairs, segment III bearing 1-4 secondary rhinaria distributed only on basal 0.2 portion; dorsal cephalic hairs 12-25 μ long; u.r.s. 0.6 - 0.7 times as long as h.t. 2; cauda bearing 7-12 hairs.

Distribution : India : Meghalaya (Nongrim Hill, Laban), Arunachal Pradesh, Assam, North West India, Rajasthan, Uttar Pradesh, West Bengal, Tamil Nadu and virtually cosmopolitan.

Genus 11. *Akkaia* Takahashi

1919. *Akkaia* Takahashi, *Insect World*, 23(12) : 439.

Type species : *Akkaia polygoni* Takahashi, 1919

32. *Akkaia bengalensis* A.N. Basu1967. *Akkaia bengalensis* Basu, A.N., *Bull. Ent.*, **8** : 113.1976. *Akkaia bengalensis* : Ghosh, M.R., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(2) : 271.*Material examined* : Many apterous, alate viviparous females and nymphs.*Host plant* : *Polygonum* spp. (Polygonaceae)*Distribution* : India : Meghalaya (Shillong), Assam, Sikkim, Tamil Nadu and West Bengal.Genus 12. *Amphorophora* Buckton1876. *Amphorophora* Buckton, *Monogr. Br. Aphides*, London, **1** : 187.Type species : *Amphorophora ampullata* Buckton, 1876.33. *Amphorophora ampullata bengalensis* Hille Ris Lambers & Basu [Fig. 27]1966. *Amphorophora ampullata bengalensis* Hille Ris Lambers & Basu, A.N., *Ent. Ber. Amst.*, **26** : 14.1970. *Amphorophora ampullata bengalensis* : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, **4**(2) : 195.*Material examined* : Many apterae and nymphs.*Host plant* : *Athyrium* sp. (Pteridophyte). Nongrim Hill, 26.12.1968.*Biology* : Greenish apterae and ash coloured nymphs were collected from the under surface of the leave.*Distribution* : India : Meghalaya (Nongrim Hill), Assam, West Bengal. Elsewhere : Nepal.Genus 13. *Anthracosiphoniella* A.N. Basu1969. *Anthracosiphoniella* Basu, A.N. *Orient. Insects*, **3**(2) : 169.Type species : *Anthracesiphoniella maculatum* Basu, 1969.34. *Anthracesiphoniella maculatum* A.N. Basu [Fig. 28]1969. *Anthracesiphoniella maculatum* Basu, A.N. *Orient. Insects*, **3**(2) : 169.*Material examined* : Many apterae and nymphs.*Host plant and locality* : *Asplenium esculentum*, Kench's trace, 18.4.76, A.K. Ghosh*Biology* : Dark brown apterae infested the under surface of the leaves.*Distribution* : India : Meghalaya (Kench's trace), West Bengal.

Remarks : A.N. Basu (1969) erected the genus *Anthracosiphoniella* which differs from its allied genus *Anthracosiphon* Hille Ris Lambers in the arrangement of secondary rhinaria on antennal segment III in apterae and their presence also on segment IV in apterae, almost flangeless siphunculi, pale cauda and first trasal chaetotaxy. The present material nearly fits with Basu's description, except spinulosity on the head which is sparse on dorsum but prominent on venter, presence of flange in the siphunculi though not described but evident in his figure and the dusky cauda. Moreover, this genus shows its close relation with the another fern aphid genus *Macromyzus* Takahashi but differs from it in having secondary rhinaria on III and IV antennal segments.

Genus 14. *Aulacorthum* Mordvilko1914. *Aulacorthum* Mordvilko, *Fauna Russie*, 1 : 68.Type species : *Aphis solani* Kaltenbach, 1843.Key to the species of *Aulacorthum***Apterae :**

- 1(2) Dorsum of head without spinules..... 3
- 2(1) Dorsum of head usually with spinules..... 5
- 3(4) A.s. *III* shorter than p.t. and with one secondary rhinarium near base; siphunculi pale with dusky apices *rhamni*
- 4(3) A.s. *III* longer than p.t. and with 2-3 secondary rhinaria on basal 0.50 portion; siphunculi brown with dark apices *cornaceae*
- 5(6) A.s. *III* longer than p.t..... 7
- 6(5) A.s. *III* usually shorter than or at most as long as p.t. 9
- 7(8) U.r.s. nearly as long as or slightly longer than h.t. 2; antennae and femora more or less uniformly dark..... *magnoliae*
- 8(7) U.r.s. much longer than h.t. 2; a.s. *III*, *IV* and *V* dark at apex and femora dark on distal 0.5 portion *dasi*
- 9(10) Head black; a.s. *III* dark only at apex..... *nipponicum*
- 10(9) Head paler; cauda and siphunculi dark 11
- 11(12) Dorsal abdominal hairs minute at least up to segment 7; u.r.s. about 1.20 x h.t.2; cauda at most upto 0.40 x siphunculi *scirpi*
- 12(11) Dorsal abdominal hairs long; u.r.s. about 1.12 - 1.19 x h.t.2; cauda about 0.45 - 0.5 x siphunculi *solani*

Alatae :

- 1(2) Marginal pigmented areas on abdomen with 4-5 quite long hairs at least on segments 1-3, the hairs being about as long as b.d. *III* *dasi*
- 2(1) Marginal pigmented areas on abdomen with never more than 3 hairs at least on segments 1-3, the hairs are shorter (less than 0.5 x b.d. *III*)..... 3
- 3(4) U.r.s. as long as to atmost 1.20 x h.t.2 *solani*
- 4(3) U.r.s. 1.25 - 1.35 x h.t.2..... 5
- 5(6) Longest hair on tergite 8 never less than 0.75 x b.d. *III*; cauda about 0.4 - 0.5 x siphunculi ...
..... *rhamni*
- 6(5) Longest hair on tergite 8 about 0.60 x b.d. *II*; cauda about 0.35 x siphunculi; a.s. *III* with 9-22 secondary rhinaria *nipponicum*

35. *Aulacorthum cornaceae* A.K. Ghosh

1969. *Aulacorthum cornaceae* Ghosh, A.K. *Bull. Ent.*, **10** : 141.

Material examined : Many apterae and nymphs.

Host plant and locality : Unidentified (Cornaceae), Shillong, 7.4.1976.

Distribution : India : Meghalaya (Shillong).

36. *Aulacorthum dasi* Ghosh, Basu and Raychaudhuri [Fig. 29, 30]

1970. *Aulacorthum dasi* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Proc. zool. Soc., Calcutta*, **24** : 66.

Material examined : 4 apterae, 4 alatae and one nymph.

Host plant and locality : *Artemisia* sp. (Compositae), Cherrapunji, 21.12.1968 and from an unidentified host of Natural order Compositae, Nongrim Hill, 30.12.1968.

Biology : Chocolate brown insects infest the undersurface of the leaves.

Distribution : India : Meghalaya (Cherrapunji, Nongrim Hill), Assam.

37. *Aulacorthum magnoliae* (Essig and Kuwana)

1918. *Aulacorthum magnoliae* Essig and Kuwana, *Proc. Calif. Acad. Sci.*, **8** : 59.

1965. *Aulacorthum magnoliae* (Essig and Kuwana), Takahashi *Insecta matsum.*, **27**(2) : 109.

Material examined : 6 apterae, 2 nymphs.

Host plant and locality : Host unidentified, Nongrim Hill, 13.12.1968.

Biology : Brownish insects were seen to infest the undersurface of the leaves.

Distribution : India : Meghalaya (Nongrim Hill), Assam, West Bengal. Elsewhere : Korea, Japan.

38. *Aulacorthum nipponicum* (Essing and Kuwana)

1918. *Aulacorthum nipponicum* Essing and Kuwana, *Proc. Calif. Sci.*, **8** : 48.

Material examined : Many apterae, alatae and nymphs, Indet. host, Shillong, 7.4.1976, A.K. Ghosh.

Distribution : India : Meghalaya (Shillong), Sikkim, West Bengal. Elsewhere : China, Japan, Korea, and Taiwan.

39. *Aulacorthum rhamni* Ghosh, Ghosh and Raychaudhuri [Fig. 31]

1970. *Aulacorthum rhamni* A.K. Ghosh, M.R. Ghosh and D.N. Raychaudhuri, *Orient. Insects*, **4** : 379.

Material examined : Many apterae, alatae and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plant : An Unidentified plant (Euphorbiaceae)

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

40. *Aulacorthum scirpi* van der Goot

1917. *Aulacorthum scirpi* v.d. Goot. *Contr. Fauna Indes. nserl* **1**(3) : 20.

Material examined : 5 apterae and 2 nymphs, Shillong 7.4.1976, A.K. Ghosh

Host plant : *Scleria cochinchensis* (Cyperaceae).

Distribution : India : Meghalaya (Shillong), Assam. Elsewhere : Java.

41. *Aulacorthum solani* (Kaltenbach)

1843. *Aphis solani* Kaltenbach, *Monogr. pflan-lause pft lause*, 15.

1969. *Aulacorthum solani* (Kaltenbach) : Basu, A.N., *Orient. Insects*, 3(4) : 357.

Material examined : Many apterae, alatae and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Gnaphalium luteoalbum* (Compositae).

Distribution : Cosmopolitan.

Genus 15. *Brachycaudus* van der Goot

1913. *Brachycaudus* van der Goot, *Tijdschr. Ent.*, 56 : 97.

Type species : *Aphis myosotidis* Koch, 1954

Key to the species of *Brachycaudus* van der Goot

Apterous viviparous female :

1(2) Posterior margin of prosternum without any tubercle; Siphunculi 1.3 to 1.6 times as long as their basal width and 0.05 to 0.06 times as long as the length of body; antennae 0.3 to 0.5 times as long as the body, p.t.2 to 2.75 times as long as the base of segment VI. F.T.C. 3,3,2..... *helichrysi*

2(1) Posterior margin of prosternum bearing a pair of tubercle; Siphunculi twice as long as their basal width and 0.09 to 0.12 times as long as the length of body; antennae 0.5 to 0.8 times as long as the body, p.t.3 to 4 times as long as the base of segment VI. F.T.C. 3,3,3. *persicaecola*

Alate viviparous female :

1(2) Siphunculi 0.06 - 0.08 times as long as body and 1.5 - 1.8 times the basal width; p.t. 2.5 to 3.5 times as long as the base of the segment VI, secondary rhinaria distributed on antennal segment III 12-23 and IV 1-5, cauda broad, thumbshaped and nearly equal to its basal width..... *helichrysi*

2(1) Siphunculi 0.09 - 0.12 times as long as body 2 to 2.5 times the basal width; p.t. 3.75 to 5 times as long as the base of segment VI, secondary rhinaria distributed on antennal segment III 22-35, IV 3-12, V 0-1; cauda conical, longer than its basal width..... *persicaecola*

42. *Brachycaudus helichrysi* (Kaltenbach)

1843. *Brachycaudus helichrysi* Kaltenbach, *Mongr. Pfl. Lause*, : 102.

1972. *Brachycaudus helichrysi* (Kaltenbach); Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, 6(3) : 336.

Material examined : Numerous apterous and alate viviparous females together with nymphs, single oviparous female and 13 alate males.

Host plant and locality : Insects were collected from 10 different plants distributed over 10 Natural orders during the whole year. Oviparous female from the *Prunus* sp. (Rosaceae), Shillong, 12.12.1968. Numerous alate viviparous females were collected in Y.P.T. during the period December to February and again in May. Alate males were collected in Y.P.T. during the period from January to February.

Biology : Light green to blackish brown insects were collected from the young growing sheets, inflorescences, under and upper surfaces of the leaves. Sometimes ants were seen in association with the aphid.

Distribution : Cosmopolitan.

Remarks : Earlier only a single alate male was noted at Simla, India (Chowdhuri *et al.*, 1970). Palmer (1952) from U.S.A. has provided illustrations and short descriptions of sexuales of this species under the name *Aphis helichrysi* Kaltenbach.

43. *Brachycaudus persicaecola* (Boisduval)

1867. *Aphis persicaecola* Boisduval, *Essai sur Entomologic horticole* : 251.

1966. *Brachycaudus persicaecola* (Boisduval); Eastop. *Australian Aphidoidea* : 429.

Material examined : 3 apterae, 5 alatae and 1 nymph.

Host plant and locality : *Ageratum conyzoides* (Compositae), Dhankheti, 30.7.1969.

Biology : Dark brown to black insects infested under surface of the leaves.

Distribution : Cosmopolitan.

Genus 16. *Brevicoryne* (Linnaeus)

1915. *Brevicoryne* van der Goot. *Beitr. Kennt. Holland, Blattlause*; 245.

Type species : *Aphis brassicae* Linnaeus, 1758.

44. *Brevicoryne brassicae* (Linnaeus)

1758. *Aphis brassicae* Linnaeus, *Syst. Nat.*, (10 ed), 1 : 452.

1986. *Brevicoryne brassicae* L.; Ghosh, L.K., *Aphididae of Himachal Pradesh, N.W. Himalaya Tech. Mongr.* 16, ZSI, 65.

Material examined : Many apterae, alatae and nymphs.

Host plant : *Brassica* sp. (Cruciferae), Shillong, 7.4.1976, A.K. Ghosh.

Distribution : India : Meghalaya (Shillong), and virtually cosmopolitan.

Remarks : Ghosh, L.K. *et al.* (1980) have given an account of the species of *Brevicoryne* van der Goot.

Genus 17. *Capitophorus* van der Goot

1913. *Capitophorus* van der Goot, *Tijdschr. Ent.*, 56 : 84.

Type species : *Aphis carduina* Walker, 1850.

Key to the species of *Capitophorus* van der Goot

Apterous viviparous female :

- 1(2) Siphunculi distinctly elavate, somewhat imbricated; antenna about equal to the length of body; u.r.s. as long as or slightly longer than the h.t.2.....*hpppophaes*
 a(d) Long hairs on abdominal tergites 6-8 but on other tergites hairs are much smaller.
 b(c) Hairs on antennal segment 1 long and capitate.....
*Capitophorus hippophaes hippophaes*
 c(b) Hairs on antennal segment 1 inconspicuous and inverted bottle-shaped
*Capitophorus hippophaes javanicus*
 d(a) Hairs on all abdominal tergites nearly of equal lengths
*Capitophorus hippophaes indicus*
- 2(1) Siphunculi cylindrical 3
- 3(4) Hairs on dorsum of abdomen never duplicated, 6 per segment on anterior tergites; siphunculi 2 to 2.8 times the length of cauda..... *Capitophorus carduinus*
- 4(3) Hairs on dorsum of abdomen duplicated, 14-16 per segment on anterior tergites; siphunculi 3 to 5 times the length of cauda. 5
- 5(6) U.r.s. 2.5 to 3 times as long as h.t. 2; siphunculi about 3 times as long as cauda.....
*Capitophorus archangelskii*
- 6(5) U.r.s. 1.7 to 2 times as long as h.t.2; siphunculi about 5 times as long as cauda.....
*Capitophorus formosartemisiae*

Alate viviparous female :

- 1(2) Siphunculi distinctly clavate; u.r.s. equal to the length of h.t.2.....
*Capitophorus hippophaes*
 a(b) Secondary rhinaria distributed on antennal segment III 10-11 and IV 0-2; siphunculi 1.7 times as long as cauda.....
*Capitophorus hippophaes javanicus*
 b(a) Secondary rhinaria distributed on antennal segments much more than mentioned above; siphunculi 2.5 to 2.75 times as long as cauda C
 c(d) Secondary rhinaria distributed on antennal segment III 26-30, IV 16-20 and V 1-9, antenna about as long as body.....
*Capitophorus hippophaes hippophaes*
 d(c) Secondary rhinaria distributed on antennal segment III 46-48, IV 18-25 and V 8-11, antenna always longer than the body
*Capitophorus hippophaes indicus*

- 2(1) Siphunculi cylindrical, u.r.s. 1.7 to 3.1 times as long as h.t. 2..... 3
 3(4) Siphunculi 4 to 4.5 times the length of cauda; u.r.s. 1.7-2 times as long as h.t.2
 *Capitophorus formosartemisiae*
 4(3) Siphunculi at most up to 3.5 times the length of cauda; u.r.s. 2.5 to little over 3 times as
 long as h.t.2 *Capitophorus archangelskii*

45. *Capitophorus archangelskii* Nevsky

1928. *Capitophorus archangelskii* Nevsky, Ent. Mitt., 17 : 193.

Material examined : 2 alate, 6 apterous females, along with 2 apterae oviparae.

Host plant and locality : *Elaeagnus* sp. (Elaeagnaceae), Nongrim Hill, 16.1.1969.

Biology : Greenish apterae, alatae and nymphs were collected from the under surface of the leaves

Distribution : India : Meghalaya (Nongrim Hill), Assam and West Bengal. Elsewhere : Middle East.

Remarks : This is the first report of sexual form for this species from India. Sexual forms were earlier described by Nevsky (1928) from Central Asia.

46. *Capitophorus carduinus* (Walker)

1850. *Aphis carduina* Walker Ann. Mag. nat. Hist., 6(2) : 22.

1953. *Capitophorus carduinus* (Walker), Hille Ris Lambers, *Tomminckia*, 9 : 140.

Material examined : 19 apterae, 5 nymphs.

Host plant and locality : *Anemone rivularis* (Ranunculaceae), Nongrim Hill, 12.12.1968 and 14.1.1969.

Biology : Greenish apterae and nymphs were collected from the under surface of the leaves.

Distribution : India : Meghalaya (Nongrim Hill), Assam, West Bengal; Elsewhere : Europe.

47. *Capitophorus elaeagni* (del Guercio)

1876. *Myzus elaeagni* del Guercio *Naturalista Sicil.*, 13 : 189.

Material examined : Many apterae, alatae and nymphs. Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Cnicus* sp. (Compositae).

Distribution : India : Meghalaya (Shillong), Sikkim and virtually cosmopolitan.

48. *Capitophorus formosartemisiae* (Takahashi)

1921. *Myzus formosartemisiae* Takahashi, *Aphididae of Formosa*, (1) : 25.

1961. *Capitophorus formosartemisiae* (Takahashi); Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 10(4) : 571.

Material examined : Many apterous, alate viviparous females and nymphs.

Host plant and locality : *Artemesia* sp. and *Artemesia vulgaris* (Compositae) from the different localities of Shillong in the month of January and again during the period May to December.

Biology : Yellowish green apterae, alatae and nymphs were collected from the undersurface of the leaves, surrounding the growing shoot and also from the inflorescence.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal. Elsewhere : Bhutan, South East Asian countries.

49. *Capitophorus hippophaes javanicus* Hille Ris Lambers

1953. *Capitophorus hippophaes javanicus* Hille Ris Lambers, *Temminckia*, **9** : 156.

1976. *Capitophorus hippophaes javanicus* : Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10(4)** : 574.

Material examined : Many apterous and alate viviparous females and nymphs, 7.4.1976, A.K. Ghosh.

Host plant : *Polygonum alatum*, *Polygonum barbatum*, *Polygonum hydropiper*, *Polygonum paniculatum*, *Polygonum* spp. (Polygonaceae).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Himachal Pradesh, Manipur, Sikkim, Uttar Pradesh, West Bengal; Elsewhere ; Australia, China, Europe, Japan, Java, Korea, New Zealand, Pakistan and Taiwan.

*** 50. *Capitophorus hippophaes mitegoni* Eastop**

1956. *Capitophorus hippophaes mitegoni* Eastop, *Entomologist*, **89** : 9

1980. *Capitophorus hippophaes mitegoni* : Raychaudhuri, Ghosh and Basu. *In Aphids of North-East India and Bhutan* : 117.

Material examined : Nil.

Distribution : India: Meghalaya, Sikkim, West Bengal; Elsewhere Africa and Australia.

51. *Capitophorus indicus* Ghosh and Raychaudhuri

1968. *Capitophorus hippophaes indica* Ghosh, A.K. and Raychaudhuri, D.N., *Ann. ent. Soc. Am.*, **63** : 752.

1976. *Capitophorus indicus* Ghosh A.K. and Raychaudhuri, D.N., *Orient. Insects*, **10(4)** : 572.

Material examined : 33 apterae, 2 alatae and 6 nymphs.

Host plant and locality : *Polygonum* sp., *Polygonum chinensis* and *Rumex* sp. of Polygonaceae and a single alate from an improbable host like *Impomoea* sp. (Convolvulaceae) were collected from the different localities of Shillong during the months of January to March and again during August to September.

Biology : Light green apterae, alatae and nymphs were noticed on under surface of the leaves.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim, Uttar Pradesh, West Bengal.

52. *Capitophorus meghalayensis* Basu and Raychaudhuri

1976. *Capitophorus meghalayensis* Basu R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10** : 575.

Material examined : 3 apterae, 2 alatae, 3 nymphs and 2 apterous oviparae. 7.4.1976, A.K. Ghosh.

Host plant : *Elaeagnus* sp. (Elaeagnaceae).

Distribution : India : Meghalaya (Shillong).

* Not included in Key because of nonavailability of material

53. *Capitophorus vernoniae* Ghosh and Raychaudhuri

1968. *Capitophorus vernoniae* Ghosh, A.K. and Raychaudhuri, D.N. 1968. *Ann. ent. Soc. Amer.*, **61**(3) : 752.

Material examined : 16 apterae and 3 nymphs.

Host plant and locality : *Callicapra macrophylla* (Verbenaceae), Patharmukhrah, 25.9.1969, *Inula cappa* (Compositae), Patharmukhrah 26.12.1968; Borapani, 30.4.1969 and from an unidentified host of Labiateae, Patharmukhrah, 22.9.1969. (all C.U. Coll).

Biology : Pale green apterae and nymphs were collected from the under surface of the leaves of host.

Distribution : India : Meghalaya (Patharmukhrah, Borapani), West Bengal and Sikkim.

Genus 18. *Cavariella* del Guercio

1911. *Cavariella* del Guercio, *Redia*, **7** : 323.

Type species : *Aphis pastinaceae* Linnaeus, 1758

Key to the species of *Cavariella* del Guercio

Apterous viviparous female :

- 1(2) Antenna 5-segmented; supracaudal process long, narrow, 1.35 to 1.75 times as long as cauda; siphunculi 7 to 8 times as long as the maximum width on distal half *araliae*
- 2(1) Antenna 6-segmented; supracaudal process shorter, not so narrow, never more than 1.3 times as long as cauda; siphunculi 4.2 to 6.5 times as long as the maximum width on distal half 3
- 3(4) U.r.s. long, about 1.35 – 1.55 x h.t.2; p.t. about 1.5 x base of ultimate segment *biswasi*
- 4(3) U.r.s. short, shorter than to at most 1.2 x h.t.2 5
- 5(6) Siphunculi not narrow at base, almost barrel-shaped, p.t. about as long as width of siphunculi at base *salicicola*
- 6(5) Siphunculi narrow at base, distinctly swollen on apical half; p.t. 1.6-2.0 x width of siphunculi at least, cauda with 5 hairs *aegopodii*

54. *Cavariella araliae* Takahashi

1921. *Cavariella araliae* Takahashi *Aphididae of Formosa*, Pt. 1 : 37.

Material examined : 8 apterae, 4 nymphs.

Host plant and locality : *Aralia thomsoni* (Araliaceae), Shillong, 4.8.1969.

Biology : Yellowish apterae and pale nymphs were collected from the upper and under surfaces of the leaves.

Distribution : India : Meghalaya (Shillong), Assam; Elsewhere : Formosa, Japan.

Remarks : Number of caudal hair may be 5 instead of 4 as in Formosan specimens.

55. *Cavariella aegopodii* (Scopoli)

1763. *Aphis aegopodii* Scopoli, *Ent. Carniolica*, : 137.

1980. *Cavariella aegopodii* (Scopoli) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 121.

Material examined : Many apterous viviparous females and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Salix babylonica* (Salicaceae)

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Manipur, Uttar Pradesh and West Bengal; Elsewhere : America, Australia, Europe, Japan, Korea, Middle East, New Zealand and Rhodasia.

56. *Cavariella biswasi* Ghosh, Basu and Raychaudhuri [Figs. 33, 34]

1969. *Cavariella biswasi* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 3 : 245.

1980. *Cavariella biswasi* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 245.

Material examined : Many apterous and 2 alate viviparous females and nymphs. Laban, 5.7.1966, Kenche's trace, 12.5.1968.

Host plant : *Salix babylonica*, *Salix elegans* (Salicaceae)

Biology : Brown apterae, alatae and nymphs were collected from both surfaces of the leaves.

Distribution : India : Meghalaya (Laban, Kenche's trace), Assam, West Bengal.

57. *Cavariella salicicola* (Matsumura)

1917. *Nipponicum salicicola* Matsumura, *J. Coll. Agric. Hokkaido imp. Univ.*, 7 : 410.

1971. *Cavariella salicicola* (Matsumura); Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, 5(2) : 211.

Material examined : Many apterous and alate viviparous females and nymphs. Umpling, 22.7.1969.

Host plant : *Salix* sp. (salicaceae)

Biology : Greenish apterae collected from undersurface of the weeds.

Distribution : India : Meghalaya (Umpling), Assam, Himachal Pradesh, Manipur, West Bengal; Elsewhere : China, Japan, Korea and Taiwan.

Genus 19. *Chaetomyzus* Ghosh and Raychaudhuri

1962. *Chaetomyzus* Ghosh and Raychaudhuri *J. Asiat. Soc. Beng.*, 4 : 104.

Type species : *Chaetomyzus rhododendri* Ghosh and Raychaudhuri, 1962

58. *Chaetomyzus rhododendri* Ghosh and Raychaudhuri [Fig. 35]

1962. *Chaetomyzus rhododendri* Ghosh A.K. and Raychaudhuri, D.N., *J. Asiat. Soc. Beng.*, 4 : 104.

1970. *Chaetomyzus rhododendri* Ghosh and Raychaudhuri; Chakrabarti, Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects.*, 4(4) 447.

Diagnosis : Apterous viviparous female : Body pale, 1.8 to 2.2 mm long with the minimum width 0.9 to 1.1 mm. Head smooth with low median and prominent diverging lateral tubercles, antennae 6 segmented, 0.5 to 0.6 times as long as body, apterae without secondary rhinaria, hairs on antennae short, with acute to acuminate apices, about 0.5 times as long as the basal diameter of antennal segment III, p.t. about twice as long as the base of the segment; rostrum long, reaching far beyond hind coxae, u.r.s. 1.4 to 1.6 times as long as h.t.2. and bears 18 to 20 hairs including preapicals. All thoracic tergites and abdominal tergites 1-6 with paired papillate processii arranged spinally and marginally, similar pleural processii also occur on all the above segments except on tergites 5 and 6; spinal processii gradually increase in length; siphunculi pale, about 0.2 times as long as body and 1.6 to 1.7 times as long as cauda, cylindrical upto basal 0.3 portion and then distinctly clavate, smooth excepting apical 0.1 portion where 3-4 spinulose striae present; cauda elongate, constricted at the basal 0.3 portion then appears bulbous at the middle and bears 5 hairs, legs pale, spinulose at apices of tibiae and whole of tarsi.

Measurements of one specimen in mm : Length of body 2.21; width of body 1.04; length of antenna 1.29; length of antennal segments III : IV : V : VI 0.44 : 0.19 : 0.17 (0.12 + 0.25); length of u.r.s. 0.13; length of h.t.2 0.09, length of siphunculus 0.42; length of cauda 0.25.

Material examined : 3 apterae and 2 Nymphs.

Host plant and locality : *Rhododendron* sp. (Ericaceae), Umpling, 26.7.1969.

Biology : Pale yellowish-green insects infest the under surface of the leaf.

Distribution : India : Meghalaya (Umpling) Assam, Uttar Pradesh, Himachal Pradesh, West Bengal.

Genus 20. *Coloradoa* Wilson

1910. *Coloradoa* Wilson, *Ann. ent. Soc. Am.*, **3** : 328.

Type species : *Aphis rufomaculata* Wilson, 1908

59. *Coloradoa rufomaculata* (Wilson) [Fig. 36]

1908. *Aphis rufomaculata* Wilson, *Ent. News.*, **19** : 261.

1980. *Coloradoa rufomaculata* (Wilson), Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Taxonomy of Aphids of North East and Bhutan, *The Zoological Society, Calcutta*, : 125.

Diagnosis : Apterous viviparous female : Body about 1-1.5 mm long with the maximum width 0.7 to 0.8 mm. Head with lateral frontal tubercles; frons convex; antenna 6 segmented, little over half to 0.62 times as long as body, without any secondary rhinaria, hairs inconspicuous, only 4 μ long, p.t. 1.6 to 1.8 times as long as the base of the segment; rostrum reaches beyond mid coxae, u.r.s. stiletto shaped, 1.2 to 1.25 times as long as h.t.2 Dorsum of abdomen pale, without any selarotic pigmentation and with fan-shaped hairs, these being 15 μ - 20 μ long; siphunculi cylindrical, clavate distally, with a flange where it is little dusky, about 0.12 to 0.14 times as long as body, 1.5 to 1.7 times as long as short tongue-shaped cauda which bears 4-5 hairs.

Measurements of one specimen in mm : Length of body 1.45; width of body 0.77; length of antenna 0.87; length of antennal segment III : IV : V : VI 0.09 : 0.11 : 0.10 : (0.12 + 0.21); length of

u.r.s. 0.10, length of h.t.2 0.08; length of siphunculus 0.88; length of cauda 0.16.

Material examined : Many apterous viviparous females and nymphs. Kench's trace, 12 iii.1969.

Host plant : *Artemesia vulgaris*, *Artemesia* sp. *Chrysanthemum* sp. (Compositae).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Assam, Himachal Pradesh, Maharashtra, Nagaland, Uttar Pradesh and West Bengal. Elsewhere : Virtually cosmopolitan.

Genus 21. *Cryptomyzus* Oestlund

1922. *Cryptomyzus* Oestlund, *Rep. St. Ent. Minn.*, 19 : 139.

Type species : *Aphis relis* Linnaeus, 1758

60. *Cryptomyzus taoi* Hille Ris Lambers

1965. *Cryptomyzus taoi* Hille Ris Lambers, *Tijdschr. Ent.*, 108(7) : 199.

1986 *Cryptomyzus taoi* Hille Ris Lambers; Ghosh L.K., *Tech. Monogr.* 16, Zoological Survey of India : 76.

Material examined : Many apterae and nymphs, Shillong, 7.4.1976.

Host plants : *Leoneurus sibricus* and *Leucus aspara* (Labiatae)

Distribution : India : Meghalaya (Shillong), China, Japan.

Genus 22. *Cryptosiphon* Buckton

1879. *Cryptosiphon* Buckton, *Monogr. Br. Aphides*, 2 : 144.

Type species : *Cryptosiphon artemisiae* Buckton, 1979

61. *Cryptosiphon artemisiae* Buckton [Fig. 37]

1879. *Cryptosiphon artemisiae* Buckton, *Monogr. Br. Aphides*, 2 : 145.

1968. *Cryptosiphon artemisiae* : Basu, A.N., *Orient. Insects*, 3(4) : 358.

Diagnosis : Apterous viviparous female : Body pale, 1.1 to 1.2 mm long with the maximum width 0.58 to 0.60 mm. Head smooth without developed lateral frontal tubercles; antennae 6 segmented, strongly imbricated, very short about 0.6 times as long as body, III antennal segment with 10-12 large round secondary rhinaria distributed irregularly on its entire length, p.t. short, slightly longer than its base; rostrum narrow, reaching beyond forecoxae, u.r.s. nearly equal in length to h.r.2. Dorsum of abdomen pale, with faint scattered sclerites, hairs with acuminate apices 30 μ 50 μ long; siphunculi minute shorter than its basal width; cauda semioval with 4 hairs. Wing veins dusky, forewing with media once or twice branched, hind wing with both media and cubitus. F.T.C. 3,3,3.

Measurements of one specimen in mm : Length of body 1.10; width of body 0.58; length of antenna 0.69; length of antennal segments III : IV : V : VI 0.22 : 0.08 : 0.08 : (0.08 + 0.11); length of u.r.s. 0.08; length of h.t.2 0.08.

Material examined : 2 alatae in Y.P.T.

Host plant and locality : *Artemesia vulgaris* (Compositae), Kench's trace, Shillong, 9.6.1970, C.U. coll.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim and West Bengal; Elsewhere : China, Europe, Japan, Korea and Taiwan.

Genus 23. *Dactynotus* Rafinesque1818. *Dactynotus* Rafinesque, *Am. mon. Mag.*, 3 : 18.Type species : *Aphis hieracium paniculatum* RafinesqueKey to the subgenera of *Dactynotus* Rafinesque1(2) Cauda pale *Dactynotus*2(1) Cauda dark..... *Uromelan*Key to the species subspecies of *Dactynotus* Rafinesque*Apterous viviparous female* :1(2) U.r.s. about 0.8 times as long as h.t.2; siphunculi not less than 0.3 times as long as body, about 1.8 to at most twice as long as cauda which bears 20-24 hairs.
..... *Dactynotus sonchi* (Linnaeus)2(1) U.r.s. 1.4 to 1.5 times as long as h.t.2; siphunculi less than 0.25 to 3 times as long as cauda which bears 5-6 hairs. *Dactynotus tanaceti indica* (Linnaeus)62. *Dactynotus sonchi* (Linnaeus)1767. *Aphis sonchi* Linnaeus, *Systema Nature*, 1 (12th ed.) : 735.1966. *Dactynotus sonchi* (Linnaeus); Miyazaki, *Insecta Matsum.*, 29(1) : 39.*Material examined* : 2 apterae.*Host plant and locality* : *Gynura* sp. (Compositae), Round Road, 30.6.1969.*Biology* : Chocolate brown insects infested the undersurface of the leaves.*Distribution* : India : Meghalaya (Shillong), widely distributed in India; Africa, Australia, Egypt, Europe and South America.63. *Dactynotus tanaceti indica* L.K. Ghosh1971. *Uroleucon tanaceti indica* L.K. Ghosh, *Orient. Insect*, 5 : 129.1980. *Dactynotus tanaceti indica* L.K. Ghosh; Raychaudhuri, D.N. (e.d.). *In Taxonomy of Aphids of North East India and Bhutan* : 131.*Material examined* : 4 apterae, 5 alatae and 1 nymph.*Host plant and locality* : *Artemisia* sp. (Compositae), Umpling, 23.6.1969; vagrant alate on *Cynoglossum* sp. (Boraginaceae), Umpling, 13.6.1969.*Biology* : Greenish brown insects infest both the surfaces of the leaves and growing shoot.*Distribution* : India : Meghalaya (Umpling), Assam; Elsewhere : Africa, Europe.64. *Dactynotus (Uromelan) compositae* (Theobald)1915. *Dactynotus compositae* Theobald, *Bull. ent. Res.*, 6 : 123.1980. **Dactynotus (Uromelan) compositae* Theobald; Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 131.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Veronia roxburgii* (Compositae)

Distribution : India : Meghalaya (Shillong), South India, West Bengal; Elsewhere : Africa, Moritius and Taiwan.

Genus 24. *Diphorodon* Börner

1931. *Diphorodon* Börner, *Anz. Schadlingsk*, 7 : 9.

Type species : *Phorodon cannabis* Passerini, 1860.

65. *Diphorodon cannabis* (Börner)

1960. *Phorodon cannabis* Passerini, *Gli. Afidi. Parm.*, : 36.

1980. *Diphorodon cannabis* (Passerini); Raychaudhuri, D.N. Ghosh M.R. and Basu, R.C., *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta*, : 134.

Material examined : Many apterous and alate viviparous females and nymphs. Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Cannabis sativa* (Moraceae)

Distribution : India : Meghalaya (Shillong), Himachal Pradesh, Kashmir, Manipur, Nagaland, South India, West Bengal; Elsewhere : Europe, Japan, Pakistan.

Genus 25. *Dysaphis* Börner

1931. *Dysaphis* Börner, *Anz. Schadlingsk*, 7 : 9.

Type species : *Aphis angelicae* Koch, 1854

66. *Dysaphis pyri* (Boyer de Fonscolombe)

1841. *Aphis pyri* Boyer de Fonscolombe, *Anls. Soc. ent. Fr.* 10 : 189.

Material examined : Many apterae and nymphs, Shillong, 17.4.1976, Umshingram, Khasi Hills, 12.4.1973, from *Pyrus pashia*, R.S. Pillai.

Distribution : India : Meghalaya (Khasi Hills); Elsewhere : Asia, Europe.

Genus 26. *Hayhurstia* del Guercio

1917. *Hayhurstia* del Guercio, *Redia*, 12 : 206.

Type species : *Hayhurstia deformans* del Guercio, 1917 (= *Aphis atriplicis* Linnaeus, 1761)

67. *Hayhurstia atriplicis* (Linnaeus)

1761. *Aphis atriplicis* Linnaeus, *Fauna Suecica* (2nd ed.), : 262.

1968. *Hayhurstia atriplicis* (Linnaeus) : Basu, A.N., *Orient. Insects.*, 3(4) : 360.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plant : *Chenopodium album* (Chenopodiaceae)

Distribution : India : Meghalaya (Shillong) Arunachal Pradesh, Himachal Pradesh, South India, Uttar Pradesh and West Bengal; Elsewhere : China, Europe, Japan, Korea, Middle East, North America and Taiwan.

Genus 27. *Hyadaphis* Kirkaldy

1904. *Hyadaphis* Kirkaldy, *Entomologist*, 37 : 279.

Type species : *Aphis xylostie* Schrank, 1801 (= *Siphocoryne foeniculi* Passerini, 1960)

68. *Hyadaphis coriandri* (Das)

1918. *Brevicoryne coriandri* Das, *Men. Indian Mus.*, 64(4) : 180

1980. *Hyadaphis coriandri* (Das) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In*: Taxonomy of the Aphids of North East India and Bhutan, *The Zoological Society, Calcutta* : 143.

Material examined : 22 alatae

Host plant and locality : *Coriandrum sativum* (Umbelliferae), Kench's trace, 16.12.1968; Y.P.T. 27.2.1969, 2.3.1969, 16.3.1969.

Biology : Brown alatae could be collected from the inflorescence of the host.

Distribution : India : Meghalaya (Shillong), Bihar, Himachal Pradesh, Manipur, Sikkim, South India, Uttar Pradesh, West Bengal; Elsewhere : Egypt, Nigeria, Pakistan and South Africa.

Genus 28. *Hyperomyzus* Börner

1933. *Hyperomyzus* Börner, *Kline Mitt. Blattlaus*, 2.

Type species : *Aphis lactucae* Linnaeus, 1958.

69. *Hyperomyzus carduellinus* (Theobald)

1915. *Rhopalosiphum carduellinus* Theobald, *Bull. ent. Res.*, 6 : 113.

1980. *Hyperomyzus carduellinus* (Theobald), Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* taxonomy of the Aphids of North East India and Bhutan, *The Zoological Society, Calcutta* : 147.

Material examined : Many apterous and alate viviparous females and nymphs.

Host plant and locality : *Gynura* sp. (Compositae), Laban, 4.7.1969. *Hypochoeris radicata* (Compositae), Laitumkhrah, 27.3.1969; *Sonchus* sp. (Compositae), Borapani, 30.4.1969 and Jowai 28.7.1969.

Biology : Light green to brown forms were seen to infest both the surfaces of the leaves, growing shoots and inflorescence.

Distribution : India : Meghalaya (Laban, Barapani, Laitumkhrah), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Manipur, Nagaland, Sikkim, South India, Uttar Pradesh and West Bengal; Elsewhere : Africa, Australia, Fiji, Indonesia, Java, Nepal, New Zealand, Taiwan and Uganda.

Genus 29. *Indumasonaphis* Ghosh, Basu and Raychaudhuri

1980. *Indumasonaphis* Ghosh *et al.*, *In* Taxonomy of the Aphids of the North-East India and Bhutan : 152.

Type species : *Masonaphis (Neomasonaphis) inulae* Ghosh and Raychaudhuri, 1972.

70. *Indumasonaphis inulae* Ghosh and Raychaudhuri

1972. *Masonaphis (Neomasonaphis) inulae* (Ghosh and Raychaudhuri) : Ghosh, A.K. and Raychaudhuri, D.N. *Orient. Insects*, 6 : 377.

1986. *Indumasonaphis inulae* Ghosh *et al.*, Ghosh L.K. *Tech. Mongr. Z.S.I.*, 16 : 91.

Material examined : 8 apterae, 1 alate and 1 Nymph, Shillong.

Host plant : *Inula cappa* (Compositae) and *Rhododendron* sp. (Ericaceae).

Distribution : India : Meghalaya (Shillong).

Genus 30. *Liosomaphis* Walker

1968. *Liosomaphis* Walker, *Zoologist*, 2(3) : 119.

Type species : *Aphis berberidis* Kaltenbach, 1843

71. *Liosomaphis himalayensis* Basu

1964. *Liosomaphis himalayensis* Basu, *J. Linn. Soc. (Zool.)*, 45 : 231.

1980. *Liosomaphis himalayensis* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Taxonomy of Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 159.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 17.4.1076, A.K. Ghosh.

Host plant : *Berberis* spp. (Berberidaceae).

Distribution : India : Meghalaya (Shillong), Himachal Pradesh, Uttar Pradesh and West Bengal; Elsewhere : Nepal.

Genus 31. *Lipaphis* Mordvilko

1928. *Lipaphis* Mordvilko, *Key to the Russian Insects* : 200 (In Russian)

Type species : *Lipaphis erysimi* Kaltenbach

72. *Lipaphis erysimi* (Kaltenbach)

1843. *Aphis erysimi* Kaltenbach, *Mon. fam. pfl.*, 99.

1980. *Lipaphis erysimi* (Kaltenbach) : Raychaudhuri, D.N. Ghosh M.R. and Basu, R.C., *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 191.

Material examined : Numerous apterous and alate viviparous females and nymphs and one apterous oviparous female.

Host plant and locality : Different species of *Brassica* (Cruciferae); *Rhapanus sativus* (Cruciferae) in different localities of survey mainly during winter; one vagrant alate from *Goodyere procere* (Orchidaceae), Botanical Survey of India, 3.12.1969, and in Y.P.T. during the months of January to March; and ovipara from a plant of Cruciferae, Cherrapunji, 20.12.1968.

Biology : Blackish brown insects infest both surfaces of the leaves, growing shoots and inflorescences.

Distribution : India : Meghalaya (Cherrapunji, Botanical garden, Shillong), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Nagaland, Rajasthan, Sikkim, South India, Tripura, Uttar Pradesh and West Bengal; Elsewhere : Bhutan, Nepal and virtually cosmopolitan.

Remarks : Although this species is very common on Cruciferae in Shillong, no sexual form was so far known from there, Oviparae (Phalak, 1968) and alate males (Verma and Mathur, 1966) have been reported from Kalimpong (Darjeeling district of West Bengal) and Kashmir respectively.

Genus 32. *Macromyzus* Takahashi

1960. *Macromyzus* Takahashi, *Kontyu*, **28** : 225.

Type species : *Myzus woodwardiae* Takahashi, 1921

73. *Macromyzus (Macromyzus) woodwardiae* Takahashi

1921. *Myzus woodwardiae* Takahashi, *Aphididae of Formosa*, **1** : 20.

1980. *Macromyzus (Macromyzus) woodwardiae* Takahashi : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 165.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 17.4.1976, A.K. Ghosh.

Host plants : *Asplenium odientum*, *Asplenium auriculatum*, *Asplenium esculentum* (Aspleniaceae); *Cheilanthus varies*, *Dichelia alata*, *Nephrodium moli* and *Polypodium* sp. (Polypodiaceae).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim and West Bengal; Elsewhere : Japan, Nepal, Taiwan.

Genus 33. *Macrosiphoniella* del Guercio

1911. *Macrosiphoniella* del Guercio, *Redia*, **7** : 331.

Type species : *Siphonophora áira* Ferrari, 1872.

Key to species of the genus *Macrosiphoniella*

- 1(2) Hind tibiae with a row of thick spines besides normal hairs on anterior margin.....
.....*spinepes*
- 2(1) Hind tibiae without such spines 3
- 3(4) Both ante-and post siphuncular sclerites developed*matsumurana*
- 4(3) Post siphuncular sclerites absent..... 5
- 5(6) Siphunculi as long as or longer than cauda and reticulated atmost on apical half.....
.....*formosartemisiae*
- 6(5) Siphunculi always shorter than cauda and reticulated area extends beyond apical half..... 7
- 7(8) Antesiphuncular sclerite well developed; dorsal abdominal hairs usually on sclerotic bases..
..... *sanborni*

- 8(7) Antesiphuncular sclerite not developed as above; dorsal abdominal hairs usually not on sclerotic bases 9
- 9(10) Flagellum entirely black, femora pale at the very base, rest dark brown; tibiae also entirely black..... *yomogifoliae*
- 10(9) Flagellum not black as above; tibiae brown at base and apex but pale at middle.....
..... *pseudoartemisiae*

74. *Macrosiphoniella formosartemisiae* Takahashi

1921. *Macrosiphoniella formosartemisiae* Takahashi, *Aphididae of Formosa*, 1 : 15.

1963. *Macrosiphoniella formosartemisiae* Takahashi; Takahashi, *Mushi*, 37(1) : 4.

Material examined : 4 apterae, 1 nymph.

Host plant and locality : *Artemisia* sp. (Compositae), Kench's trace, 17.8.1969, *Fragaria* sp. (Rosaceae), Sweet falls, 23.3.1969.

Biology : Dark brownish insects were collected from the under surface of the leaves and the growing shoots.

Distribution : India : Meghalaya (Kench's trace), Assam, West Bengal; Elsewhere : Formosa.

75. *Macrosiphoniella matsumurana* Ghosh, Basu and Raychaudhuri [Fig. 38]

1980. *Macrosiphoniella matsumurana* Ghosh, Basu, Raychaudhuri, *Orient. Insects* 4(1) : 71.

Material examined : 9 apterae.

Host plant and locality : *Artemisia vulgaris* (Compositae), Kench's trace, 11.1.1969.

Biology : Brownish specimens infest both the surfaces of the leaves and the growing shoots.

Distribution : India : Meghalaya (Kench's trace)

76. *Macrosiphoniella pseudoartemesiae* Shinji

1933. *Macrosiphoniella pseudoartemesiae* Shinji, *Kontyu*, 7(5 & 6) : 216.

1976. *Macrosiphoniella pseudoartemesiae* : Basu, R.C., and Raychaudhuri, D.N., *Orient. Insects*, 10(2) : 302.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : *Artemisia* spp. (Cimpositae), Kench's trace, 7.4.1976.

Distribution : India : Meghalaya (Kench's trace), Sikkim, South India, Uttar Pradesh and West Bengal; Elsewhere : Bhutan, China, Japan, Korea.

77. *Macrosiphoniella sanborni* (Gillette)

1908. *Macrosiphum sanborni* Gillette, *Can. Ent.*, 40 : 65.

1976. *Macrosiphoniella sanborni* (Gillette); Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 10(2) : 305.

Material examined : Numerous apterae, alatae and nymphs.

Host plant and locality : *Chrysanthemum coronarium* (Compositae), Umpling, 26.7.1969, Nongrim Hill, 1.8.1969, Nongthymai, 13.8.1969, Patharmukhrah, 25.9.1969; *Geranium* sp. (Geraniaecae), Nongrim Hill, 13.12.1968; *Urtica* sp. (Urticaecae), Nongrim Hill, 12.12.1968 and in Y.P.T. 1.7.1969.

Biology : Brownish specimens infest most of the aerial parts of a host plant.

Distribution : India : Meghalaya (all other districts) and all over India; Cosmopolitan.

78. *Macrosiphoniella spinipes* Basu

1967. *Macrosiphoniella spinipes* Basu, A.N., *Bull. Ent.*, **8** : 151.

1976. *Macrosiphoniella spinipes* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(2) : 304.

Material examined : Four apterae and nymphs.

Host plant and locality : *Artemesia* spp. (Compositae), Shillong, 7.4.1972, A.K. Ghosh.

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

Remarks : Raychaudhuri, D.N. (ed.) 1980, discussed on the species.

79. *Macrosiphoniella yomogifoliae* (Shinji)

1922. *Macrosiphoniella yomogifoliae* Shinji *Zool. Mag. Tokyo*, **34**(407) : 788.

1976. *Macrosiphoniella yomogifoliae* (Shinji) : Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(2) : 305.

Material examined : 4 apterae and 1 nymph.

Host plant and locality : *Artemisia vulgaris* (Compositae), S.E. Falls, 3.7.1969, 24.9.1969, Z.S.I. Coll.

Biology : Brownish green insects infest the tender shoots and under surface of the leaves.

Distribution : India : Meghalaya (S.E. Falls), Arunachal Pradesh, Himachal Pradesh, Sikkim, South India, Uttar Pradesh, West Bengal; Elsewhere : China, Japan, Korea, Malayasia and Taiwan.

Genus 34. *Macrosiphum* Passerini

1860. *Macrosiphum* Passerini, *Gli Afidi, Parma* : 27.

Type species : *Aphis rosae* Linnaeus, 1758.

Key to the subgenera of the genus *Macrosiphum* Passerini

- 1(2) First tarsal segment with 4,4,4 hairs *Neomacrosiphum*
 2(1) First tarsal segment with 3,3,3 hairs 3
 3(4) Longest hair on segment III never less than 0.50 times as long as diameter of the segment...
 *Sitobion*
 4(3) Longest hair on segment III never less than 0.75 times as long as but may be longer than
 basal diameter of the segment *Macrosiphum* s.s.

Key to the species of *Macrosiphum* Passerini

Apterous viviparous female :

- 1(10) Longest hair on antennal segment III about 0.6 times as long as the basal diameter of the segment; 1st instar nymphs with four caudal hairs..... *Macrosiphum* S. S.
- 2(3) Hind tibiae with spines besides normal hairs..... 4
- 3(2) Hind tibiae with normal hairs..... 8
- 4(5) Antennae, siphunculi and cauda dark; 7th and 8th abdominal sternites with spinulose striations. Infest Compositae.....
.....*Macrosiphum spinepes spinepes*
- 5(4) Antennae, siphunculi, cauda paler; venter of abdomen evenly and distinctly spinulose.....
..... 6
- 6(7) Cauda with more hairs (20-23)*Macrosiphum spinipes rhododendri*
- 7(6) Cauda with less hairs *Sipnotibium*
- 8(9) III antennal segment with 1-3 secondary rhinaria; siphunculi dark in comparison to the pale body; cauda pale; u.r.s. about 0.6 - at most 0.8 times as long as h.t.2.....
.....*Macrosiphum pachysiphon*
- 9(8) III antennal segment with 9-13 secondary rhinaria distributed on basal half; siphunculi brownish on basal half and at the very apex, rest paler; cauda dusky; u.r.s. never less than 0.9 times as long as to longer than h.t.2..... *Macrosiphum rosae*
- 10(1) Longest hair on antennal segment III at most 0.6 times as long as the basal diameter of the segment; 1st instar nymphs with 2 caudal hairs..... Subgenus *Sitobion*
- 11(14) U.r.s. distinctly longer than h.t.2..... 12
- 12(13) Venter of the head spinulose; flagellum; (excepting the apices of segments III, IV, V and p.t. which are dusky) pale, segment III with 4-8 secondary rhinaria; dorsum of abdomen pale.....
.....*Macrosiphum (Sitobion) plectranthi*
- 13(12) Venter of head smooth; flagellum nearly black with the very base of segment III dusky; segment III with 1-2 secondary rhinaria near base; dorsum of abdomen with an irregular brownish patch medially extending from abdominal segment 1-5.....
.....*Macrosiphum (Sitobion) luteum*
- 14(11) U.r.s. distinctly shorter than or at most equal to h.t.2..... 15
- 15(16) Head smooth; III antennal segment with 2-4 secondary rhinaria near base; p.t. 5.5 - 6 times as long as base of the segment; u.r.s. bears shaped; dorsum of abdomen dusky; ante-siphuncular sclerite present.....
.....*Macrosiphum (Sitobion) smilacifoliae*
- 16(15) Head with granules on the dorsum..... 17

- 17(18) U.r.s. never less than 1.5 and may be up to 1.8 times as long as its basal width; p.t. slightly longer than the width of head including the outer margin of the eyes; antennal segment III with 1-3 secondary rhinaria near base, p.t. about 4-5 times as long as the base of segment VI. *Macrosiphum (Sitobion) africanum*
- 18(17) U.r.s. at most up to 1.3 times as long as its basal width..... 19
- 19(20) Head and body pale with scattered brownish muskel plattern like structure on the abdomen; flagellum pale with apices of segments III,IV,V and whole of VI brownish, segment III with 3-6 secondary rhinaria near base, p.t. 5 to 6 times as long as the of segment VI; siphunculi dark, little less than to little over twice as long as pale cauda. Infest Rosaceae.....
..... *Macrosiphum (Sitobion) rosaeformis*
- 20(19) Head darker with apices of femora and tibiae blackish brown or black; abdomen with broken brownish to blackish brown sclerites on dorsum, or these may sometimes fuse to form a solid patch..... 21
- 21(22) Antennae much longer than the body, p.t. 6 to 7.5 times as long as the base of segment VI; dorsum of abdomen with a dark almost continuous patch extending from segments 2-6; cauda dark *Macrosiphum (Sitobion) miscanthi*
- 22(21) Antennae shorter than to at most equal to the length of body; p.t. 4-5.2 times as long as the base of segment VI; dorsum of abdomen with brownish patch medially and scattered patches marginally, cauda rather pale
..... *Macrosiphum (Sitobion) avanae*
- Alate viviparous female :*
- 1(6) Antennal hairs always more than 0.6 times as long as to as long as the basal diameter of III antennal segment; 1st instar nymphs with 4 caudal hairs.
..... *Macrosiphum S.S.*
- 2(5) Hind tibiae only with normal hairs 3
- 3(4) III antennal segment with 47-35 secondary rhinaria on about basal 0.8 portion; flagellum (excepting the segment III which is partly darker) pale brownish; u.r.s. as long as to slightly longer than h.t.2..... *Macrosiphum rosae*
- 4(3) III antennal segment with 16-22 secondary rhinaria distributed on its entire lengt, flagellum dark brown; u.r.s. 0.6-0.7 times as long as h.t.2; body rather pale with scattered sclorites; siphunculi dark *Macrosiphum pachysiphon*
- 5(2) Hind tibiae with spines distributed all throughout its length besides normal hairs; antennae blackish brown on III and IV segments, rest brownish; III antennal segment with 46-64 secondary rhinaria distributed irregularly over its entire length; u.r.s. stout and rather long, about 1.5-1.6 times as long as h.t.2.....
..... *Macrosiphun spinipes spinipes*

- 6(1) Antennal hairs short, less than 0.5 to at most 0.6 times the basal diameter of III antennal segment; 1st instar nymphs with 2 caudal hairs..... Subgenus *Sitobion*
- 7(10) U.r.s. as long as or longer than h.t.2..... 8
- 8(9) Antennal segment III longer than p.t. and with 15-25 secondary rhinaria distributed over the entire length; 8th abdominal tergites with 6 hairs
.....*Macrosiphum (Sitobion) rosaeformis*
- 9(8) Antennal segment III shorter than p.t. and with 14-15 secondary rhinaria; 8th abdominal tergites with 4 hairs *Macrosiphum (Sitobion) luteum*
- 10(7) U.r.s. distinctly shorter than h.t.2 11
- 11(12) Post-siphuncular sclerite absent; antennal segment 1 with 8 hairs, III antennal segment much shorter than p.t. and with 8-11 secondary rhinaria.....
.....*Macrosiphum (Sitobion) avenae*
- 12(11) Post-siphuncular sclerite present; antennal segment 1 with 5-6 hairs 13
- 13(14) Siphunculi about 11-12 times as long as its minimum width, about 5 times as long as h.t.2 and about 6.5 times as long as u.r.s.; cauda with 8-9 hairs; antennal segment 1 with 5 and II with 3 hairs; III antennal segment with 10-13 secondary rhinaria.....
.....*Macrosiphum (Sitobion) smilacifoliae*
- 14(13) Siphunculi about 9 times as long as its minimum width, about 4 times as long as h.t.2 and about 4-5 times as long as u.r.s.; cauda with 7-8 hairs; antennal segment I with 6 and II with 4 hairs, III antennal segment with 8-9 secondary rhinaria.....
.....*Macrosiphum (Sitobion) miscanthi*

80. *Macrosiphum (Macrosiphum) aulacorthoides* David, Narayanan and Rajasingh

1970. *Macrosiphum aulacorthoides* David, Narayanan and Rajasingh *Orient. Insects*, 4(4) : 240.
1980. *Macrosiphum (Macrosiphum) aulacorthoides* David, Narayanan and Rajasingh : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Taxonomy of the Aphids of North East India and Bhutan. The Zoological Society, Calcutta* : 180.

Material examined : Three apterous viviparous females and nymphs, Kench's trace, 7.4.1976, A.K. Ghosh.

Host plant : *Rubus* sp. (Rosaceae).

Distribution : India : Meghalaya (Kench's trace), Arunachal Pradesh, Himachal Pradesh, Sikkim and West Bengal.

81. *Macrosiphum (Macrosiphum) pachysiphon* Hille Ris Lambers

1966. *Macrosiphum pachysiphon* Hille Ris Lambers, *Tijdschr. Ent.*, 109 : 203.
1980. *Macrosiphum (Macrosiphum) pachysiphon* : Raychaudhuri, D.N., Ghosh, M.R., and Basu, R.C., *In Taxonomy of Aphids of North East India and Bhutan. The Zoological Society, Calcutta* : 181.

Material examined : Several apterae, alate and nymphs.

Host plant and locality : *Rosa* sp. (Rosaceae), Nongrim Hill, 12.12.1968, Nongthymai, 19.8.1969; *Rubus ellipticus* (Rosaceae), Nongrim Hill, 13.12.1968, *Rubus rosaefolius* (Rosaceae), Nongrim Hill, 13.12.1968, 25.6.1969, Umpling, 1.7.1969, 11.7.1969, Patharmukhrah, 25.9.1969, vagrant alatae on *Ficus* sp. (Moraceae), Laitumkhrah, 4.6.1969 and on *Pinus* sp. (Pinaceae), Mulki 7.7.1969. (C.U. Coll)

Biology : Pinkish to brownish specimens with black siphunculi infest both the surfaces of the leaves, growing shoots, buds and flowers.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Pakistan.

82. *Macrosiphum (Macrosiphum) rosae* (Linnaeus)

1758. *Aphis rosae* Linnaeus, Syst. Nat., 10th ed.), 1 : 452.

1980. *Macrosiphum (Macrosiphum) rosae* (Linnaeus) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., In Taxonomy of the Aphids of North East India and Bhutan. The Zoological Society, Calcutta : 181.

Material examined : 8 apterae, 4 alatae.

Host plant and locality : *Rosa* sp. (Rosaceae), Laitumkhrah, 10.3.1969.

Biology : Light brownish insects were seen to infest the leaves, the young shoots and the buds.

Distribution : India : Meghalaya (Laitumkhrah), Manipur, Sikkim, South India, Uttar Pradesh and West Bengal. Elsewhere : Virtually cosmopolitan.

83. *Macrosiphum spinipes spinipes* (Basu [Fig. 41])

1967. *Macrosiphoniella spinipes spinipes* Basu A.N. Bull. Ent., 8(2) : 151.

Material examined : 10 apterae, 2 alatae and 2 nymphs.

Host plant and locality : *Artemisia vulgaris* (Compositae), Cherrapunji, 21.12.1968, Nongrim Hill, 25.6.1969; vagrant alata on *Cynorlossus* sp. (Boraginaceae), Happy Valley, 13.6.1969.

Biology : Brownish green insects with black siphunculi and dusky cauda infest the growing shoots, under the upper surfaces of the leaves.

Distribution : India : Meghalaya (Cherrapunji, Happy Valley), Assam, West Bengal.

Remarks : The species was described by Basu A.N. (1967) as *Macrosiphoniella spinipes*. However, the species differs from typical *Macrosiphoniella* in the absence of hair bearing sclerites and in the shape of ultimate rostral segment which is not stileto-shaped. Further, the cauda of new born nymphs of the species shows 4 hairs and all these characters prompt transference of this species to *Macrosiphum* S.S. from *Macrosiphoniella*.

84. *Macrosiphum spinipes rhododendri* (Ghosh, Basu and Raychaudhuri)

1969. *Macrosiphum spinipes rhododendri* Ghosh, Basu, Raychaudhuri Orient. Insects, 3(3) : 250.

Material examined : 2 apterae and 4 nymphs.

Host plant and locality : *Rhododendron arboreum* (Ericaceae), Kench's trace, 11.7.1966.

Biology : Light brown specimens were collected from the under surface of the leaves.

Distribution : India : Meghalaya (Kench's trace), Assam, West Bengal.

85. *Macrosiphum (Macrosiphum) spinotibium* Ghosh, Ghosh and Raychaudhuri.

1970. *Macrosiphum spinotibium* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects*, **4(4)** : 381.

1980. *Macrosiphum (Macrosiphum) spinotibium* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta* : 182.

Material examined : Many apterous and alate viviparous females and nymphs, Shillong, 7.4.1976, A.K. Ghosh.

Host plants : *Artemesia* spp. and other identified plants (Compositae).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Manipur, Sikkim and West Bengal.

Remarks : Ghosh A.K., Banerjee and Raychaudhuri D.N. (1971) reported the oviparae from Arunachal Pradesh.

86. *Macrosiphum (Sitobion) africanum* Hille Ris Lambers

1954. *Macrosiphum (Sitobion) africanum* Hille Ris Lambers *Boll. Lab. Zool. Gen. Agr. Portici.*, **33** : 169.

Material examined : 3 apterae and 5 nymphs.

Host plant and locality : *Poa* sp. (Gramineae), Motinagar, 26.2.1969, Patharmukhrah, 25.9.1969.

Biology : Brownish forms infest the under and upper surfaces of the leaves, growing shoots and the basal portion of the stem of the host plants.

Distribution : India : Meghalaya (Motinagar), Assam, South India, West Bengal. Elsewhere : East Africa.

87. *Macrosiphum (Sitobion) avenae* (Fabricius)

1775. *Aphis avenae* Fabricius, *Systema Entomologiae* : 736.

1953. *Macrosiphum (Sitobion) avenae* (Fabricius): Cottier *Aphids of New Zealand* : 222.

Material examined : 8 apterae, 7 alatae and 2 nymphs.

Host plant and locality : *Allium ascalomicum* (Liliaceae), Patharmukhrah, 3.3.1969; *Brassica oleracea* (Cruciferae), Patharmukhrah, 25.3.1969; *Paspalum dilatatum* (Gramineae), Patharmukhrah, 25.9.1969; *Poa* sp. (Gramineae), Nongrim Hill, 5.3.1969, 28.5.1969; *Solanum tuberosum* (Solanaceae), Patharmukhrah, 3.3.1969; *Spinacea eleracea* (Chenopodiaceae), Nongrim Hill, 17.12.1968; *Stellaria media* (Caryophyllaceae), Laitumkhrah, 11.3.1968 and Y.P.T. 3.3.1969.

All alatae excepting these on the host plants like *Poa* sp., *Paspalum dilatatum* and *Stellaria media* may be vagrant ones.

Biology : Brownish insects were seen not only on the under and upper surfaces of the leaves but also surrounding the apical and basal portions of the shoot.

Distribution : India : Meghalaya (Widely distributed); Elsewhere : Formosa, Japan, Java, Africa, Australia, Europe, America.

88. *Macrosiphum (Sitobion) fagopyri* Ghosh and Raychaudhuri

1972. *Macrosiphum fagopyri* Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects*, 6 : 375.

1980. *Macrosiphum (Sitobion) fagopyri* : Raychaudhuri, D.N., Ghosh M.R. and Basu, R.C. *In Aphids of North East India and Bhutan* : 183.

Material examined: Many apterous viviparous females and nymphs.

Host plant and locality : *Fagopyrum* sp., *Fagopyrum cymosum* (Polygonaceae), Shillong, 7.4.1976, A.K. Ghosh

Distribution : India : Meghalaya (Shillong), West Bengal.

89. *Macrosiphum (Sitobion) ibarae* Matsumura

1964. *Sitobion indicum* Basu, *J. Linn. Soc., (zool.)*, 45 : 230.

1980. *Macrosiphum (Sitobion) ibarae* : Raychaudhuri, Ghosh and Basu, *In. Aphids of North-East India and Bhutan* : 184.

Material examined : Nil

Host plant : *Cymbidium* sp.

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

90. *Macrosiphum (Sitobion) indicum* (Basu)

1964. *Sitobion indicum* Basu, A.N., *J. Linn. Soc. (zool.)*, 45 : 230

1980. *Macrosiphum (Sitobion) indicum* (Basu), Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 184.

Host plant : *Cymbidium* sp.

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

91. *Macrosiphum (Sitobion) luteum* (Buckton)

1876. *Siphonophora lutea* Buckton, *Monograph British Aphides*, 1 : 119.

1937. *Macrosiphum (Sitobion) luteum* (Buckton): Hille Ris Lambers, *Temminckia*, 4 : 118.

1968. *Macrosiphum (Sitobion) luteum* (Buckton), Ghosh and Raychaudhuri *Proc. zool. Soc. Calcutta*. 21 : 184.

Material examined : Numerous apterae and alatae.

Host plant and locality : *Calanthe masuca*, *Cymbidium monronianum*, *Dendrobium longicorum*, *Eria lambusifolia*, *Otochilus porrecta* of the Natural order Orchidaceae, Botanical Survey of India, 23.12.1968.

Biology : Yellowish green insects infest the upper and under surfaces of the leaves, growing shoot and also the inflorescence.

Distribution : India : Meghalaya (Shillong), Assam, West Bengal. Elsewhere : America, Australia, Europe.

92. *Macrosiphum (Sitobion) mimosae* Ghosh, Basu and Raychaudhuri

1977. *Macrosiphum (Sitobion) mimosae* Ghosh, M.R., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **11**(4) : 583.
 1980. *Macrosiphum (Sitobion) mimosae* : Raychaudhuri, D.N., Ghosh M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 184.

Material examined : 1 apterous viviparous female and one nymph.

Host plant and locality : *Mimosa pudica* (Mimosae), Shillong. 17.4.1976, A.K. Ghosh.

Distribution : India : Meghalaya (Shillong), West Bengal.

93. *Macrosiphum (Sitobion) miscanthi* (Takahashi)

1921. *Macrosiphum miscanthi* Takahashi, *Aphididae of Formosa*, **1** : 8.
 1980. *Macrosiphum (Sitobion) miscanthi* : Raychaudhuri, D.N., Ghosh M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 185.

Material examined : 4 apterae, 2 alatae and 2 nymphs.

Host plant and locality : *Cyperus rotundus* (Cyperaceae), Beadon Falls, 7.8.1979; *Poa* sp. (Gramineae), Beadon Falls, 7.8.1969; *Sarothamnus pallidus* (Orchidaceae), New colony, 17.7.1965.

Biology : Brown to blackish brown insects infest the leaves, both growing and basal portions of the shoots.

Distribution : India : Meghalaya (Shillong), Assam, West Bengal, Sikkim, Himachal Pradesh, Uttar Pradesh. Elsewhere : Australia, China, Formosa, England.

94. *Macrosiphum (Sitobion) plectranthi* Ghosh, Ghosh and Raychaudhuri [Fig. 39]

1970. *Macrosiphum (Sitobion) plectranthi* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects*, **4**(4) : 382.
 1980. *Macrosiphum (Sitobion) plectranthi* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Aphids of North East India and Bhutan* : 185

Material examined : 3 apterae and 1 nymph.

Host plant and locality : *Perilla* sp. (Labiatae), Motinagar, 6.6.1969.

Biology : Light brown apterae were seen on the under surface of the leaves and surrounding the inflorescence.

Distribution : India : Meghalaya (Motinagar) Assam, West Bengal.

95. *Macrosiphum (Sitobion) resaeformis* (Das) [Fig. 40]

1918. *Macrosiphum resaeformis* Das, *Mem. Indian Mus.*, **6**(4) : 158.
 1980. *Macrosiphum (Sitobion) resaeformis* : Raychaudhuri, D.N., Ghosh M.R. and Basu, R.C. *In Aphids of North East India and Bhutan* : 186.

Material examined : Many apterous and alate viviparous females and nymphs.

Host plant and locality : *Rosa cania*, *Rosa macrophylla*, *Rosa moschata*, and *Spiraea corymbosa* (Rosaceae), Shillong, 17.4.1976, A.K. Ghosh.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Assam, Bihar, Manipur, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal. Elsewhere : Nepal; Pakistan.

96. *Macrosiphum (Sitobion) sikkimensis* Ghosh and Raychaudhuri

1968. *Macrosiphum (Sitobion) sikkimensis* Ghosh and Raychaudhuri, *Ann. ent. Soc. Am.*, **61** : 753.

Material examined : Nil

Host plant : *Smilax* sp. (Liliaceae).

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

97. *Macrosiphum (Sitobion) smilacifoliae* (Takahashi)

1921. *Macrosiphum smilacifoliae* Takahashi, *Aphididae of Formosa*, pt. 1 : 12.

1964. *Macrosiphum (Sitobion) smilacifoliae* (Takahashi); Takahashi, *Kontyu*, **32**(3) : 353.

Material examined : 3 apterae, 4 alatae and 1 nymph.

Host plant and locality : *Smilax forex* (Liliaceae), Umpling, 23.6.1969, Shillong, 17.4.1976, A.K. Ghosh.

Biology : Brown to chocolate brown specimens were seen to infest the under surface of the leaves of the host plant.

Distribution : India : Meghalaya (Shillong), Assam, West Bengal. Elsewhere : Formosa, Japan.

Remarks : This species is very closely related to *Macrosiphum (Sitobion) avenae* (Shinji) which is in the opinion of Takahashi (1964) is perhaps *miscanthi* Takahashi.

98. *Macrosiphum (Sitobion) Takahashii* Eastop

1959. *Macrosiphum (Sitobion) Takahashii* Eastop, *Entomologist*, **92** : 104.

1980. *Macrosiphum (Sitobion) Takahashii* Eastop; Raychaudhuri, D.N., et al. *In Taxonomy of the Aphids of North East India and Bhutan* : 188.

Material examined : 5 apterae and nymphs, Mawphlang, 27.4.1976, A.K. Ghosh.

Host plant : Unidentified.

Distribution : India : Meghalaya (Mawphlang), Sikkim, South India, West Bengal. Elsewhere : Africa, Japan and Taiwan.

Genus 35. *Matsumuraja* Schumacher

1921. *Matsumuraja* Schumacher, *Zool. Anz.*, **53** : 186.

99. *Matsumuraja capitophoroides* Hille Ris Lambers [Fig. 42]

1966. *Matsumuraja capitophoroides* Hille Ris Lambers, *Tijdschr. Ent.*, **109**(8) : 215.

Material examined : Numerous apterae and nymphs.

Host plant and locality : *Rubus macilentus* (Rosaceae), Nongrim Hill, 13.12.1969; *Rubus rosaefolius* (Rosaceae), Upper Shillong, 5.1.1969; Dhankhetti, 30.7.1969; *Rubus* sp. (Rosaceae), Upper Shillong, 30.1.1969.

Biology : Pale Yellowish insects were collected from under and upper surfaces of the leaves, growing shoots and inflorescence.

Distribution : India : Meghalaya (Shillong), Assam, Uttar Pradesh , Himachal Pradesh, West Bengal. Elsewhere : West Pakistan.

Genus 36. *Metaphorodon* Takahashi

1961. *Metaphorodon* Takahashi, *Bull. Univ. Osaka Prefect* (Ser. B) 11 : 1.

100. *Metaphorodon polygoni* (van der Goot) [Fig. 43]

1917. *Phorodon polygoni* van der Goot, *Contrib. Faune. Indes Neerl.*, 1(3) : 44.

1961. *Metaphorodon polygoni* (van der Goot) : Takahashi *Bull. Univ. Osaka Prof.*, (B) 11 : 3.

1968. *Metaphorodon polygoni* (van der Goot) : Ghosh, A.K. and Raychaudhuri, D.N. *Proc. zool. Soc. Calcutta*, 21 : 136.

Material examined : 6 apterae, 3 alatae and 2 nymphs.

Host plant and locality : *Polygonum* sp. (Polygonaceae), Upper Shillong, 5.1.1969, Umpling 16.5.1969, Cherrapunji 4.6.1969, Dhankheti, 19.6.1969; *Polygonum serrulatum* (Polygonaceae), Laban, 4.7.1969.

Biology : Brownish insects infest both the surfaces of the leaves and soft growing shoots.

Distribution : India : Meghalaya (Umpling, Cherrapunji, Dhankheti, Laban, Shillong), Sikkim, West Bengal. Elsewhere : Japan; Java.

Genus 37. *Metopolophium* Mordvilko

1914. *Metopolophium* Mordvilko, *Faune. Russie.*, 1 : 82.

Type species : *Aphis dihorda* Walker, 1848.

101. *Metopolophium (Metopolophium) euryae* (Takahashi)

1937. *Macrosiphum euryae* Takahashi, *Philipp. J. Sci.*, 63 : 7.

1980. *Metopolophium (Metopolophium) euryae* (Takahashi) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Taxonomy of In Aphids of North East India and Bhutan* : 196.

Material examined : 2 apterae.

Host plant and locality : *Eurya japonica* (Ternstroemiaceae), Mawphlang, 4.ix.1972, A.K. Ghosh

Distribution : India : Meghalaya (Mawphlang). Elsewhere : Taiwan.

Remarks : This species was recorded for the first time from India by Ghosh, A.K. (1974). He discussed about its affinity with Japanese material.

Genus 38. *Micromyzodium* David

1958. *Micromyzodium* David, *Indian J. Ent.*, 20(3) : 175.

Type species : *Micromyzodium filicium* David, 1958.

102. *Micromyzodium filicium* David1958. *Micromyzodium filicium* David, *Indian J. Ent.*, **20**(3) : 176.1972. *Micromyzodium filicium* David : Ghosh, L.K. *Orient. Insects.*, **6**(2) : 172.*Material examined* : 4 apterae*Host plant and locality* : *Pitrogramme chrysophila* (Pteridoceae), Shillong, 17.iv.1976, A.K. Ghosh.*Biology* : Brownish to black aphids were collected from the undersurface of leaves of the host plants.*Distribution* : India : Meghalaya (Shillong), Himachal Pradesh, Uttar Pradesh and South India.Genus 39. *Micromyzus* van der Goot1917. *Micromyzus* van der Goot, *Contr. Faune. Indes. neerl.*, **1**(3) : 52.Type species : *Micromyzus nigrum* van der Goot, 1917.103. *Micromyzus kalimpongensis* Basu [Fig. 44]1967. *Micromyzus kalimpongensis* Basu, A.N., *Bull. Ent.*, **8** : 152.1980. *Micromyzus kalimpongensis* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In The Aphids of North East India and Bhutan* : 205.*Material examined* : 4 apterae and 2 nymphs*Host plant and locality* : *Curcuma longa* (Zingiberaceae), Silvicultural Garden, 3.1.1969.*Biology* : Brownish insects infest the undersurface of the leaves.*Distribution* : India : Meghalaya (Shillong), West Bengal.104. *Micromyzus mawphlangensis* Ghosh1974. *Micromyzus mawphlangensis* Ghosh, A.K. *Orient. Insects*, **8** : 163.*Material examined* : 2 alatae and nymphs.*Host plant and locality* : *Polypodium* sp. Mawphlang, Khasi Hills, 4.xi.1972. A.K. Ghosh.*Biological notes* : The species was collected in a colony from young shoot of host plant in Mawphlang forest.*Distribution* : India : Meghalaya (Mawphlang, Khasi Hills).105. *Micromyzus* Sp.

Morphological Characters : *Apterous oviparous female* : Body about 1.5 – 1.65 mm long, with about 0.8 – 0.92 mm as maximum width, pale but head, antennae, legs, siphunculi and cauda are brown. Head spinulose with somewhat parallel lateral frontal tubercles; flagellum distinctly imbricated, segment III nearly equal to the length of segments IV and V taken together, rest broken; rostrum reaching hind coxae, u.r.s. about 1.5 times as long as h.t.2., dorsum of abdomen pale, with very short hairs which are about 15 μ – 18 μ long; siphunculi cylindrical, weakly clavate, about 0.17 times as long as body; cauda about 0.6 times as long as siphunculi, with somewhat bulbous base and narrowed apex, bears 6-8 hairs. Hind tibiae swollen and bears 40-45 pseudosensoria, F.T.C. 3,3,2.

Measurements of one specimen in mm : Length of body 1.65; width of body 0.92; length of antennal segments III : IV : V 0.30 : 0.17 : 0.14; length of u.r.s. 0.11; length of h.t.2 0.07; length of siphunculus 0.27; length of cauda 0.17.

Material examined : 2 apterous oviparous females.

Host plant and locality : *Symplocos* sp. (Symplococaceae), Cherrapunji, 20.12.1969.

Biology : Greenish brown insects were seen on undersurface of the leaf.

Remarks : Scantly material and lack of viviparae made specific identification difficult and only a short description of the oviparous morph is given.

Genus 40. *Myzus* Passerrini

1860. *Myzus* Passerrini, *Gli Afidi Parma* : 27.

Type species : *Aphis cerasi* Fabricius, 1775.

Key to the species of *Myzus* Passerrini

- 1(2) U.r.s. short with obtuse apex, shorter than ht₂..... *obtusirostris*
- 2(1) U.r.s. long, about as long as to 1.5 times as long as ht₂ 3
- 3(4) Tergite 7 slightly and subgenital plate strongly produced posteriorly, the latter nearly triangular *siegesbeckicola*
- 4(3) Tergite 7 and subgenital plate normal hairs on abdominal dorsum short with myzine type of apices 5
- 5(6) Siphunculi very short, never exceeding 0.06-0.08 times as long as body and slightly shorter to just longer than cauda *brevisiphon*
- 6(5) Siphunculi never less than 0.10 times as long as body and at least 1.5 times as long as cauda 7
- 7(8) Siphunculi strongly clavate 9
- 8(7) Siphunculi usually cylindrical or very weakly swollen on inner margin just before apical flange 13
- 9(10) Distance between 6th and 7th spiracles distinctly longer than that between 5th and 6th *persicae*
- 10(9) Distance between 6th and 7th spiracles distinctly shorter than that between 5th and 6th 11
- 11(12) 8th abdominal tergite with 2 hairs; antennae shorter than to about as long as body *cymballariellus*
- 12(11) 8th abdominal tergite with 4 hairs; antennae always longer than body *ascalonicus*
- 13(14) Siphunculi as long as or longer than width of head across outer margin of eyes; siphunculi bent outward at apex *dycei*

- 14(13) Siphunculi distinctly shorter than width of head across outer margin of eyes..... 15
 15(16) Dorsum of head uniformly spinulose or warty 17
 16(15) Dorsum of head not uniformly spinulose or warty 19
 17(18) P.t. longer than a.s. III and siphunculi; siphunculi with normal imbrications *manoji*
 18(17) P.t. shorter than a.s. III and siphunculi; siphunculi with strong imbrications *cerasi*
 19(20) Dorsum of abdomen pale but usually with segmentally arranged dark patches; u.r.s. usually as long as ht₂..... *ornatus*
 20(19) Dorsum of abdomen not as above; u.r.s. never less than 1.20 times as long as ht₂..... 21
 21(22) F.T.C. 3 : 3 : 3; cauda with 4 hairs..... *indicus*
 22(21) F.T.C. 3 : 3 : 2; cauda with 6 hairs..... *meghalayensis*

106. *Myzus ascalonicus* Doncaster

1964. *Myzus ascalonicus* Doncaster, *Proc. R. ent. Soc. Lond.*, (B) 15 : 27.

1980. *Myzus ascalonicus* Doncaster : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In The Aphids of North East India and Bhutan* : 221.

Material examined : Many apterae, 3 alatae and nymphs.

Host plant and locality : *Calamintha* sp. (Labiatae), Jowai, 19.3.1969; *Ceresteum glomorum* (Carryophyllaceae), Upper Shillong, 31.12.1969, 30.1.1969, 5.3.1969; *Chrysanthemum* sp. (Compositae), Laban, 13.2.1969, 25.2.1969; *Hypochoeris radicata* (Compositae), Jail Road, 7.3.1969; *Papaver somnifera* (Papavaraeaceae), Laban, 17.2.1969; *Richardsonia pilosa* (Eubiaceae), Laitumkhrah, 31.12.1968; *Sonobieria pinnotifida* (Cruciferae), Kench's trace, 7.3.1969 (C.U. Coll.)

Biology : Greenish brown to dark brown apterae and alatae infest under and upper surfaces of the leaves, growing shoots and inflorescences.

Distribution : India : Meghalaya (Shillong), Assam, West Bengal, Uttar Pradesh Elsewhere : Australia; New Zealand; Europe; North America.

107. *Myzus brevisiphon* A.N. Basu

1969. *Myzus brevisiphon* Basu, A.N., *Orient. Insects*, 3 : 180.

1967. *Myzus brevisiphon* Basu; Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 10(1) : 98.

Material examined : 3 apterae and 2 nymphs.

Host plant and locality : *Polygonum capitatum*, *Polygonum* sp. (Polygonaceae), Shillong. (C.U. Coll.)

Distribution : India : Meghalaya (Shillong), Uttar Pradesh, West Bengal.

108. *Myzus cerasi* (Fabricius)

1775. *Aphis cerasi* Fabricius, *Syst. Ent.*, : 734.

1976. *Myzus cerasi* (Fabricius); Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 10(1) : 99.

Material examined : 2 apterae

Host plant and locality : *Sambucas javanica* (Caprifoliaceae), Cherrapunji, 21.12.1968.

Biology : Dark brown insects were collected from the under surface of the leaves.

Distribution : India : Meghalaya (Cherapunji), Assam, West Bengal, Himachal Pradesh, Sikkim, Uttar Pradesh. Elsewhere : Japan; Australia; New Zealand, Europe; North America and virtually cosmopolitan.

109. *Myzus cymballariellus* Stroyan

1967. *Myzus* (*Sciamyzus*) *cymballariellus* Stroyan, *Proc. R. ent. Soc. Lond* (B.) : 186 [= *Myzus* (*Sciamyzus*) *cymballariellus* Stroyan 1954].

1976. *Myzus cymballeriellus* Stroyan; Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, 10(1) : 99.

Material examined : 3 apterae

Host plant and locality : *Amaranthus viridis* (Amaranthaceae), Laban, 4.7.1969; *Oxalis corniculata* (Oxalidaceae), S.E. Falls, 27.1.1969 and *Spiraea* sp. (Rosaceae), Nongrim Hill, 12.12.1968.

Biology : Brown to reddish apterae were seen on the stem and under surface of the leaves.

Distribution : India : Meghalaya (Nongrim Hill, Laban), Himachal Pradesh, West Bengal. Elsewhere : Australia; England; New Zealand; South Africa.

110. *Myzus dycei* Carver

1961. *Myzus dycei* Carver, *Proc. R. ent. Soc. Lond.*, (B) 30 : 69.

1976. *Myzus dycei* : Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 10(1) : 99.

Material examined : 16 apterae, 3 alatae and 2 nymphs.

Host plant and locality : *Cucurbita* sp. (Cucurbitaceae), Laitumkhrah, 27.12.1968, and *Digitalis* sp. (Scrophulariaceae), Laban, 16.12.1968; *Urtica* sp. (Urticaceae), Nongrim Hill, 12.12.1968 and Dhankhetti, 26.6.1968; also in Y.P.T. 15.12.1968.

Distribution : India : Meghalaya (Laitumkhrah, Laban, Nongrim Hill, Dhankhetti).

Biology : Black insects were collected from the stem and under surface of the leaves. Sometimes ants were seen in association.

111. *Myzus indicus* Basu & Raychaudhuri

1976. *Myzus indicus* Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects* 10(1) : 100.

1980. *Myzus indicus* Basu and Raychaudhuri; Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In Aphids of North East India and Bhutan* : 214.

Material examined : 10 apterae and nymphs

Host plant and locality : *Boehmeria* sp. (Urticaceae), Shillong, 28.xii.1968, C.U. coll.

Distribution : India : Meghalaya (Shillong).

Remarks : Raychaudhuri, D.N. (ed.), 1980 discussed taxonomic affinities of *M. indicus* with its related species.

112. *Myzus meghalayensis* Basu and Raychaudhuri

1976. *Myzus meghalayensis* Basu R.C and Raychaudhuri, D.N. *Orient. Insects.*, **10**(1) : 105.

1980. *Myzus meghalayensis* Basu and Raychaudhuri; Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., In *Aphids of North East India and Bhutan* : 216.

Material examined : 4 apterae

Host plant and locality : Host unidentified, Shillong, 18.xii.1968, R. C. Basu coll.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is endemic and originally described from Meghalaya. It is characterised by its completely pale body, dorsum of head not uniformly spinulose, smooth dorsum of femora.

113. *Myzus manoji* Basu and Raychaudhuri

1976. *Myzus manoji* Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(1) : 104.

1980. *Myzus manoji* Basu and Raychaudhuri; Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., In *Aphids of North East India and Bhutan* : 215.

Material examined : 2 apterae and nymphs.

Host plant and locality : Host undetermined, Shillong, A.K. Ghosh (ZSI. Coll.)

Distribution : India : Meghalaya (Shillong), West Bengal.

114. *Myzus obtusirostris* David, Narayanan and Rajasingh

1971. *Myzus obtusirostris* David, Narayanan and Rajasingh, *Orient. Insects*, **5**(4) : 563.

1972. *Myzus obtusirostris* : Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects*, **6**(3) : 367.

Material examined : 1 aptera

Host plant and locality : *Lindra* sp., Shillong, 28.iii. 1970, C.U. coll.

Distribution : India : Meghalaya (Shillong).

Remarks : This species was originally described from material collected on grass from Meghalaya.

115. *Myzus ornatus* Laing

1932. *Myzus ornatus* Laing, *Ent. Mon. Mag.*, **68** : 52.

1976. *Myzus ornatus* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(1) : 197.

Material examined : Many apterae, alatae and nymphs.

Host plant and locality : Numerous plants belonging to varied Natural orders were seen to be infested throughout the year in many localities. A few alatae were collected in Y.P.T.

Biology : Light green to dark brown insects were seen to infest almost all the parts of a plant body excepting the roots. Sometimes ants were seen in association.

Distribution : India : Meghalaya (almost all the districts of the state) and all over India; Virtually cosmopolitan.

116. *Muzus persicae* (Sulzer)

1776. *Aphis persicae* Sulzer, *Abgekürzte Gesch. Insekten* : 105.

1976. *Muzus persicae* (Sulzer) : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(1) : 107.

Material examined : Many apterae, alatae and nymphs.

Distribution : India : Meghalaya (almost all districts) and throughout India; Virtually cosmopolitan.

117. *Myzus siegesbeckicola* Strand

1923. *Myzus siegesbeckicola* Strand, *Act. Univ. Latviensis*, **20** : 22.

1976. *Myzus siegesbeckicola* : Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(1) : 108.

Material examined : Many apterae and alatae.

Host plant and locality : A number of plants distributed over a number of Natural orders were infested throughout the year in Shillong and its adjacent areas. Some alatae were also collected in Y.P.T. alate males were collected from *Prunus persica* (Rosaceae), Nongrim Hill, 16.12.1968 and in Y.P.T. 27.12.1968.

Biology : Light green to black forms were seen to infest the growing shoots, under and upper surfaces of the leaves, inflorescences, flowers and even fruits. In a few seasons ants were seen in association.

Distribution : India : Meghalaya (almost all districts), West Bengal. Elsewhere : Japan; Korea; Sumatra and Taiwan.

Remarks : Cottier (1953) has given detailed description of sexuales of this species from New Zealand.

Genus 41. *Neohyalomyzus* Basu, Ghosh and Raychaudhuri

1976. *Neohyalomyzus* Basu, R.C., Ghosh, M.R. and Raychaudhuri, D.N., *Entomon*, **1** : 60.

Type species : *Hyalomyzus raoi* Hille Ris Lambers, 1973

118. *Neohyalomyzus raoi* (Hille Ris Lambers)

1973. *Hyalomyzus raoi* Hille Ris Lambers, *Orient. Insects*, **7** : 242.

1980. *Neohyalomyzus raoi* (Hille Ris Lambers) : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In The Aphids of North East India and Bhutan* : 222.

Material examined : Many apterae, alatae and nymphs.

Host plant and locality : *Chenopodium* sp. (Chenopodiaceae); *Artemesia* sp. (Compositae); *Rubus ellipticus*, *Rubus reticulata* (Rosaceae); Shillong, (ZSI Coll.)

Distribution : India : Meghalaya (Shillong), Sikkim, Uttar Pradesh, West Bengal.

Genus 42. *Neomegouropsis* Ghosh, Basu and Raychaudhuri

1977. *Neomegouropsis* Ghosh, Basu and Raychaudhuri, *Orient. Insects*, **II** : 584.

Type species : *Megouroparsus dooarsis* Ghosh and Raychaudhuri, 1967.

119. *Neomegouropsis cajanae* (Ghosh and Raychaudhuri)1970. *Megoura cajanae* Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, 4 : 358.1980. *Neomegouropsis cajanae* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N., *In The Aphids of North East India and Bhutan* : 225.*Material examined* : Many apterae, alatae and nymphs.*Host plant and locality* : *Cajanus cajan*, (Papilionaceae), Shillong, (ZSI Coll.)*Distribution* : India : Meghalaya (Shillong), Arunachal Pradesh, Manipur, West Bengal.Genus 43. *Neomyzus* van der Goot1915. *Neomyzus* van der Goot, *Beitr. Kennt. Blattause* : 7Type species : *Siphonophora circumflexus* Buckton, 1876.Key to the species of *Neomyzus**Apterous viviparous females* :1(2) Fore femora and at least basal 0.50 portion of segment III smooth; siphunculi slightly swollen on distal 0.50 portion on inner margin.....*primulum*2(1) Fore femora with a few scaly imbrications at distal end; siphunculi usually cylindrical*circumflexus*120. *Neomyzus (Neomyzus) circumflexus* Buckton1976. *Siphonophora circumflexus* Buckton, *Monogr. Br. Aphides*, 1 : 30.1980. *Neomyzus (Neomyzus) circumflexus* Buckton : Raychaudhuri, D.N. Ghosh, M.R. Basu, R.C., *In The Aphids of North East India and Bhutan* : 229.*Material examined* : Many apterae, alatae and nymphs.*Host plant and locality* : Extremely polyphagous. Found throughout the year in Meghalaya State, Shillong (C. U. coll.)*Biology* : Greenish brown insects feed on both the surfaces of the leaves, growing shoots and inflorescences.*Distribution* : India : Meghalaya (widely distributed), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal; Virtually cosmopolitan.121. *Neomyzus (Neomyzus) primulum* (Ghosh, Banerjee and Raychaudhuri)1971. *Aulacorthum (Neomyzus) primulum* Ghosh, Banerjee and Raychaudhuri, *Proc. zool. Soc. Calcutta*, 24 : 100,1980. *Neomyzus (Neomyzus) primulum* (Ghosh, Banerjee and Raychaudhuri) : *In The Aphids of North East India and Bhutan* : 230.*Material examined* : Many apterae and nymphs.*Host plant and locality* : *Primula* sp. (Primulaceae), Shillong (C. U. Coll.)

Distribution : India : Meghalaya (Shillong) and Sikkim.

Genus 44. *Ovatus* van der Goot

1913. *Ovatus* van der Goot, *Tidjschr. Ent.*, **56** : 84.

Type species : *Myzus mespili* van der Goot, 1912 (= *Aphis crataegaria* Walker, 1850)

122. *Ovatus minutus* (van der Goot)

1917. *Phorodon minutus* van der Goot, *Contr. Faune Indes Neerl.*, **1** : 43.

1980. *Ovatus minutus* (van der Goot) : In The Aphids of North East India and Bhutan : 232.

Material examined : Many apterae and nymphs.

Host plant and locality : *Leonurus sibiricus* (Labiatae), Shillong, (C. U. Coll.)

Distribution : India : Meghalaya (Shillong). Elsewhere : Java.

Genus 45. *Paczoskia* Mordvilko

1914. *Paczoskia* Mordvilko, *Faune Rossie*, **1** : 63.

Type species : *Paczoskia paczorskii* Mordvilko, 1919

123. *Paczoskia budhium* Banerjee, Ghosh and Raychaudhuri [Fig. 45]

1969 *Paczoskia budhium* Banerjee, H., Ghosh, A. K. and Raychaudhuri D. N., *Orient. Insects*, **3** : 259.

1980. *Paczoskia budhium* : Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., In The Aphids of north East India and Bhutan : 234.

Material examined : 12 apterae, 3 alatae and 2 nymphs.

Host plant and locality : *Inula cappa* (Compositae), S. E. Falls, 3.7.1969, Borapani, 12.8.1969; Sweet Falls, 23.9.1969 and vagrant alatae on *Ficus* sp. (Urticaceae), Laitumkharah, 28.7.1969.

Biology : Brownish to dark greenish brown insects infest mostly the undersurface of the leaves and also the young shoots of the plant.

Distribution : India : Meghalaya (Borapani, Sweet Falls, Laitumkharah), Uttar Pradesh, West Bengal.

Genus 46. *Pentalonia* Coquerel

1859. *Pentalonia* Coquerel *Ann. Soc. ent. Fr.*, **3** : 259.

Type species : *Pentalonia nigronervosa* Coquerel, 1859

124. *Pentalonia nigronervosa* Coquerel

1859. *Pentalonia nigronervosa* Coquerel, *Ann. Soc. ent. Fr.*, **3** : 260.

1980. *Pentalonia nigronervosa* : Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. R., In The Aphids of North East India and Bhutan : 235.

Material examined : Many apterae and alatae

Host plant and locality : *Musa* spp. (Musaceae), Shillong, 12.8.1969, (ZSI Coll.)

Distribution : India : Meghalaya (Shillong), widely distributed in India and virtually cosmopolitan.

Genus 47. *Perillaphis* Takahashi1965. *Perillaphis* Takahashi, *Insecta matsum.*, 27 : 101.Type species : *Macrosiphum perillae* Shinji, 1924125. *Perillaphis perillae* (Shinji)1924. *Macrosiphum perillae* Shinji, *Zool. Mag., Tokyo*, 36 : 363.1980. *Perillaphis perillae* (Shinji) : Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 237.*Material examined* : Many apterous and alate viviparous females and nymphs.*Host plant and locality* : *Perilla* sp. (Labiatae), Shillong, C. U. Coll.*Distribution* : India : Meghalaya, Arunachal Pradesh, West Bengal. Elsewhere : Japan, Taiwan.Genus 48. *Pleotrichophorus* Börner1930. *Pleotrichophorus* Börner, *Arch. Klass. Phyl. Ent.*, 1 : 138.Type species : *Aphis glandulosa* Kaltenbach, 1846126. *Pleotrichophorus chrysanthemi* (Theobald)1920. *Capitophorus chrysanthemi* Theobald, *Bull. ent. Res.*, 11 : 69.1980. *Pleotrichophorus chrysanthemi* (Theobald); Raychaudhuri, Ghosh and Basu, *In. Taxonomy of the Aphids of North East India and Bhutan* : 239.*Material examined* : Nil.*Distribution* : India : Meghalaya. Elsewhere : Australia; Egypt; England; Ireland, Rhodesia and South Africa.*Remarks* : Ghosh A. K. (1974) reported this species for the first time from Meghalaya. So far, this species is apparently not recorded from anywhere in India except in the State of Meghalaya.Genus 49. *Pseudoacyrthosiphon* Ghosh and Raychaudhuri1969. *Pseudoacyrthosiphon* Ghosh, A. K. and Raychaudhuri *Orient. Insects*, 3 : 94.Type species : *Macrosiphum holsti* Takahashi, 1935127. *Pseudoacyrthosiphon (Pseudoacyrthosiphon) holsti* Takahashi1935. *Macrosiphum holsti* Takahashi, *Kanowia*, 14 : 318.1918. *Pseudoacyrthosiphon (Pseudoacyrthosiphon) holsti* (Takahashi) : Raychaudhuri, D.N. Ghosh M.R. and Basu, R.C., *In Aphids of North East India and Bhutan* : 142.*Material examined* : 2 apterous viviparous females.*Host plant and locality* : *Rhododendron arboreum* (Ericaceae), Shillong, C.U. coll.*Distribution* : India : Meghalaya (Shillong), Sikkim, West Bengal. Elsewhere : Japan and Taiwan.

Genus 50. *Rhodobium* Hille Ris Lambers

1947. *Rhodobium* Hille Ris Lambers, *Temminckia*, 7 : 300.

Type species : *Macrosiphum rosaefolium* Theobald, 1915.

128. *Rhodobium porosum* (Sanderson)

1901. *Muzus porosum* Sanderson, *Rep. Del. Univ. agric. Exp. Stn.*, 12 : 205.

1980. *Rhodobium porosum* (Sanderson); Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 244.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : *Rosa cania*, *Rosa macrophylla*. *Rosa* sp. (Rosaceae), Shillong, C. U. coll.

Distribution : India : Meghalaya (Shillong); South India, West Bengal; virtually cosmopolitan.

Genus 51. *Rhopalosiphoninus* Baker

1920. *Rhopalosiphoninus* Baker, *Bull. U. S. Dep. Agric.* (826) : 58.

Type species : *Amphorophora latysiphon* Davidson, 1912

129. *Rhopalosiphoninus latysiphon* (Davidson)

1912. *Amphorophora latysiphon* Davidson, *J. econ. Ent.*, 5 : 408.

1980. *Rhopalosiphoninus latysiphon* (Davidson) : Raychaudhuri, Ghosh and Basu., *In Taxonomy of the Aphids of North East India and Bhutan* : 245.

Material examined : Nil

Host plant and locality : *Poa* sp. (Gramineae), Shillong, C. U. coll.

Distribution : India : Meghalaya (Shillong), South India. Elsewhere : America; England; Germany, Holland and Switzerland.

Genus 52. *Scelromyzus* Basu, Ghosh and Raychaudhuri

1979. *Scelromyzus* Basu, Ghosh and Raychaudhuri, *Entomon.*, 1 : 64.

Type species : *Myzus corylopsis* Basu, Ghosh and Raychaudhuri, 1973.

130. *Scelromyzus corylopsis* (Basu, Ghosh and Raychaudhuri)

1973. *Myzus corylopsis* Basu, Ghosh and Raychaudhuri, *Proc. zool. Soc.*, Calcutta, 26 : 91.

1980. *Scelromyzus corylopsis* (Basu et al) : *In Taxonomy of the Aphids of North East India and Bhutan* : 247.

Material examined : Many apterae and nymphs.

Host plant and locality : *Corylopsis* sp. (Hammamelidaceae); Shillong, C. U. coll.

Distribution : India : Meghalaya (Shillong), Assam.

Genus 53. *Semiaphis* van der Goot

1913. *Semiaphis* van der Goot, *Tijdschr. Ent.*, 56 : 105.

Type species : *Aphis carotae* Koch, 1854 (= *Aphis dauci* Fabricius, 1775).

131. *Semiaphis heraclei* (Takahashi) [Fig. 46, 47]1921. *Brachycolus heraculi* Takahashi, *Aphididae of Formosa*, 1 : 60.1980. *Semiaphis heraclei* (Takahashi); Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 248.*Material examined* : Many alate viviparous females and nymphs.*Host plant and locality* : Unidentified plant of Rosaceae, Kenche's trace, 19.ix.1969.*Distribution* : India : Meghalaya (Shillong), West Bengal. Elsewhere : China; Hawaii; Japan; Korea; Sumatra and Taiwan.Genus 54. *Shinjia* Takahashi1938. *Shinjia* Takahashi, *Tenthredo*, 2 : 6.Type species : *Microtarsus pteridifoliae* Shinji, 1929.132. *Shinjia pteridifoliae* (Shinji) [Fig. 48, 49]1929. *Microtarsus pteridifoliae* Shinji, *Lansonia*, 1 : 44.1969. *Shinjia pteridifoliae* (Shinji): Basu, A. N. 1969, *Orient. Insects*, 3(4) : 366.*Material examined* : Many apterous and alate viviparous females and nymphs, 15 oviparae and 1 alate male.*Host plant and locality* : *Athyrium* sp. (Pteridophyte), Umpling, 22.7.1969, 29.7.1969, Upper Shillong, 2.8.1969, Borapani, 12.8.1969; vagrant alate male from *Sausaria* sp. (Ternstroeeaceae), Laitumkhrah, 31.12.1968 and oviparous females from an unidentified fern, Botanical Garden, 4.1.1969.*Biology* : Pale greenish to very light brownish insects with brownish antennae infest mostly the different species of fern. Mostly the under surface of the leaves and also the growing shoots are affected.*Distribution* : India : Meghalaya (Umpling, Shillong, Borapani, Laitumkhrah), Arunachal Pradesh, Assam, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Australia; China; Japan; Korea and Nepal.*Remarks* : This species is fairly common in higher altitudes of eastern India where ferns are very common but so far no sexual form had been known from India. Sorin (1962) gives a detailed biological account of this species from Japan.*Apterous oviparous female* : Body pale, about 1.3-1.4 mm long with the maximum width 0.7-0.8 mm. Head smooth, with very low diverging lateral frontal tubercles; antennae 6 segmented pale on basal two segments, root brownish, about 1.2-1.3 times as long as body, without any secondary rhinaria, p.t. 6.5-7.5 times as long as the base of segment VI; rostrum reaching beyond mid coxae, u.r.s. obtuse, about 0.12 mm long. Hairs on head, dorsum of abdomen and antennae with acute to acuminate apices and about 4 μ -7 μ long; siphunculi rather short, very weakly clavate, about 0.2 times as long as body and about 3 times as long as cauda which bears only 4 hairs; tarsi atrophied like the viviparous forms, hind tibiae enlarged and bear numerous pseudosemsoria.

Measurements of one specimen in mm : Length of body 1.39; width of body 0.73; length of antenna 1.75; length of antennal segments III : IV : V : VI 0.34 : 0.23 : 0.23; (0.11 + 0.72); length of u.r.s. 0.12; length of siphunculus 0.28; length of cauda 0.09.

Alate male : Body 1.5 mm long with the maximum width 0.66 mm. Head light brownish, smooth almost flat; antennae concolourous with the body, about 1.25 times as long as body; antennal segment III with 30-35, IV with 18-20 and V with 9-12 secondary rhinaria, p.t. 6.5 times as long as the base of the segment, hairs on the antennae inconspicuous; rostrum reaching about hind coxae, u.r.s. rather long, about 0.14 mm long. Dorsum of abdomen almost pale with pale brownish patches marginally on each segment and centrally on tergites 3-4, those on 8th tergite forming a band; siphunculi brownish, cylindrical to weakly clavate, about 0.16 times as long as body and about 3 times as long as cauda which bears 5 hairs. Tarsi atrophied. Distinct penis and claspers-like structure present. Media of fore wing twice branched, hind wing with 2 obliques, all wing veins are bordered brownish.

Measurements of one specimen in mm : Length of body 1.50; width of body 0.66; length of antenna 1.98; length of antennal segment III : IV : V : VI 0.44 : 0.27 : 0.27 : (0.11 + 0.72); length of u.r.s. 0.14; length of siphunculus 0.24; length of cauda 0.08.

Genus 55. *Sinomegoura* Takahashi

1961. *Sinomegoura* Takahashi, *Kontyu*, 28 : 228.

Type species : *Acyrtosiphon photinae* Takahashi, 1936

Key to the species of *Sinomegoura* Takahashi

- 1(2) Cauda dark..... 3
- 2(1) Cauda pale..... 5
- 3(4) Cauda with many hairs (12-24); polygonal reticulation on body very distinct.....
.....*citricola*
- 4(3) Cauda with fewer hairs (about 7); polygonal reticulation on body very indistinct.....
.....*rhododendri*
- 5(6) Antennae pale, cauda with 10-18 hairs; u.r.s. about 1.5 x h.t.2.....*photinae*
- 6(8) Antennae dark brown; cauda with 11-12 hairs; u.r.s. 1.0-1.2 x h.t.2.....*pyri*

133. *Sinomegoura citricola* (van der Goot)

1927. *Macrosiphoniella citricola* van der Goot, *Contr. Fauna Indes neerl.*, 1(3) : 34.

1980. *Sinomegoura citricola* (van der Goot); Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 252.

Material examined : Many apterous and alate viviparous females and nymphs.

Host Plant and locality : Polyphagous. In and around Shillong.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Sikkim, West Bengal. Elsewhere : Australia; China; Japan; Java; Nepal; New Guinea; Philippines; Singapore; Sumatra and Taiwan.

134. *Sinomegoura photinae* (Takahashi)

1936. *Acyrtosiphon photinae* Takahashi, *Lingnan Sci. J.*, **15** : 600.

1980. *Sinomegoura photinae* (Takahashi); Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 253.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : *Photinia integrifolia* and *Photinia* sp. (Rosaceae). C. U. coll.

Distribution : India : Meghalaya (Kench's trace), Sikkim, West Bengal. Elsewhere : China and Japan.

135. *Sinomegoura pyri* Ghosh and Raychaudhuri

1968. *Sinomegoura pyri* Ghosh and Raychaudhuri, *Ann. ent. Soc. Am.*, **61** : 753.

1980. *Sinomegoura pyri* Ghosh and Raychaudhuri : Raychaudhuri, Ghosh and Basu, *In Taxonomy of the Aphids of North East India and Bhutan* : 253.

Material examined : 6 apterae and 2 nymphs

Host plant and locality : *Ardisia* sp. (Myrsinaceae) and *Pyrus* sp. (Rosaceae), Shillong, C. U. coll.

Distribution : India : Meghalaya (Shillong)

Remarks : The species is originally described from Meghalaya and so far known only from the state.

136. *Sinomegoura rhododendri* (Takahashi)

1937. *Acyrtosiphon rhododendri* Takahashi, *Philipp. J. Sci.*, **63** : 8.

1983. *Sinomegoura rhododendri* (Takahashi) : Chakrabarti, Mandal and Raha *J. Linn. Soc. (Zool.)* **78** : 359.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : *Rhododendron* sp. (Ericaceae), Kench's trace, 19.9.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), West Bengal. Elsewhere : Japan.

Genus 56. *Subovatomyzus* Basu

1964. *Subovatomyzus* Basu, A. N., *J. Linn. Soc. (Zool.)*, **45** : 241.

Type species : *Subovatomyzus leucosceptri* Basu, 1964

137. *Subovatomyzus leucosceptri* Basu

1964. *Subovatomyzus leucosceptri*; Basu, A.N. *J. Linn. Soc., (Zool.)*, **45** : 241.

1980. *Subovatomyzus leucosceptri*; Basu, Raychaudhuri, Ghosh and Basu, *In Taxonomy of the Aphids of North East India and Bhutan*, 255.

Material examined : Many apterae, alatae and nymphs

Host plant and locality : *Vernonia* sp. (Compositae), Shillong, 19.9.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), Sikkim, West Bengal.

Genus 57. *Tricaudatus* Narzikulov

1957. *Tricaudatus* Narzikulov, *Ent. Oboz.*, **36** : 683.

Type species : *Rhopalosiphoninus polygona* Narzikulov, 1953

138. *Tricaudatus polygona* (Narzikulov)

1953. *Rhopalosiphoninus polygona* Narzikulov, *Izv. Akad. Nauk. tadzhik*, (4) : 62.

1980. *Tricaudatus polygona* (Narzikulov); Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., In *Aphids of North East India and Bhutan* : 259.

Material examined : Many apterous and alate viviparous females and nymphs.

Host plant and locality : *Polygonum* sp. (Polygonaceae), *Spiraea* sp. (Rosaceae), Shillong, 2.8.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Japan; Korea; Taiwan and U. S. S. R.

Genus 58. *Trichosiphonaphis* Takahashi

1922. *Trichosiphonaphis* Takahashi, *Proc. ent. Soc. Wash.*, **24** : 205.

Type species : *Myzus polygoniformosanus* Takahashi, 1921.

Key to the species of *Trichosiphonaphis* Takahashi

Apterous viviparous females :

1(2) Cauda with 7-8 hairs; siphunculi constricted near apical flange; body pale, without any sclerite *gerbarae*

2(1) Cauda with 12-14 hairs, siphunculi not constricted near apical flange; body blackish brown, more sclerotised on dorsum..... *lonicerae*

139. *Trichosiphonaphis gerbarae* Ghosh and Raychaudhuri

1972. *Trichosiphonaphis gerbarae* Ghosh, A. K. and Raychaudhuri, D. N., *Orient. Insects*, **6**(3) : 381.

1980. *Trichosiphonaphis gerbarae* : Raychaudhuri, D. N. Ghosh, M. R. and Basu, R. C., In *Aphids of North East India and Bhutan* : 262.

Material examined : Many apterous and alate viviparous females and nymphs.

Host plant and locality : *Gerbera macrophylla*, *Gerbera* sp. (Compositae); *Polygonum serrulatum*, *Polygonum* sp. (Polygonaceae), Shillong, 19.9.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), West Bengal.

140. *Trichosiphonaphis lonicerae* (Uye)

1923. *Macrosiphum lonicerae* (Uye) *Insect World.*, **27** : 4.

1965. *Trichosiphonaphis lonicerae* (Uye) Takahashi, *Insecta matsum.*, **28**(1) : 43.

Material examined : Several apterae and nymphs.

Host plant and locality : *Lonicera macrantha* (Caprifoliaceae) Borapani, 30.4.1969, Kench's trace, 2.8.1969 and Nongrim Hill, 19.9.1969.

Biology : Brown to blackish brown insects mostly infest the undersurface of the leaves and the growing shoots.

Distribution : India : Meghalaya (Nongrim Hill, Kench's trace, Borapani), Assam. Elsewhere : Japan.

Genus 59. *Tuberocephalus* Shinji

1929. *Tuberocephalus* Shinji, *Lansania*, 1(3) : 39.

Type species : *Tuberocephalus artemissiae* Shinji, 1929

141. *Tuberocephalus sasaki* (Matsumura)

1917. *Myzus sasaki* Matsumura, *J. Col. Agric. Tohoku imp. Univ.*, 7 : 404.

1980. *Tuberocephalus sasaki* (Matsumura) : Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C., *In Aphids of North East India and Bhutan* : 265.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : *Artemesia* sp., Shillong, 19.9.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), Sikkim, West Bengal.

Genus 60. *Vesiculaphis* del Guercio

1911. *Vesiculaphis* del Guercio, *Redia*, 7 : 463.

Type species : *Toxoptera caricis* Fullaway, 1910

Key to the species of *Vesiculaphis* del Guercio

Apterous viviparous female :

- 1(2) Processus terminalis shorter than the base of the segment and 0.2-0.28 times as long as antennal segment III, antennae 5 or 6 segmented, 0.3-0.35 times as long as body..... *pieridis*
- 2(1) Processus terminalis 2-3 times as long as the base of the segment and slightly shorter to longer than antennal segment III, antennae 6-segmented, 0.45 to 0.66 times as long as body
- 3(4) Large, plumpy body, 2.2 to 2.4 mm long; antenna short, never more than 0.5 times as long as body, p.t. 2.0 to 2.5 times as long as the base of the segment and shorter than antennal segment III; abdominal dorsum dark brown excepting lateral margin which is pale ; F.T.C. 3, 3, 2..... *kuwanis*
- 4(3) Spindle-shaped body, 1.70 to 1.90 mm long; moderately long antenna which is 0.5 to 0.66 times as long as body, p.t. 2.5 to 3 times as long as the base of the segment and equal to slightly longer than the antennal segment III; dorsum of abdomen brown to blackish brown; F. T. C. 3; 3, 3..... *verbasci*

142. *Vesiculaphis kuwanis* Ghosh, Basu and Raychaudhuri [Fig. 50]

1970. *Vesiculaphis kuwanis* Ghosh, M. R., Basu R.C. and Raychaudhuri, D. N., *Orient. Insects*, 4(1) : 73.

1976. *Vesiculaphis kuwanis* : Ghosh, M. R., Basu, R. C. and Raychaudhuri, D. N., *Orient. Insects*, 10(2) : 276.

Material examined : Many apterae

Host plant and locality : Host unidentified, Myllieum, 5.4.1965.

Biology : Dark brown insects were collected from the tender shoots and under surface of the leaves.

Distribution : India : Meghalaya (Myllieum), Sikkim, West Bengal.

143. *Vesiculaphis pieridis* Basu [Fig. 51]

1964. *Vesiculaphis pieridis* Basu, A.N., J. Linn. Soc. (Zool), **45** : 237.

1990. *Vesiculaphis pieridis* Basu, Agarwala and Mahapatra, *Orient. Insects*, **24** : 239.

Material examined : 6 apterae, 11 nymphs.

Host plant and locality : *Pieris evalifolia* (Ericaceae), Nongrim Hill, 14.i.1969 and Jowai, 11.2.1969.

Biology : Deep brown apterae and light brown nymphs were collected from the under surface of the leaves.

Distribution : India : Meghalaya (Nongrim Hill, Jowai), Assam, West Bengal.

Remarks : Basu (1964) described the species with 5 segmented antennae but collections from Shillong show that antenna may be 5 or 6 segmented and body much longer than reported in the original description.

144. *Vesiculaphis verbasci* Chowdhuri, Basu, Chakrabarti and Raychaudhuri

1969. *Vesiculaphis verbasci* Chowdhuri, Basu, R. C., Chakrabarti and Raychaudhuri, D. N., *Orient. Insects*, **3**(1) : 90.

1980. *Vesiculaphis verbasci* : Ghosh, M. R., Basu, R. C. and Raychaudhuri, D. N., *Orient. Insects*, **10**(2) : 276.

Material examined : Many apterous viviparous females and nymphs.

Host plant and locality : Collections were made from quite a few number of host plants of different Natural orders (Polygonaceae, Rosaceae) during the months of March and again during May to December.

Biology : Light to dark brown apterae and nymphs were collected from the young shoots, inflorescences, under and upper surfaces of the leaves.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Himachal Pradesh, Manipur, Nagaland, Sikkim, Uttar Pradesh, West Bengal.

Genus 61. *Xenomyzus* Aizenberg

1935. *Xenomyzus* Aizenberg, *Zap. biol. Sta. Bolcheva.*, **78** : 152.

Type species : *Xenomyzus corticis* Aizenberg, 1935.

145. *Xenomyzus scabripes* Basu, Ghosh and Raychaudhuri

1976. *Xenomyzus scabripes* Basu, R.C., Ghosh M.R., and Raychaudhuri, D.N., *Entomon*, **1** : 64.

1980. *Xenomyzus scabripes* Basu *et al.* : Raychaudhuri, Ghosh, and Basu, *In Taxonomy of the Aphids of North East India and Bhutan* : 276.

Material examined : Many apterae, alatae and nymphs.

Host plant and locality : *Polygonum* spp. (Polygonaceae), Shillong, 19.9.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim, Uttar Pradesh and West Bengal.

Remarks : This species is characterised in having longer dorsal cephalic hairs, shorter body, shorter p.t. and scabrous femora and tibiae and also dark siphunculi.

Subfamily III. DREPANSIPHINAE

Key to the Genera :

- 1(2) Apical tibial hairs not differentiated; Rudimentary gonapophyses 2 or 4, never 3; a.s. II longer than a.s. I *Machilaphis*
- 2(1) Apical tibial hairs well differentiated as spines; Rudimentary gonapophyses 2, 3 or 4 3
- 3(4) Embryo and 1st instar with dorsal body hairs in 6 or more longitudinal rows; a.s. II with more than 1 hair, fore coxae normal; alatae without spinal finger-like processes 5
- 4(3) Embryos and 1st instar with dorsal body hairs in 4 longitudinal rows; a.s. II with only 1 hair; fore coxae often enlarged, alatae often with spinal finger-like processes 11
- 5(6) Dorsal body hairs sparse, not in clusters; anal plate bilobed 7
- 6(5) Dorsal body hairs always in clusters; anal plate rounded or shallowly indented *Clethrobius*
- 7(8) p.t. subequal to base of a.s. VI; apterae without secondary rhinaria; cauda elongate with a constriction near the middle *Neobetulaphis*
- 8(7) P.t. shorter or longer than the base VI; apterae with secondary rhinaria 9
- 9(10) Viviparous females alatae; p.t. 2-3 x base VI; siphunculi straight, without hair attached; cauda with a short rounded knob *Betacallis*
- 10(9) Viviparous females alatae and apterae; p.t. subequal or shorter than base VI; cauda elongate with a slender knob *Taoia*
- 11(12) Fore coxae of alatae normal; alate viviparae with finger-like spinal processes *Tuberculatus*
- 12(11) Fore coxae of alatae elongate or more or less enlarged 13
- 13(14) Dorsal body hairs of apterae and alaloid nymphs stout, capitate, with spinulose surface *Mesocallis*
- 14(13) Dorsal body hairs of apterae and alaloid nymphs if stout and capitate, with smooth surface .. 15
- 15(16) Rostrum elongate, reaching far beyond fore coxae, apical segment longer than its greatest basal width 17

- 16(15) Rostrum reaching a little beyond fore coxae, apical segment about as long as its greatest basal width..... 21
- 17(18) Dorsal integument without extended fields of wax gland pores..... 19
- 18(17) Dorsal integument provided with extended fields of specialised wax gland pores; secondary rhinaria narrow oval, alatae without spinal processes..... *Shivaphis*
- 19(20) Fore coxae somewhat enlarged, elongated; siphunculi with hair appended.....
..... *Tinocalloides*
- 20(19) Fore coxae greatly enlarged; siphunculi mostly without hair appended; wings often with veins bordered or with dark spots *Tinocallis*
- 21(22) P.t. subequal to the base of a.s. VI; siphunculi cylindrical, sometimes with a hair appended..
..... *Takecallis*
- 22(21) P.t. shorter than the base of a.s. VI; siphunculi short, cylindrical without a hair appended.....
..... *Subtakecallis*

Genus 62. *Betacallis* Matsumura

1919. *Betacallis* Matsumura, Trans. Sapporo nat. Hist. Soc., 7 : 110.

Type species : *Betacallis alnicolens* Matsumura, 1919.

Key to the species of *Betacallis* :

- 1(2) Dorsal cephalic hairs subequal to b.d. III; a.s. III with 18-22 secondary rhinaria.....
..... *prunicola*
- 2(1) Dorsal cephalic hairs much longer (1.25-1.60 x b.d. III), a.s. III with 26-40 secondary rhinaria..... *querciphaga*

146. *Betacallis prunicola* Basu et al.

1973. *Betacallis prunicola* Basu, R. C., Ghosh, A. K. and Raychoudhuri, D. N., *Proc. zool. Soc. Calcutta*, 26 : 93.

1980. *Betacallis prunicola* Basu et al., Raychaudhuri et al. In Aphids of North East India and Bhutan : 282.

Material examined : 3 alatae

Host plant and locality : *Prunus cerasus*, Shillong, Meghalaya, 31.12.1969.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, West Bengal. Elsewhere : China.

147. *Betacallis querciphaga* Basu et al.

1974. *Betacallis querciphaga* Basu, R. C., Ghosh, M. R. and Raychaudhuri, D. N., *Orient. Insects*, 8 : 237.

1990. *Betacallis querciphaga* Basu et al.; Ghosh, A. K. and Quednau, Fauna India (Homoptera : Aphidoidea) subfamily Drepanosiphinae, Z. S. I., pt. 5 : 24.

Material examined : 1 alata

Host plant and locality : *Quercus* sp., Old Barapani, Meghalaya, 3.2.1974, A. K. Ghosh (NZC).

Distribution : India : Meghalaya (Barapani), Sikkim, West Bengal.

Genus 63. *Clethrobius* Mordvilko

1928. *Clethrobius* Mordvilko, In Philipjev, Keys to identification of Russian insects : 181.

Type species : *Callipterus giganteus* Cholodkovsky, 1899.

148. *Clethrobius dryobius* Chakrabarti and Raychaudhuri [Fig. 52]

1976. *Clethrobius dryobius* Chakrabarti and Raychaudhuri, D. N. *Orient. Insects*, **10** : 443.

1990. *Clethrobius dryobius* Chakrabarti and Raychaudhuri; Ghosh A. K. and Quednau, *Fauna India* (Homoptera : Aphidoidea) Subfamily Drepanosiphinae, Z. S. I., pt. 5 : 64.

Material examined : 2 alatae

Host plant and locality : Undet, Rosaceae, old Barapani, Meghalaya, 2.2.1974, K. Deb.

Distribution : India : Meghalaya (Barapani), Sikkim, West Bengal, Arunachal Pradesh.

Genus 64. *Machilaphis* Takahashi

1960. *Machilaphis* Takahashi, R., *Kontya*, **28** : 11.

Type species : *Phyllaphis machili* Takahashi, 1928

149. *Machilaphis machili* (Takahashi)

1928. *Phyllaphis machili* Takahashi, R., *Trans nat. Hist. Soc. Formosa*, **16** : 146.

1990. *Machilaphis machili* (Takahashi); Ghosh, A. K. and Quednau, *Fauna India* (Homoptera : Aphidoidea), Subfamily Drepanosiphinae, Z.S.I., pt. 5 : 109.

Material examined : 4 alatae.

Host plant and locality : *Machilus odonatissima*, Meghalaya, 9.11.1969, Coll. H.B., N.Z.C.

Distribution : India : Meghalaya (Shillong), Assam. Elsewhere : China, Taiwan, Japan.

Genus 65. *Mesocallis* Matsumura

1919. *Mesocallis* Matsumura, S., *Trans. Sapporo. nat. Hist. Soc.*, **7** : 103.

150. *Mesocallis alnicola* A. K. Ghosh

1974. *Mesocallis alnicola* Ghosh, A. K., *Orient insects*, **8**(4) : 425.

1990. *Mesocallis alnicola* Ghosh; Ghosh and Quednau, *Fauna India* (Homoptera : Aphidoidea), Subfamily Drepanosiphinae, Z. S. I., pt. 5 : 116.

Material examined : 6 apterae and 3 alatae.

Host plant and locality : *Alnus nepalensis*, Shillong, 10.5.1972 and 11.5.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong).

Remarks : This is an endemic species.

Genus 66. *Neobetulaphis* A. N. Basu

1964. *Neobetulaphis* Basu, A. N., *J. Linn. Soc. (Zool.)*, **45** : 226.

Type species : *Neobetulaphis pussila* Basu, 1964

151. *Neobetulaphis immaculata* A. K. Ghosh1976. *Neobetulaphis immaculata* Ghosh, A. K., *Orient. Insects*, 10 : 46.1990. *Neobetulaphis immaculata* Ghosh; Ghosh, A. K. and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae, Z. S. I., pt. 5 : 140.*Material examined* : 7 apterae and 2 nymphs.*Host plant and locality* : Undet Rosaceae, Shillong, Meghalaya, 8.7.1974, A. C. Sukla (NZC).*Distribution* : India : Meghalaya (Shillong).*Remarks* : This endemic species is characterised in the presence of long rostrum, pale smooth tergum, pale antennae and legs.Genus 67. *Shivaphis* Das1918. *Shivaphis* Das, B., *Mem. Indian Mus.*, 6 : 245.Type species : *Shivaphis celti* Das, 1918152. *Shivaphis celti* Das1918. *Shivaphis celti* Das, B., *Mem. Indian Mus.*, 6 : 245.1984. *Shivaphis celti* Das; Agarwala, Basant, K. and Ghosh, A. K., *Rec. zool. Surv. India Misc. Publ. Occ. paper*, 50 : 26.*Material examined* : Not available.*Distribution* : India : Jammu and Kashmir, Himachal Pradesh, Sikkim, West Bengal, Meghalaya, Manipur. Elsewhere : Pakistan, Sri Lanka, Korea, Japan and China (Ghosh and Quednau 1990 : 201).Genus 68. *Subtakecallis* Raychaudhuri and Pal1974. *Subtakecallis* Raychaudhuri, D. N. and Pal, P. K., *Orient. Insects*, 8 : 96.Type species : *Cranaphis pilosa* David, Rajasingh and Narayanan, 1970.153. *Subtakecallis pilosus* (David, Rajasingh and Narayanan)1970. *Cranaphis pilosus* David, Rajasingh and Narayanan, *Orient. Insects*, 4 : 409.1974. *Subtakecallis pilosus*; Raychaudhuri, D. N. and Pal, *Orient. Insects*, 8 : 98.1990. *Subtakecallis pilosus*; Ghosh, A. K. and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae, ZSI, pt. 5 : 209.*Material examined* : Not available.*Distribution* : India : Meghalaya, West Bengal (Ghosh, A. K. and Quednau, 1990).*Remarks* : According to Ghosh and Quednau (*op. cit.*) the species is characterised in having longer spinal hairs on anterior tergites and in the ratio of base VI. to p.t.Genus 69. *Takecallis* Matsumura1917. *Takecallis* Matsumura, *J. Coll. Agric. Tohokuimp. Univ.*, 7 : 373.Type species : *Takecallis bambusae* Matsumura, 1917.

154. *Takecallis arundinariae* (Essig)

1917. *Myzocallis arundinariae* Essig, *Univ. Calif. Publs. Ent.*, **1** : 308.

1990. *Takecallis arundinariae*; Ghosh and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae; ZSI, pt. 5 : 232.

Material examined : Many alatae

Host plant and locality : *Bambusa* sp., Lowshtun, Khasi Hills, Meghalaya. 9.12.1965, S. W. Prasad.

Distribution : India : Meghalaya (Khasi Hills), Arunachal Pradesh, Assam, Himachal Pradesh, West Bengal. Elsewhere : Japan, Korea, Formosa, Europe, North America.

Remarks : The species has often been recorded on *Bambusa* spp. in North East India and North West Hill area.

Genus 70. *Taoia* Quednau

1973. *Taoia* Quednau, *Can. Ent.*, **105** : 217.

Type species : *Euceraphis chuansiensis* Tao

155. *Taoia indica* (Ghosh and Raychaudhuri)

1969. *Euceraphis chuansiensis* David and Rajasingh, *Proc. zool. Soc. Calcutta*, **22** : 153.

1990. *Taoia indica* (Ghosh and Raychaudhuri) : Ghosh and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae, Z. S. I., pt. 5 : 244.

Material examined : 2 apterae

Host plant and locality : *Alnus nepalensis*, Shillong, 25.11.1972 (N.Z.C.).

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

Elsewhere : Nepal.

Remarks : The species appears to have a monoecious holocyclic mode of reproduction on *Alnus* and *Betula* in North East Himalaya.

Genus 71. *Tinocallis* Matsumura

1919. *Tinocallis* Matsumura, *Trans. Sapporo nat. Hist. Soc.*, **7** : 100.

Type species : *Tinocallis ulmiparvifoliae* Matsumura

156. *Tinocallis magnoliae* Ghosh and Raychaudhuri

1977. *Tinocallis magnoliae* Ghosh, A. K. and Raychaudhuri : D. N., *Orient. Insects*, **6**(3) : 379.

1990. *Tinocallis magnoliae* Ghosh and Raychaudhuri, Ghosh and Quednau, *Fauna India (Homoptera : Aphidoidea)* Subfamily Drepanosiphinae, ZSI, pt. 5 : 279.

Material examined : 1 alata and 1 nymph.

Host plant and locality : *Magnolia* sp., Shillong, 7.7.1970, S. Sarkar (C. U. coll.).

Distribution : India : Meghalaya (Shillong).

Remarks : This is an endemic species.

Genus 72. *Tinocalloides* Basu

1969. *Tinocalloides* Basu, A. N. *Orient. Insects*, **3** : 367.

Type species : *Tinocalloides montanus* Basu, 1969.

157. *Tinocalloides montanus* Basu [Fig. 53]

1969. *Tinocalloides montanus* Basu, A. N. *Orient. Insects*, **3** : 367.

1990. *Tinocalloides montanus* Basu; Ghosh and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae, pt. 5 : 287.

Material examined : 6 alatae

Host plant and locality : *Prunus* sp., Shillong, 20.1.1976 (N.Z.C.).

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

Remarks : The species is endemic to India.

Genus 73. *Tuberculatus* Mordvilko

1894. *Tuberculatus* Mordvilko, *Rab. Lab. zoll. Kab. Imp. Varsh. Univ.* **8**(3) : 51.

Type species : *Aphis quercea* Kaltenbach

Key to the species of *Tuberculatus* Mordvilko

- 1(2) Mesonotum with one pair of finger-like spinal processes; abdominal tergites 1-3 with a few hairs near the bases of spinal processes *indicus*
- 2(1) Mesonotum without such spinal processes 3
- 3(4) Pronotum with two pairs of finger-like spinal processes; Media of forewing with narrow diffuse brown bordering *nervatus*
- 4(3) Pronotum with one pair of finger-like spinal process; Media of forewing not bordered as above; u.r.s. 1.1-1.2 x as long as h.t.2. *paiki*

158. *Tuberculatus indicus* L. K. Ghosh

1972. *Tuberculatus indicus* Ghosh, L. K. *Orient. Insects*, **6**(3) : 229.

1990. *Tuberculatus indicus* Ghosh : Ghosh, A. K. and Quednau, *Fauna India (Homoptera : Aphidoidea)*, Subfamily Drepanosiphinae, Z.S.I., pt. 5 : 297.

Material examined : 4 alatae and 4 nymphs.

Host plant and locality : *Quercus* sp., Shillong, 29.4.1975 and 6.9.1975 (N.Z.C.).

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Manipur. Elsewhere : Japan, Korea.

Remarks : Ghosh, A. K. and Quednau (1990) have made valuable comments on the species.

159. *Tuberculatus nervatus* Chakrabarti & Raychaudhuri [Fig. 54]

1974. *Tuberculatus capitatus* Basu, R. C., Ghosh, M. R., Raychaudhuri, D. N. , *Sci. Cult* **40** : 43 (misid).

1990. *Tuberculatus nervatus* : Ghosh, A. K., Quednau, F. W. *The fauna of India and the adjacent countries*, pt. 5 Subfamily : Drepanosiphinae. **356** : 309.

Material examined : 2 alatae and 3 nymphs

Host plant and locality : *Quereus* sp., Shillong, 16.xii.1968, R. C. Basu coll.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is restricted to Khasi Hills of Meghalaya so far as distribution is concerned. It is characterised by brown patches on abdomen, dark patch on the postscutum as dusky wing venation.

160. *Tuberculatus paiki* Hille Ris Lambers

1974. (1972). *Tuberculatus (Orientubersuloides) paiki* Hille Ris Lambers, D., *Boll. Zool. Agr. Bachic. (II)*, **11** : 68.

1990. *Tuberculatus paiki* : Ghosh, A. K., and Quednau, F. W., *The Fauna of India and adjacent countries*, pt. 5, Subfamily : Drepanosiphinae, **309** : 313.

Material examined : 1 alate and 1 nymph.

Host plant and locality : *Quercus* sp., Shillong, 19.iv.1969, R. Basu coll.

Distribution : India : Meghalaya (Shillong). Elsewhere : Korea.

Remarks : In India, the species is so far known only from Meghalaya.

Subfamily IV. GREENIDEINAE

Key to tribes of the subfamily Greenideinae :

- 1(2) Body in apterae and alatae never with any figure-like processii; siphunculi with many long hairs..... Greenideini
- 2(1) Body in apterae always with figure-like processii; in alatae this processii reduced or absent; Siphunculi with a few short hairs Cervaphidini

Tribe Cervaphidini

Key to the genera :

- 1(2) Cauda rounded or with a median stylus; 7th tergite with only one pair of distinct tubercle; antennae 5-segmented *Schoutedenia*
- 2(1) Cauda never with a median stylus..... 3
- 3(4) Body processi mostly branched in apterae; siphunculi long *Cervaphis*
- 4(3) Body processi never branched in apterae; siphunculi short *Sumatraphis*

Genus 74. *Cervaphis* van der Goot

1917. *Cervaphis* van der Goot, *Contr. Faune. Indes. neerl.*, **1**(3) : 1

Type species : *Cervaphis schouteniae* van der Goot, 1917

161. *Cervaphis quercus* Takahashi

1918. *Cervaphis quercus* Takahashi, *Zool. Mag., Tokyo*, **30** : 458.

1993. *Cervaphis quercus* Takahashi, Ghosh, A. K. and Agarwala, The Fauna of India and the adjacent countries, (Homoptera : Aphidodidea), Part-6, Subfamily Greenideinae : 21.

Material examined : 7 apterae and nymphs.

Host plant and locality : *Quercus griffithi* (Fagaceae), Shillong, 6.4.1975, M. S. Jyrwa.

Distribution : India : Meghalaya (Shillong), Manipur. Elsewhere : Japan; Korea; Taiwan.

162. *Cervaphis schouteniae* Hille Ris Lambers

1953. *Cervaphis schouteniae* Hille Ris Lambers, *Ent. Bericht., Amst.*, **16** : 130.

1993. *Cervaphis schouteniae* Hille Ris Lambers : Ghosh, A. K. and Agarwala, B. K., The Fauna of India and the adjacent countries, (Homoptera : Aphidodidea), Part-6, Subfamily Greenideinae : 36.

Material examined : 3 apterae and 2 nymphs.

Host plant and locality : *Mixocos peniculata* (Tiliaceae), Shillong, 3.5.1970, H. Banerjee.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Tripura. Elsewhere : Indonesia, Malayasia; Philippines and Vietnam.

Genus 75. *Schoutedenia* Rubsaamen

1905. *Schoutedenia* Rubsaamen, *Marcellia*, **4** : 19.

Type species : *Schoutedenia ralumensis* Rubsaamen, 1905.

Key to the species of *Schoutedenia* :

1(2) P.t. 0.38-0.60 X base of last segment and 0.5-1.0 X as long as u.r.s. *emblica*

2(1) P.t. 0.53-0.85 X base of last segment as 1.1-1.6 X as long as u.r.s. *ralumensis*

163. *Schoutedenia emblica* (Patel and Kulkarni)

1952. *Schoutedenia emblica* Patel and Kulkarni, *Curr. Sci.*, **21** : 350.

1993. *Schoutedenia emblica* : Ghosh, A. K. and Agarwala, B. K., The Fauna of India and the adjacent countries (Homoptera : Aphidodidea), Part-6, Subfamily Greenideinae : 46.

Material examined : 2 apterae

Host plant and locality : *Phyllanthus emblica*, Shillong, 18.3.1969, R. C. Basu.

Distribution : India : Meghalaya (Shillong), Andhra Pradesh, Maharashtra, Tamil Nadu, Tripura, West Bengal. Elsewhere : Nepal.

164. *Schoutedenia ralumensis* Rubsaamen

1905. *Schoutedenia ralumensis* Rubsaamen, F. H., *Marcellia*, **4** : 5-25.

1993. *Schoutedenia ralumensis* Rubsaamen : Ghosh, A. K. and Agarwala, B. K., The Fauna of India and the Adjacent countries, Part-6. Greenideinae : 52.

Material examined : 6 apterae and 5 alatae

Host plant and locality : *Phyllanthus hamiltonicus*, Barnihat, 31.7.1973, M. Dutta.

Distribution : India : Meghalaya (Barnihat), Sikkim, Tripura, West Bengal. Elsewhere : Africa; Australia; Indonesia; Malaysia; Pakistan; Taiwan.

Genus 76. *Sumatraphis* Takahashi1935. *Sumatraphis* Takahashi, *Miscenea Zool. Sumatrana.*, 97 : 3.Type species : *Sumatraphis celti* Takahashi, 1935165. *Sumatraphis celti* Takahashi [Fig. 56]1935. *Sumatraphis celti* Takahashi, *R. Miscena Zool., Sumatra*, 97 : 2.1993. *Sumatraphis celti* : Ghosh, A. K., and Agarwala, B. K., *The fauna of India and the adjacent countries Part-6, Greenideinae* : 57.*Material examined* : 1 alata*Host plant and locality* : Yellow Pan Trap, Shillong, 12.5.1977; (C. U. Coll.).*Distribution* : India : Meghalaya (Shillong), Manipur, Tamil Nadu, West Bengal. Elsewhere : Indonesia (Sumatra); Nepal; Taiwan.

Tribe Greenideini

Key to genera :

- 1(2) Body hairs on raised sockets, with capitate or expanded apices in both apterae and alatae *Allotrichosiphum*
- 2(1) Body hairs usually on normal sockets, never with capitate or expanded apices..... 3
- 3(4) Siphunculi in apterae barrel-shaped *Brevitrichosiphon*
- 4(3) Siphunculi in apterae never as above 5
- 5(6) Cauda transversely oval with a median stylus; Siphunculi reticulated..... *Greenidea*
- 6(5) Cauda never with a median stylus..... 7
- 7(8) U.r.s. blunt; segments IV & V distinctly divided..... *Greenidioida*
- 8(7) U.r.s. usually pointed, segments 4 and 5 distinctly separated 9
- 9(10) Hind tibiae with stridulatory ridges in the form of transverse cuts; siphunculi long, cylindrical..... *Mollitrichosiphum*
- 10(9) Hind tibiae without any stridulatory ridge; siphunculi usually curved outwards *Eutrichosiphum*

Genus 77. *Allotrichosiphum* Takahashi, 19621962. *Allotrichosiphum* Takahashi, R., *Trans. Shikoku. ent. Soc.*, 7 : 70.Type species : *Trichosiphum kashicola* Kurisaki, 1920.166. *Allotrichosiphum assamense* Raychoudhuri, Ghosh, Banerjee and Ghosh1970. *Allotrichosiphum kashicola* Ghosh, A. K., Basu, R. C. and Raychaudhuri, D. N. *Orient. Insects*, 4 : 65-70.1993. *Allotrichosiphum assamense* Ghosh, A. K. and Agarwala, B. K., *The fauna of India and the adjacent countries, pt-6 Greenideinae* : 62.

Material examined : 1 aptera

Host plant and locality : *Quercus dealbata*, Cherrapunji, 27.xii.1969, H. Banerjee.

Distribution : India : Meghalaya (Cherrapunji).

Genus 78. *Brevitrichosiphon* Raychaudhuri et al.

1973. *Brevitrichosiphon* Raychaudhuri, Ghosh, Banerjee and Ghosh, *Kontyu*, **41** : 54.

Type species : *Brevitrichosiphon mukerjii* Raychaudhuri et al., 1973

167. *Brevitrichosiphon mukerjii* Raychaudhuri et al.

1973. *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh, Banerjee and Ghosh, *Kontyur*, **41** : 54.

1993. *Brevitrichosiphon mukerjii*; Ghosh, A. K. and Agarwala, The Fauna of India and the adjacent countries, pt. 6, Subfamily Greenideinae : 66.

Material examined : 1 aptera

Host plant and locality : Host unidentified, Cherrapunji. C.U. coll.

Distribution : India Meghalaya (Cherrapunji), Manipur, West Bengal.

Genus 79. *Eutrichosiphum* Essig and Kuwana

1908. *Trichosiphum* Pergande : Okajima, G., *Bull. Coll. Agric. Tokyo Imp. Univ.*, **8** : 23 (Partim).

Type species : *Trichosiphum pasaniae* Okajima, 1908

Key to the species of *Eutrichosiphum* :

- 1(2) None of the dorsal hairs on abdomen with furcated apices..... 3
- 2(1) At least some of the dorsal hairs on abdomen with furcated apices 5
- 3(4) Dorsal hairs of abdomen thick and stiff, mostly thorny, antennae 5 or 6-segmented
.....*dubium*
- 4(3) Dorsal hairs of abdomen with acute, blunt apices or a few thorny; u.r.s. 0.19-0.23 mm long
and 1.90-2.40 X 2..... *pyri*
- 5(6) Most of the dorsal hairs on abdomen with branched apices, a few shorter ones with acute or
blunt apices 7
- 6(5) Some or a few of the dorsal hairs on abdomen with branched apices, others with acute,
acuminate or blunt apices` 11
- 7(8) Abdominal dorsum smooth; antennae 5 or 6-segmented; u.r.s. obtuse at apex; p.t. 1.6-1.7 X
base of last antennal segment..... *raychaudhurii*
- 8(7) Abdominal dorsum spinulose entirely; antennae 5-segmented..... 9
- 9(10) Dorsum of head spinulose; siphunculi with a few hairs with furcated apices near the base.....
.....*subinoyi*
- 10(9) Dorsum of head smooth; none of the siphuncular hairs with furcated apices.....
.....*pseudopasaniae*

- 11(12) Dorsum of head spinulose.....*khasyanum*
 12(11) Dorsum of head smooth..... 13
 13(14) U.r.s. long and acute.....*tattakanum*
 14(13) U.r.s. obtuse or long and tapering or acute 15
 15(16) Most of the dorsal hairs of abdomen with blunt apices..... 17
 16(15) Most of the dorsal hairs of abdomen with acute, acuminate or some with blunt or furcated apices..... 19
 17(18) Dorsum of abdomen with a brown central patch extending on 3-5 tergites; antennae 6-segmented and 2-2.4 X h. t.2..... *querciphaga*
 18(17) Dorsum of abdomen variably sclerotised, never with a brown central patch.....
*neotattakanum*
 19(20) Dorsum of abdomen locally spinulose..... 21
 20(19) Dorsum of abdomen smooth..... 27
 21(22) Antennae 5-segmented; u.r.s. 1.8-2.1 X h.t.2.....*sankari*
 22(21) Antennae 6-segmented,..... 23
 23(24) Siphunculi densely spinulose throughout *rameshi*
 24(23) Siphunculi sparsely spinulose except near apical region which is densely spinulose..... 25
 25(26) Siphunculi 0.20-0.36 mm long and 0.15-0.19 X body..... *flavum*
 26(25) Siphunculi 0.60-0.85 mm long and about 0.30 X body *blackmanum*
 27(28) Antennae 5-segmented; u.r.s. obtuse..... 29
 28(27) Antennae 6-segmented; siphunculi densely spinulose throughout, 0.24-0.28 X body; u.r.s. 2.7-3.6 X h.t.2 *russellae*
 29(30) Siphunculi sparsely spinulose on most of the portion, densely spinulose near the apex
*maki*
 30(29) Siphunculi densely spinulose throughout; u.r.s. 0.20-0.30 mm long..... *assamense*
- Note : The key does not include *E. alnicola* A. N. Basu and *E. sensoriata* A. K. Ghosh due to lack of sufficient material.

168. *Eutrichosiphum alnicola* (Basu)

1967. *Paratrichosiphum alnicola* Basu, A. N., *Bull. Ent.*, 18 : 14.

1993. *Eutrichosiphum alnicola* : Ghosh, A. K., and Agarwala, B. K., The fauna of India and the adjacent countries, Part-6. Greenideinae : 76.

Material examined : Nil.

Host plant and locality : *Alnus nepalensis*, Upper Shillong, 17.xi.1965, British Museum. Coll.

Distribution : India :Meghalaya (upper Shillong), Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Nepal.

Remarks : Due to nonavailability of material the species could not be included in the key.

169. *Eutrichosiphum assamense* Ghosh *et al.* [Figs. 58, 60]

1969. *Eutrichosiphum assamensis* Ghosh, A. K., Basu, R. C. and Raychaudhuri, D. N., *Orient. Insects*, **3** : 247.

1993. *Eutrichosiphum assamensis* : Ghosh, A. K. and Agarwala, B. K., *The fauna of India and the adjacent countries*, Pt. 6. Greenideinae : 84.

Material examined : 5 apterae and 1 alata

Host plant and locality : *Quercus* sp. Elephant falls, Shillong, 18.v.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong), Himachal Pradesh, Manipur, Uttar Pradesh.

170. *Eutrichosiphum blackmanum* Agarwala and Ghosh

1962. *Paratrachosiphum tattakanum assamesis* Ghosh, A. K. and Raychaudhuri, D. N., *J. Asiatic Soc.*, **4** : 112; Partim

1993. *Eutrichosiphum blackmanum* Ghosh, A. K. and Agarwala, B. K. *The Fauna of India and the adjacent Countries*, Part 6, Greenideinae : 92.

Material examined : 6 aptera and 4 nymphs.

Host plant and locality : Unidentified, New Colony, Shillong, 21.viii.1974, Sukla.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is originally described from Meghalaya.

171. *Eutrichosiphum dubium* (van der Goot)

1956. *Eutrichosiphum dubium* van der Goot, P., *Rec. Indian Mus.* : **13** : 178.

1933. *Eutrichosiphum dubium*, van der Goot, Ghosh, A. K. and Agarwala, B. K. *The Fauna of India and the adjacent countries*, Pt-6. Subfamily Greenideinae : 97.

Material examined : 2 apterae

Host plant and locality : Host indet. Malki Reserve Forest, Shillong, 28.x.1975, R. S. Giri.

Distribution : India : Meghalaya (Shillong) Manipur, West Bengal. Elsewhere : China; Taiwan.

172. *Eutrichosiphum flavum* Takahashi

1941. *Paratrachosiphum flavum*; Takahashi, R., *Rep. Govt. Agric. Res. Inst. Taiwan*, **78** : 8.

1993. *Eutrichosiphum flavum*, Takahashi, Ghosh, A. K. and Agarwala, B. K., *The Fauna of India and the adjacent countries*, Pt. 6, Subfamily Greenideinae : 99.

Material examined : 4 apterae and 3 nymphs.

Host plant and locality : *Quercus* sp., Motinagar, Shillong, 30.v.1974, M. S. Jyrwa.

Distribution : India : Meghalaya (Shillong), Manipur. Elsewhere : Indonesia, Taiwan.

173. *Eutrichosiphum khasyanum* (Ghosh and Raychaudhuri)

1962. *Paratrichosiphum* (*Neoparatrichosiphum*) *khasyanum*, Ghosh, A. K. and Raychaudhuri, D. N., *J. Asiat. Soc.*, 4 : 108.

1993. *Eutrichosiphum khasyanum*, Ghosh, A. K. and Agarwala, B. K., *The Fauna of India and the adjacent countries*, Pt.-6, Subfamily Greenideinae : 104.

Material examined : 5 apterae and 1 alata

Host plant and locality : *Quercus* sp., Shillong, 19.v.1977, K. Deb.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Uttar Pradesh. Elsewhere : Nepal.

174. *Eutrichosiphum makii* Raychaudhuri and Chatterjee

1974. *Eutrichosiphum* (*Eutrichosiphum*) *makii*, Raychaudhuri, D. N. and Chatterjee M., *Kontyu*, 42 : 122.

1993. *Eutrichosiphum makii* Raychaudhuri and Chatterjee, Ghosh, A. K. and Agarwala, B. K., *The fauna of India and the adjacent countries*, Pt.-6, Subfamily Greenideinae : 108.

Material examined : 4 apterae

Host plant and locality : *Glochidion* sp., Shillong, 26.viii.1970, S. Sarkar.

Distribution : India : Meghalaya (Shillong), West Bengal.

175. *Eutrichosiphum neotattakanum* Agarwala and Ghosh

1993. *Eutrichosiphum neotattakanum* Ghosh, A. K., and Agarwala, B. K. *The Fauna of India and the adjacent countries*, Part 6, Greenideinae : 117.

Material examined : 1 aptera and 5 nymphs.

Host plant and locality : *Quercus dealbata*, Happy valley, Shillong, 8.xii.1970, C. U. Coll.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is characterised by its long and narrow ultimate rostral segment.

176. *Eutrichosiphum pseudopasaniae* Szelegiewicz [Fig. 59]

1968. *Eutrichosiphum pseudopasaniae*, Szelegiewicz; *Annls. Zool. Warsz.*, 25 : 466.

1993. *Eutrichosiphum pseudopasaniae* Szelegiewicz; Ghosh, A. K. and Agarwala, B. K., *The Fauna of India and the adjacent countries*, Part-6, Subfamily Greenideinae : 119.

Material examined : 6 apterae

Host plant and locality : *Castanopsis tripuloides*, Barapani, 17.viii.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Barapani), Manipur, Uttar Pradesh, West Bengal. Elsewhere : Nepal, Vietnam.

177. *Eutrichosiphum pyri* Chakrabarti, Ghosh and Raychaudhuri

1972. *Eutrichosiphum pyri* Chakrabarti, S., Ghosh, A. K. and Raychaudhuri, D. N., *Orient. Insects.*, 6 : 389.

1993. *Eutrichosiphum pyri*, Ghosh, A. K. and Agarwala, B. K., *The fauna of India and the adjacent countries*, Part-6, Greenideinae : 123.

Material examined : 1 aptera

Host plant and locality : *Pyrus communis* (Rosaceae), Shillong, 9.iv.1970, H. Banerjee.

Distribution : India : Meghalaya (Shillong), Uttar Pradesh.

178. *Eutrichosiphum rameshi* (Raychaudhuri, Chatterjee and Raychaudhuri)

1977. *Holotrichosiphum rameshi* Raychaudhuri, D. N., Chatterjee, M. and Raychaudhuri, D., *Orient. Insects*, **11** : 286.

1993. *Eutrichosiphum rameshi* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Part-6, *Greenideinae* : 131.

Material examined : 1 aptera and 2 nymphs

Host plant and locality : *Quercus dealbata*, Shillong, 1.vii.1969, R. C. Basu.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is originally described from Meghalaya.

179. *Eutrichosiphum raychaudhurii* Ghosh

1969. *Paratrichosiphum* (*Neoparatrichosiphum*) *raychaudhurii* Ghosh, A. K., *Proc. Zool. Soc. Calcutta*, **22** : 224.

1993. *Eutrichosiphum raychaudhurii* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Part-6, *Greenideinae* : 131.

Material examined : 6 apterae

Host plant and locality : *Alnus nepalensis*, Shillong, 11.v.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong), Sikkim, Tamil Nadu, West Bengal.

Remarks : This is an endemic species.

180. *Eutrichosiphum russellae* Ghosh, Ghosh and Raychaudhuri [Fig. 64]

1971. *Holotrichosiphum russellae*, Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D. N., *Orient Insects.*, **5** : 213.

1993. *Eutrichosiphum russellae* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Part-6, *Greenideinae* : 134.

Material examined : 1 aptera and 2 nymphs.

Host plant and locality : *Quercus dealbata*, Mawphlong, 29.ix.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Mawphlong). So far known only from the State.

181. *Eutrichosiphum sankari* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Eutrichosiphum* (*Eutrichosiphum*) *sankari*, Raychaudhuri, D. N., Ghosh, M. R., Banerjee, M. and Ghosh, A. K. *Kontyu*, **42** : 58.

1993. *Eutrichosiphum sankari* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Part-6, *Greenideinae* : 139.

Material examined : 2 alatae and 3 nymphs

Host plant and locality : *Litsea cubeba*, Shillong, 8.viii.1974, A. C. Sukla.

Distribution : India : Meghalaya (Shillong), West Bengal.

182. *Eutrichosiphum sensoriatum** (Ghosh, A. K.)

1974. *Paratrichosiphum sensoriatum* Ghosh, A. K., *Orient. Insects*, 8 : 172.

1993. *Eutrichosiphum sensoriatum* Ghosh, A. K. and Ararwala, B. K. *The fauna of India and the adjacent countries*, Pt.-6, Greenideinae : 142.

Material examined : Nil.

Host plant and locality : Host indet, Mawphlang, 4.xi.1972, A. K. Ghosh.

Distribution : India : Meghalaya (Mawphlang).

Remarks : This is an endemic species originally described from Meghalaya.

183. *Eutrichosiphum subinoyi* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Eutrichosiphum* (*Neotrichosiphum*) *subinoyi*, Raychaudhuri, D. N., Ghosh, M. R., Banerjee, M. and Ghosh, A. K., *Kontyu*, 41 : 59.

1993. *Eutrichosiphum subinoyi* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Pt.-6, Greenideinae : 147.

Material examined : 1 aptera and 1 alata

Host plant and locality : *Pterospermum* sp., Shillong, 27.vii.1970, S. Sarkar.

Distribution : India : Meghalaya (Shillong).

Remarks : Also an endemic species known from Meghalaya so far.

184. *Eutrichosiphum tattakanum* (Takahashi)

1925. *Greeidea tattakanum* Takahashi, R., *Aph. of Formosa*, pt. 4 : 30

1993. *Eutrichosiphum tattakanum* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Pt.-6, Greenideinae : 149.

Material examined : 2 apterae and 1 nymph

Host plant and locality : *Quercus* sp., Khasi Hills, 6.vi.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Khasi Hills), Himachal Pradesh, Manipur, Uttar Pradesh. Elsewhere: Bhutan, Nepal, Japan, Pakistan, Taiwan.

Genus 80. *Greenidea* Schouteden, 1905

1905. *Greenidea* Schouteden, H., *Spolia Zeylan.*, 2 : 181

Type generies : *Siphonophora artocarpi* Westwood., 1890)

Key to the subgenera of genus *Greenidea* :

1(2) Hind tibiae of both apterae and alatae viviparae with a variable number of transverse cuts...

..... *Paragreenidea*

- 2(1) Hind tibiae of apterae and alatae viviparae without any transverse cut..... 3
 3(4) Siphunculi in apterae viviparae distinctly reiculated near the base on one surface.....

..... ***Trichosiphum***

- 4(3) Siphunculi in apterae viviparae distinctly reticulated on both surfaces throughout the length
 ***Greenidea* S. S.**

Key to the species of subgenus ***Greenidea*** :

Apterous viviparous Females :

- 1(2) None of the hairs on siphunculi with furcated apices; antennae shorter than the body
 ***decaspermi***

- 2(1) Atleast some of the hairs on siphunculi with furcated apices; antennae shorter to longer or
 longer than body..... 3

- 3(4) Siphunculi long, 0.71-0.87 X as long as body, segment 4 of u.r.s. with less than 10
 accessory hairs..... ***longicornis***

- 4(3) Siphunculi 0.42-0.57 X as long as body; segment 4 of u.r.s. with more than 10 accessory
 hairs; dorsum of abdomen yellowish brown; u.r.s. upto about 2.7. X ht2
 ***longirostris***

Alate viviparous Females :

- 1(2) Siphunculi 2.90 mm long, longer than body ***longicornis***

- 2(1) Siphunculi shorter than body; venter of abdomen medially smooth, rest variably spinulose...
 3

- 3(4) 7th tergite with 6 spino-pleural hairs besides marginal ones..... ***himansui***

- 4(3) 7th tergite with 2 spinal hairs 5

- 5(6) Siphunculi short, about 0.76 mm long and 0.31 X as long as body; antennal segment III
 with at least 35 secondary rhinaria..... ***artocarpi***

- 6(5) Siphunculi short to long, usually long (1.01-1.96 mm), seldom short, 0.33-0.81 X as long as
 body; antennal segment III with less than 35 secondary rhinaria. U.r.s. 0.29-0.41 mm long;
 longest hair on anterior tergites 1.10-1.30 X as long as b.d. III..... ***longirostris***

185. ***Greenidea (Greenidea) artocarpi*** (Westwood)

1890. *Siphonophora artocarpi*, Westwood, *Trans. Ent. Soc. Lond.*, Pt. 4 : 649.

1993. *Greenidea (Greenidea) artocarpi* (Westwood) Ghosh, A. K. and Agarwala, B. K., *The fauna of India and the adjacent countries Pt.-6, Greenideinae* : 176.

Material examined : Nil.

Distribution : India : Meghalaya, South India. Elsewhere : China; Sri Lanka.

Remarks : Due to nonavailability of material, the species is included in the key on the basis of literature.

186. *Greenidea (Greenidea) decaspermi* Takahashi

1933. *Greenidea decaspermi* Takahashi, R., *Philipp. Jour. Sci.*, **52** : 294.

1993. *Greenidea (Greenidea) decaspermi*; Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, Pt. 6, *Greenideinae* : 178.

Material examined : 2 apterae and 8 nymphs.

Host plant and locality : Indet. Myrsinaceae, Jowai, 22.i.1975, A. K. Ghosh.

Distribution : India : Meghalaya (Jowai), Karnataka, Sikkim. Elsewhere : Nepal; Taiwan.

187. *Greenidea (Greenidea) himansui* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Greenidea) himansui* Raychaudhuri, D. N., Ghosh, M. R., Banerjee, M. and Ghosh, A. K., *Kontyu*, **41** : 60.

1993. *Greenidea (Greenidea) himansui* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 186.

Material examined : 1 alata.

Host plant and locality : *Randia* sp., Dawki, 3.v.1970, H. Banerjee.

Distribution : India : Meghalaya (Dawki).

188. *Greenidea (Greenidea) longicornis* (Ghosh, Ghosh and Raychaudhuri)

1970. *Greenidea (Greenidea) longicornis* Ghosh, M. R., Ghosh, A. K. and Raychaudhuri, D. N., *Orient. Insects.*, **4** : 380.

1993. *Greenidea (Greenidea) longicornis*, Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 187.

Material examined : 1 aptera and 3 nymphs.

Host plant and locality : *Cassia* sp., Cherapunji, 14.iii.1971, S. Sarkar.

Distribution : India : Meghalaya (Cherapunji), Sikkim.

189. *Greenidea (Greenidea) longirostris* Basu, A. N.

1969. *Greenidea longirostris* Basu, A. N., *Orient. Insects*, **3** : 358.

1993. *Greenidea longirostris* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 189.

Material examined : 3 apterae, and 3 nymphs.

Host plant and locality : *Schima wallichii*, Laitumkhrach, 3.v.1969, Laban, 28.6.1969, R. C. Basu.

Biology : Greenish brown insects infest mostly the under surface of the leaves.

Distribution : India : Meghalaya (Laban, Laitumkhrach), Arunachal Pradesh, Manipur, Sikkim, West Bengal. Elsewhere : Nepal.

190. *Greenidea (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri

1969. *Greenidea (Greenidea) symplocosis* Ghosh, A. K., Basu, R. C. and Raychaudhuri, D. N., *Orient. Insects.*, **3** : 248.

1993. *Greenidea (Greenidea) symplocosis* Ghosh, A. K., and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 205.

Material examined : Nil

Distribution : India : Meghalaya (Shillong), Sikkim, West Bengal.

Remarks : Due to nonavailability of material, the species could not be included in the key.

Key to the species of subgenus *Trichosiphum*

Apterous viviparous females :

- 1(2) Mid ventral area spinulose; caudal hairs 4..... *sikkimensis*
 2(1) Mid ventral area smooth, rest variably spinulose; caudal hairs 6-8..... 3
 3(4) U.r.s. upto 3.0 x as long as h.t.2..... *quercicola*
 4(3) U.r.s. less than 2.40 x as long as h.t.2 5
 5(6) Abdominal venter with a dark spino-pleural sclerotic patch, evenly spinulose.....
 *prunicola*
 6(5) Abdominal venter with median region-smooth, laterally variably spinulose..... 7
 7(8) P. t. longer than antennal segment III *camelliae*
 8(7) P. t. shorter to subequal of antennal segment III 9
 9(10) U.r.s. 0.21-0.25 mm long and 1.91-2.27 x as long as h.t.2
 *formosana formosana*
 10(9) U.r.s. 0.15-0.19 mm long and 1.20-1.72 x as long as h.t.2
 *formosana heeri*
 13. Siphunculi black or dark brown, 0.20-0.29 x as long as body; dorsum of abdomen brown
 sclerotic and wrinkled *bucktonis*

191. *Greenidea (Greenidea) bucktonis* Ghosh, Basu and Raychaudhuri [Fig. 61]

1970. *Greenidea (Trichosiphum) bucktonis* Ghosh, A. K., Basu, R. C. and Raychaudhuri, D. N., *Orient. Insects.*, 4 : 69.
 1993. *Greenidea (Greenidea)bucktonis* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 212.

Material examined : 3 apterae and 2 nymphs.

Host plant and locality : *Syzigium* sp., Mawphlang, 17.v.1977, H. Khajuria.

Distribution : India : Meghalaya (Shillong), Sikkim, Uttar Pradesh and West Bengal.

192. *Greenidea (Trichosiphum) camelliae* Agarwala and Ghosh

1993. *Greenidea (Trichosiphum) camelliae* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 216.

Material examined : 1 aptera

Host plant and locality : *Camellia* sp., Shillong, 12.iv.1974, A. C. Sukla.

Distribution : India : Meghalaya (Shillong).

Remarks : The species is originally described from Meghalaya.

193. *Greenidea (Trichosiphum) formosana formosana* (Maki)

1916. *Trichosiphum formosana* Maki, M., *Coll. Essays for Nawa, Gifu*, 13 (Partim)

1993. *Greenidea (Trichosiphum) formosana formosana* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 217.

Material examined : 7 apterae and 1 alata.

Host plant and locality : *Psidium guajava*, Morch, 20.i.1976, A. K. Ghosh.

Distribution : India : Meghalaya (Morch), Manipur, West Bengal. Elsewhere : Bangladesh; China; Indonesia; Japan; Nepal; Taiwan.

194. *Greenidea (Trichosiphum) prunicola* Ghosh, Banerjee and Raychaudhuri

1971. *Greenidea (Trichosiphum) prunicola* Ghosh, A. K., Banerjee, H. and Raychaudhuri, D. N., *Proc. zool. Soc. Calcutta*, **26** : 104.

1993. *Greenidea (Trichosiphum) prunicola* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 230.

Material examined : 1 aptera

Host plant and locality : *Purvus* sp., Shillong, 8.vii.1970, H. Banerjee.

Distribution : India : Meghalaya (Shillong), Sikkim.

195. *Greenidea (Trichosiphum) quercicola* Basu, Ghosh and Raychaudhuri [Fig. 63]

1973. *Greenidea (Trichosiphum) quercicola* Basu, R. C., Ghosh, A. K. and Raychaudhuri, D. N., *Proc. zool. Soc. Calcutta*, **26** : 96.

1993. *Greenidea (Trichosiphum) quercicola* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 231.

Material examined : 1 aptera.

Host plant and locality : *Quercus dealbata*, Shillong, 22.vii.1969, R. Basu.

Distribution : India : Meghalaya (Shillong), Manipur.

196. *Greenidea (Trichosiphum) sikkimensis* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Trichosiphum) sikkimensis* Raychaudhuri, D. N., Ghosh, M. R., Banerjee, M. and Ghosh, A. K., *Kontyu*, **41** : 69.

1993. *Greenidea (Trichosiphum) sikkimensis* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 233.

Material examined : 6 apterae and 1 nymph.

Host plant and locality : *Castanopsis* sp., Pynursha, 29.vii.1973, S. K. Chakraborty.

Distribution : India : Meghalaya (Pynursha), Sikkim.

Genus 81. *Greenideoida* van der Goot

1917. *Greenideoida* Goot, P. van der, *Contrib. Fauna Indes. Neerl.*, 1 : 140.

Key to the subgenera of genus *Greenideoida*

- 1(2) First tarsal segments with 5 ventral hairs; antennae 5-segmented; media of forewings twice-branched, hind wings with 1 oblique vein.....*Pentatrichosiphum*
- 2(1) First tarsal segments with 7 ventral hairs; antennae 6-segmented..... 3
- 3(4) Hind tibiae with transverse cuts; media of forewings once branched.....
.....*Paragreenideoida*
- 4(3) Hind tibiae without transverse cuts; media of forewings twice branched.....
.....*Neogreenideoida*

197. *Greenideoida (Neogreenideoida) bengalensis* Raychaudhuri and Chatterjee

1977. *Greenideoida (Neogreenideoida) bengalensis* Raychaudhuri, D. N. and Chatterjee, M., *Orient. Insects*, 11 : 264.

1993. *Greenideoida (Neogreenideoida) bengalensis* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 250.

Material examined : Nil

Distribution : India : Meghalaya, West Bengal.

198. *Greenideoida (Paragreenideoida) ceyloniae* van der Goot

1905. *Greenidea artocarpi* Schouteden, H. *Spolia Zeylan*, 2 : 181 (Partim).

1993. *Greenideoida (Paragreenideoida) ceyloniae* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries* : 255.

Material examined : Nil

Distribution : India : Meghalaya, Assam, Tripura, South India. Elsewhere : Malaysia; The Philippines; Sri Lanka.

199. *Greenideoida (Pentatrichosiphum) luteum* (Basu, A. N.)

1969. *Pentatrichosiphum luteum* Basu, A. N., *Orient. Insect.*, 3 : 183.

1993. *Greenideoida (Pentatrichosiphum) luteum*, Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 263.

Material examined : 1 aptera and 2 nymphs

Host plant and locality : *Buddleia* sp., Shillong, 18.vii.1970, H. Banerjee.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Sikkim, West Bengal. Elsewhere : Bhutan.

Genus 82. *Mollitrchosiphum* Suenaga1934. *Mollitrchosiphum* Suenaga, *Bull. Kagoshima Imp Coll. Agric. For.* 1 : 798.Type Species : *Trichosiphum tenuicarpus* Okajima, 1908Key to the subgenera of genus *Mollitrchosiphum*1(2) Flagellum with long and short hairs, radial sector curved *Metatrchosiphon*2(1) Flagellum with hairs of nearly similar lengths, radial sector, nearly straight
..... *Mollitrchosiphum*Key to the species of subgenus *Metatrchosiphon*1(2) Longest hair on a.s.III 5.5-6.5 x b.d.III *montanum*

2(1) Longest hair on a.s.III 2.3-4.7 x b.d.III 3

3(4) Abdominal dorsum locally spinulose; 7th tergite with 2 hairs *kazirangi*4(3) Abdominal dorsum never spinulose; u.r.s. 2.3-2.75 x h.t.2 *rhusae*200. *Mollitrchosiphum (Mollitrchosiphum) tenuicarpus* Okajima1908. *Trichosiphum tenuicarpus* Okajima, G., *Bull. Coll. Agric. Koryo Imp. Unit.*, 8 : 22.1993. *Mollitrchosiphum (Mollitrchosiphum) tenuicarpus* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae*, : 273.*Material examined* : 2 apterae and 2 alatae*Host plant and locality* : *Castanopsis* sp., Shillong, 3.xi.1976, M. S. Jyrwa.*Distribution* : India : Meghalaya (Shillong), Sikkim, West Bengal. Elsewhere : Indonesia; Japan.201. *Mollitrchosiphum (Metatrchosiphon) montanum* (van der Goot)1917. *Trichosiphum montanum* Goot, P., van der, *Rec. Indian Mus.*, 13 : 179.1993. *Mollitrchosiphum (Metatrchosiphon) montanum* Ghosh, A. K. and Agarwala, B. K. *The fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 287.*Material examined* : 1 aptera*Host plant and locality* : *Alnus* sp., Shillong, 31.vii.1968, R. Basu.*Distribution* : India : Meghalaya (Shillong), Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Nepal.202. *Mollitrchosiphum (Metatrchosiphon) rhusae* Ghosh, A. K.1974. *Mollitrchosiphum (Metatrchosiphon) rhusae* Ghosh, A. K., *Orient. Insects.*, 8 : 168.1993. *Mollitrchosiphum (Metatrchosiphon) rhusae* Ghosh, A. K. and Agarwala, B. K. *The Fauna of India and the adjacent countries*, pt. 6, *Greenideinae* : 294.*Material examined* : 3 apterae*Host plant and locality* : *Rhus* sp., Barapani, 6.vi.1974, A. K. Ghosh.*Distribution* : India : Meghalaya (Barapani).

Remarks : This is an endemic species originally described from Meghalaya.

Subfamily V. HORMAPHIDINAE

Key to tribes :

- 1(2) Frons with a pair of horn-like processii; Siphunculi present usually pore-like Cerataphidini
 Cerataphidini
 2(1) Frons without horn-like processii. Siphunculi pore-like or absent; apterae aleurodiform Nipponaphidini
 Nipponaphidini

Tribe Cerataphidini

Key to genera of Cerataphidini :

- 1(2) Frons without any process or tubercle 3
 2(1) Frons often with distinct frontal process or lowly elevated tubercles 5
 3(4) Body aleurodiform in apterae, with row of wax glands arranged along entire margin Aleurodaphis
 Aleurodaphis
 4(3) Body without wax glands as above Glyphinaphis
 5(6) Frons with a median and low lateral blunt tubercles, each with a short spine; median tubercle deeply notched Tuberaphis
 6(5) Frons with a pair of horn-like processii; Dorsum with variable wax glands 7
 7(8) Pronotum in apterae with two pleural grooves, separated by a median ridge; 8th tergite in apterae with small wax pores or distinct wax gland cells in oval plates Pseudoregma
 Pseudoregma
 8(7) Pronotum without deep pleural grooves; wax gland groups variable 9
 9(10) Wax gland groups composed of rounded cells or some irregularly-shaped one; first instar larvae with long, slender pointed frontal horns Ceratovacuna
 10(9) At least marginal wax gland groups on abdomen with transversely oval cells arranged in a row. First instar larvae with thick and strongly conical, frontal horns Astegopteryx
 Astegopteryx

Genus 83. Aleurodaphis van der Goot

1917. *Aleurodaphis* van der Goot, P., *Contr. Faune Indes.*, 1(3) : 239

Type species : *Aleurodaphis blumeae* v.d. Goot, 1917.

203. Aleurodaphis blumeae van der Goot [Fig. 67]

1917. *Aleurodaphis blumeae* van der Goot, P., *Cont. Faune Inoks. Neerl.*, 1 (3) : 240.

1980. *Aleurodaphis blumeae* Raychaudhuri, D. N., Ghosh, M. R., Pal, P. K. Ghosh, A. K., In *Aphids of North East India and Bhutan*: 362.

Material examined : 5 apterae

Host plant and locality : Undet. Compositae, Shillong, 5.1972, S. Biswas.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, West Bengal. Elsewhere : Indonesia, Japan, Korea, Taiwan.

Genus 84. *Astegopteryx* Karsch, 1890

1890. *Astegopteryx* Karsch, *Ber. dt. bot. Geo.*, **8** : 51.

204. *Astegopteryx bambusae* (Buckton)

1893. *Oregma bambusae* Buckton, G. B., *Indian Mus. Notes*, **3** : 87

1988. *Astegopteryx bambusae*: Ghosh, A. K. *Fauna India (Homoptera : Aphidoidea)* pt. 4 Hormaphidinae : 267.

Material examined : 10 apterae

Host plant and locality : Bamboo, Shillong, 16.5.1974, A. C. Sukla.

Distribution : India : Meghalaya (Shillong), North West and North East India.

Genus 85. *Ceratovacuna* Zehntner

1897. *Ceratovacuna* Zehntner, L., *Archif. Java. Suikerindust.*, **5** : 553.

Key to the species of the genus *Ceratovacuna* :

- 1(2) Dorsum of abdomen without spinal and pleural wax gland cell groups *spinulosa*
- 2(1) Dorsum of abdomen usually with spinal wax gland cell groups..... 3
- 3(4) Dorsal abdominal hairs with normal or swollen apices. Longest hair on antennal segment III at most equal to the basal diameter of the segment..... *silvestrii*
- 4(3) Dorsal abdominal hairs with acute apices. Longest hair on antennal segment III upto 2.20 X as long as the basal diameter of the segment..... *perglandulosa*

205. *Ceratovacuna perglandulosa* Basu, Ghosh & Raychaudhuri [Figs. 69, 70]

1973. *Ceratovacuna perglandulosa* Basu, R. C., Ghosh, A. K. and Raychaudhuri, D. N., *Proc. zool. Soc., Calcutta*, **26** : 98.

1988. *Ceratovacuna perglandulosa*: Ghosh, A. K., *The fauna of India and adjacent countries Part-4. Hormaphininae*, Z.S.I. : 321.

Material examined : Many apterae and nymphs.

Host plant and locality : Undet Grasses, Shillong, 12.2.1970, H. Banerjee (C. U. coll.); Bamboo, Sonapurdi, 27. 8. 1974, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Assam, Sikkim, West Bengal.

Remarks : This species is originally described from Meghalaya.

206. *Ceratovacuna silvestrii* (Takahashi)

1927. *Oregma silvestrii* Takahashi, *R. Bull. Lab. Zool. Gen. agric. Portici.*, **20** : 148.

1988. *Ceratovacuna silvestrii*; Ghosh, A. K., *The fauna of India and the adjacent countries Part-4. Hormaphidinae*, Z.S.I. : 325.

Material examined : Four apterae

Host plant and locality : On Bamboo, Mowphlang, 12.2.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Mowphlang), Arunachal Pradesh, Assam, Manipur, Nagaland, Meghalaya, Sikkim, Tripura, West Bengal. Elsewhere : China.

207. *Ceratovacuna spinulosa* Ghosh and Raychaudhuri

1972. *Ceratovacuna spinulosa* Ghosh, A. K. and Raychaudhuri, D. N., *Proc. zool. Soc. Calcutta*, **25** : 103.
1988. *Ceratovacuna spinulosa* : Ghosh, A. K., *Fauna of India and the adjacent countries Part-4, Hormaphidinae*, Z.S.I. : 332.

Material examined : Two apterae and Five nymphs.

Host plant and locality : Grass, Shillong, 19.12.1968, (C. U. coll.).

Distribution : India : Meghalaya (Shillong), Manipur, West Bengal.

Genus 86. *Glyphinaphis* van der Goot

1917. *Glyphinaphis* van der Goot, *P. Contrib. Fauna Neerl.*, **1**(3) : 232.

208. *Glyphinaphis bambusae* van der Goot [Fig. 68]

1417. *Glyphinaphis bambusae* van der Goot, *P. Contrib. Fauna Neerl.*, **1**(3) : 232.
1988. *Glyphinaphis bambusae* : Ghosh, A. K., *The fauna of India and the adjacent countries Part-4. Hormaphidinae* : 349.

Material examined : Four apterae and nymphs.

Host plant and locality : Bamboo, Shillong, 30.6.1977, (K. Deb coll.)

Distribution : India : Meghalaya (Shillong), Arunachal Pradesh, Manipur, Sikkim, West Bengal. Elsewhere : Indonesia.

Genus 87. *Pseudoregma* Doncaster

1966. *Pseudoregma* Doncaster, *Entomologist*, **99** : 159.

Type species : *Pseudoregma bucktonii* Doncaster, 1966

Key to the species of the genus *Pseudoregma* :

- 1(2) Dorsoapical hairs on second tarsal segments with funnel-shaped apices; frontal horns small blunt.....*panicola*
- 2(1) Dorsoapical hairs of two types, one with expanded, apex, other with normal apex 3
- 3(4) Fore wings with a distinct pale area along the inner margin, extending all along the length of subcosta; eighth tergite with 6 hairs; cauda with 10 to 12 hairs..... *alexanderi*
- 4(3) Fore wings without pale area along the inner margin of subcosta.....*bucktoni*

209. *Pseudoregma alexanderi* (Takahashi)

1924. *Oregma alexanderi* Takahashi, R., *Aphididae of Formosa*, 3 : 81.

1988. *Pseudoregma alexanderi* : Ghosh, A. K., *The fauna of India and adjacent countries*, Part 4 : *Harmaphidinae* : 386.

Material examined : Many apterae and alatae.

Host plant and locality : Plant and locality : Bamboo, Cherrapunji, 28.5.1968.

Distribution : India : Meghalaya (Cherrapunji), Manipur, Nagaland, Sikkim, West Bengal. Elsewhere : Nepal, Taiwan.

Remarks : Originally described under *Oregma* the species was transferred to *Pseudoregma* by A. N. Basu (1968).

210. *Pseudoregma bucktoni* Ghosh *et al.*

1893. *Oregma bambusae* Buckton, *Indian Mus. Notes.*, 3 : 7-8 (partim)

1974. *Pseudoregma bucktoni* Ghosh, M. R., Pal, P. K. and Raychaudhuri, D. N., *Proc. zool. Soc. Calcutta*, 27 : 113.

1988. *Pseudoregma bucktoni* Ghosh *et al.*: Ghosh, A. K., *Fauna of India and the adjacent countries* (Homoptera : Aphidoidea), pt. 4 : 373.

Material examined : Nil.

Distribution : India : Meghalaya (Ghosh, A. K. 1988), Karnataka, Manipur, Sikkim, Tamil Nadu, West Bengal. Elsewhere : Sri Lanka, Taiwan, Vietnam.

211. *Pseudoregma panicola* (Takahashi)

1918. *Oregma panicola* Takahashi, *Aphididae of Formosa*, 1 : 90.

1988. *Pseudoregma panicola* (Takahashi): Ghosh, A. K., *Fauna of India and Adjacent countries* (Homoptera : Aphidoidea) pt. 4 : 386.

Material examined : 5 apterae

Host plant and locality : On Poaceae, Old Barapani, 17.8.1978, Z.S.I.; Shillong, 19.12.1973, (Z.S.I.).

Distribution : India : Meghalaya (Borapani, Shillong), Arunachal Pradesh, Manipur, Sikkim, Tamil Nadu, West Bengal. Elsewhere : Mauritius, Formosa, Japan, Australia, New Zealand, Africa, Puerto Rico, Cuba.

Genus 88. *Tuberaphis* Takahashi

1933. *Tuberaphis* Takahashi, *Stylops*, 2 : 27.

Type species : *Tuberaphis coreanus* Takahashi, 1933.

212. *Tuberaphis loranthei* (van der Goot)

1917. *Oregma loranthei* van der Goot, *Contrib. Fauna Indes. Neerl.*, 1(3) : 194-196.

1971. *Tuberaphis loranthei* : Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D. N., *Orient. Insects*, 5(3) : 332.

Material examined : 2 apterae, 1 alata and 10 nymphs.

Host plant and locality : On *Loranthus*, on *Vitex*, Shillong, 26.1.1975, M. S. Jyrwa.

Biology : The dirty green to brownish insects form small or large colonies, covered with white waxy secretion and often cause marginal folds on leaves insides which the insects live [Ghosh, A. K. (1988)].

Distribution : India : Meghalaya (Shillong), West Bengal. Elsewhere : Indonesia, Java.

Tribe Nipponaphidini

Key to the genera of Nipponaphidini

- 1(2) Sipunculi present. Prosoma never completely fused with abdominal segments (II to VII); rhinaria either closely placed or wide apart..... 3
- 2(1) Sipunculi absent; antennae placed ventrally, unsegmented, abdomen with round plate-like structures, without submarginal hairs **Neothoracaphis**
- 3(4) Eighth tergite always with hairs; antennae reduced; rhinaria closely placed.....
..... **Metanipponaphis**
- 4(3) Eighth tergite usually with 4 to 8 hairs; cauda broader than long and appears semioval 5
- 5(6) Dorsum of prosoma with distinct spinal and lateral figure-like tubercles; eighth tergite with four hairs **Indonipponaphis**
- 6(5) Dorsum of prosoma variably pustulate, without any figure-like tubercles 7
- 7(8) Tergum smooth but bearing pointed Triangular spine-like pustules.....
..... **Sinonipponaphis**
- 8(7) Tergum never with triangular spine-like pustules..... 9
- 9(10) Abdominal segments (II to VII) with six pairs of submarginal hairs, but without any postero mesial hairs at hind end; eighth tergite with 2 to 4 hairs..... **Thoracaphis**
- 10(9) Abdominal segments (II to VII) always with a pair of posteromesial hairs at hind end; eighth tergite with 4 to 8 hairs..... **Nipponaphis**

Genus 89. *Neothoracaphis* Takahashi

1958. *Neothoracaphis* Takahashi, *Bull. Univ. Osaka Pref. (B)*, 8 : 1.

Type species : *Nipponaphis yononis* Matsumura.

213. *Neothoracaphis sutepensis* (Takahashi)

1941. *Thoracaphis sutepensis* Takahashi, *Rept. Taiwan Govt. Agric. Res. Inst.*, 78 : 22.

1988. *Thoracaphis sutepensis* Takahashi : Ghosh, A. K. *Fauna of India and adjacent countries (Homoptera : Aphidoidea)*, pt. 4 : 170.

Material examined : Many apterous aliencolae.

Host plant and locality : *Quercus* sp., Mawphlang, Khasi Hills, 21.9.1973, A. K. Ghosh (ZSI Coll).

Distribution : India : Meghalaya (Khasi Hills), Manipur. Elsewhere : China, Thailand.

Remarks : The aphids are dark and form small colonies on undersurface of leaves of the host plant at temperate climatic condition.

Genus 90. *Nipponaphis* Pergande

1906. *Nipponaphis* Pergande, *Ent. News.*, **17** : 205.

Type species : *Nipponaphis distychii* pergande

Key to the species of *Nipponaphis* :

- 1(2) Prosoma incompletely separated from fused abdominal segments (2-7); submarginal hairs of variable lengths *himalayensis*
- 2(1) Prosoma completely separated from fused abdominal segments (2-7); only 4th and 5th pair of submarginal hairs much shorter than others *machiliphaga*

214. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri

1973. *Nipponaphis himalayensis* Ghosh, A. K. and Raychaudhuri, D. N., *Kontyu*, **41**(4) : 483.

1988. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri; Ghosh, A. K., *Fauna of India and Adjacent countries (Homoptera : Aphidoidea)*, pt. 4 : 176.

Material examined : 7 apterous aliencolae.

Host plant and locality : *Litsea* sp., Garampani, Meghalaya, 26.1.1975, (Z.S.I., coll.).

Distribution : India : Meghalaya (Garampani), Assam, West Bengal. Elsewhere : Japan.

215. *Nipponaphis (Pseudonipponaphis) machiliphaga* Takahashi

1959. *Nipponaphis machiliphaga* Takahashi, *Akitu*, **8** : 41.

1988. *Nipponaphis (Pseudonipponaphis) machiliphaga*; Ghosh, A. K., *Fauna of India and adjacent countries (Homoptera : Aphidoidea)*, pt. 4, Subfamily Hormaphidinae : 180.

Material examined : 7 apterous aliencolae.

Host plant and locality : *Litsea* sp., Garampani, Meghalaya, 26.1.1975 (Z.S.I. coll.).

Distribution : India : Meghalaya (Garampani), Assam, West Bengal. Elsewhere : Japan.

Genus 91. *Indonipponaphis* Ghosh and Raychaudhuri

1973. *Indonipponaphis* Ghosh, A. K. and Raychaudhuri, D. N., *Kontyu*, **41** : 150.

Type species : *Indonipponaphis tuberculata* Ghosh and Raychaudhuri, 1973.

216. *Indonipponaphis tuberculata* Ghosh and Raychaudhuri

1973. *Indonipponaphis tuberculata* Ghosh, A. K. and Raychaudhuri, D. N., *Kontyu*, **41**(2) : 158.

1988. *Indonipponaphis tuberculata* : Ghosh, A. K., *The fauna of India and adjacent countries, Part-4. Harmaphidini*, Z.S.I., 152.

Material examined : 5 apterae.

Host plant and locality : *Quercus dealbata*, Shillong, H. Banerjee.

Distribution : India : Meghalaya (Shillong).

Remarks : This is an endemic species.

Genus 92. *Metanipponaphis* Takahashi

1959. *Metanipponaphis* Takahashi, R. Bull. Univ. Osaka, Pref. (B) 9 : 5.

Key to the species of *Metanipponaphis* :

- 1(2) Prosoma with numerous round to irregular pustules being spiny and hook-like on marginal area..... *echinata*
- 2(1) Prosoma with round oval, polygonal pustules but these never appear spiny; body large (1.7-1.8 mm) *assamensis*

217. *Metanipponaphis assamensis* Ghosh and Raychaudhuri

1973. *Metanipponaphis assamensis* Ghosh, A. K. and Raychaudhuri, D. N. Kontyu, 41(2) : 160.

1988. *Metanipponaphis assamensis* : Ghosh, A. K., *The fauna of India and the adjacent countries*, Part-4, Harmaphidinae : 157.

Material examined : 4 apterae.

Host plant and locality : *Castanopsis tribuloides*, Shillong, 12.3.1969, C. U. coll.

Distribution : India : Meghalaya (Shillong).

Remarks : This is also an endemic species to India.

218. *Metanipponaphis echinata* A. K. Ghosh

1974. *Metanipponaphis echinata* Ghosh, A. K., *Orient. Insects.*, 8 : 429.

1988. *Metanipponaphis echinata* : Ghosh, A. K., *The fauna of India and the adjacent countries*, Part-4, Harmaphidinae : 159.

Material examined : 6 apterae

Host plant and locality : *Castanopsis histrix*, old Barapani, 7.7.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Old Barapani).

Remarks : This is again an endemic species to India.

Genus 93. *Sinonipponaphis* Tao

1966. *Sinonipponaphis* Tao, C.C.C., *Q.J. Taiwan Mus.*, 19 : 175.

219. *Sinonipponaphis monzeni* (Takahashi)

1958. *Nipponaphis monzeni* Takahashi, R. Akitu, 7 : 88.

1988. *Sinonipponaphis monzeni* : Ghosh, A. K., *The fauna of India and the adjacent countries* Part-9, Harmaphidinae : 219.

Material examined : 2 apterae, 2 alatae, 2 nymphs.

Host plant and locality : *Machilus* sp., Shillong, 4.3.1981, C. U. coll.

Distribution : India: Meghalaya (Shillong). Elsewhere : Japan.

Genus 94. *Thoracaphis* v.d. Goot

1917. *Thoracaphis* van der Goot, *Gontr. Faune. Indes. neerl.*, 1(3) : 242.

Type species : *Thoracaphis arboris* van der Got, 1917.

220. *Thoracaphis quercifoliae* A. K. Ghosh

1973. *Thoracaphis* sp., Ghosh, A. K., and Raychaudhuri, D. N., *Kontyu*, 41(4) : 493.

1988. *Thoracaphis quercifoliae* Ghosh, A. K., *The fauna of India and the adjacent countries Part-4. Harmaphidinae* : 227.

Material examined : 9 apterae.

Host plant and locality : *Quercus dealbata*, Shillong, 26.3.1972, Z.S.I. coll.

Distribution : India : Meghalaya (Shillong).

Subfamily VI. LACHNINAE

Key to the tribes :

- 1(2) U.r.s. always blunt, rostral segment 5 reduced; fore wing often with pigmentation..... Lachnini
- 2(1) U.r.s. usually acuminate, distinctly divided into segment 4 and 5; fore wing usually hyaline. Cinarini

Tribe CINARINI

Key to the subtribes :

- 1(2) Body elongate or elongate oval. Epicranial suture obscure or invisible or distinct. Ultimate rostral segment short and blunt, segment 5 indistinctly separated from segment 4. Siphunculi hardly elevated, with or without any surrounding hairs. First tarsal segment sometimes with a pair of dorsal hairs..... *Eulachnina*
- 2(1) Body rounded. Epicranial suture usually distinct. Ultimate rostral segment pointed, distinctly divided into segment 4 and 5. Siphunculi on small to large, sclerotic cones, bearing many hairs. First tarsal segments never with dorsal hairs..... *Cinarina*

Subtribe CINARINA

Genus 95. *Cinara* Curtis

1835. *Cinara* Curtis, T. *British Entomology*, 12 : 576.

Type species : *Aphis pini* Linnaeus, 1758

221. *Cinara atrotibialis* David and Rajasingh [Fig. 66]

1968. *Cinara atrotibialis* David, S. Kanakaraj and Rajasingh, S. G. *Orient. Insects*, 2(1) : 103.

1982. *Cinara atrotibialis* David and Rajasingh : Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, pt. 2, subfamily Lachninae, Z. S. I. : 20.

Material examined : Many apterae and nymphs.

Host plant and locality : *Pinus* sp., Shillong, 10.1.1960, 11.5.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong), Himachal Pradesh, Manipur. Elsewhere : Thailand, Philippine Is.

Remarks : The species is characterised by its abdominal dorsum with many scattered dark brown hair bearing sclerites.

Subtribe Eulachnina

Genus 96. *Eulachnus* del Guercio

1909. *Eulachnus* del Guercio, *Riv. Patol. Veg.*, **3** : 329.

Type species : *Lachnus agilis* Kaltenbach

222. *Eulachnus thunbergii* Wilson

1919. *Eulachnus thunbergii* Wilson, *Ent. News.*, **30** : 3.

1982. *Eulachnus thunbergii* Wilson; Ghosh, A. K., *Fauna India, (Homoptera : Aphidoidea)*, pt. 2, Subfamily Lachninae : 69.

Material examined : 5 apterae

Host plant and locality : Pine, Shillong, 8.10.1967, S. G. Rajasingh; Pine, 28.12.1965, S. K. Chanda; Pine, Mawphlang, 12.1.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong, Mawphlang), Arunachal Pradesh, Assam, Manipur, Nagaland. Elsewhere : Japan, Korea, Formosa and Australia.

Remarks : The species is recognisable by its dirty green to brown coloured colonies on pine needles.

Tribe LACHNINI

Key to the genera of Lachnini

- 1(8) Forewings with pterostigma elongate, radial sector little curved or straight. Wings immaculate. Apterae may be with or without a single tubercle on 4th abdominal tergite..... 2
- 2(3) Eyes without ocular tubercles. Dorsal cephalic hairs long and fine, may be up to 6.5 X as long as the basal diameter of antennal segment III. Forewings with median much paler and thinner than other veins, may be simple, once or twice-branched.....
..... *Nippolachnus*
- 3(2) Eyes with distinct ocular tubercles. Dorsal cephalic hairs up to 3.5X as long as the basal diameter of antennal segment III. Forewings with media as dark as or paler than other veins, usually twice branched 4
- 4(5) Abdominal dorsum with a large spinal tubercle on 4th tergite. Flagellum with secondary rhinaria on segment IV in apterae and on segments III and IV in alatae. Hairs on the hind tibiae up to 0.70 X as long as the diameter at the middle of hind tibiae
..... *Tuberolachnus*

- 5(4) Abdominal dorsum without tubercle on 4th tergite. Flagellum with secondary rhinaria on segments III-IV in apterae and in alatae. Hairs on hind tibiae shorter or longer than the diameter at the middle of hind tibiae..... 6
- 6(7) Hairs on flagellum and dorsum of abdomen fine, always longer than the basal diameter of antennal segment III. Abdominal dorsum with large marginal sclerites..... *Longistigma*
- 7(6) Hairs on flagellum and dorsum of abdomen fine or thick, those on flagellum shorter or longer than the basal diameter of antennal segment III. Abdominal dorsum without large marginal sclerites, as above..... *Pyrolachnus*
- 8(1) Forewings with pterostigma blunt; radial sector usually curved. Wings often variably pigmented or with a dark or pale. Apterae with ocular tubercles and never with a single dorsal tubercle on 4th tergite 9
- 9(10) Abdominal dorsum with hair-bearing sclerites, which may sometimes become confluent. Ultimate rostral segment much shorter than or nearly equal to second segment of hind tarsus and bearing 10-15 accessory hairs. Hind legs usually similar to fore and mid legs. Forewings with a pigmented blotch at base of media. On *Rosa* and *Rubus* *Maculolachnus*
- 10(9) Abdominal dorsum usually without sclerites as above. Ultimate rostral segment shorter or longer than second segment of hind tarsus and bears 6 to more than 20 accessory hairs. Hind legs much elongated. Forewings usually strongly variegated. On various dicotyledons *Lachnus*

Genus 97. *Lachnus* Burmeister

1758. *Aphis* Linnaeus, C., *Systema Naturae*, 1 : 451, (partim auctores diversi).

1835. *Lachnus* Burmeister, H. C. C., *Handb. Ent.*, 2(1) : 91.

Type species : *Lachnus fasciatus* Burmeister (= *Aphis roboris* Linnaeus).

223. *Lachnus tropicalis* (van der Goot) [Fig. 65]

1916. *Pterochlorus tropicalis* van der Goot, *Rec. Indian Mus.*, 12 : 3

1982. *Lachnus tropicalis* (v. d. Goot) : Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, pt. 2, subfamily Lachninae : 91.

Material examined : 4 apterae and 1 alata.

Host plant and locality : *Quercus*, Shillong, 1966, S. B. Biswas; undet host plant, Cherrapunji, 10.12.1968, A. K. Ghosh.

Biology : This species usually forms small to medium-sized colony on the stems of the host plants.

Distribution : India : Meghalaya (Shillong, Cherrapunji) Manipur, Sikkim, West Bengal. Elsewhere : Malaya, China, Japan, Korea, Vietnam, Indonesia.

Genus 98. *Longistigma* Wilson1909. *Longistigma* Wilson, *Can. Ent.*, **41** : 385.Type species : *Aphis caryae* Harris224. *Longistigma liquidambarus* (Takahashi)1925. *Dilachnus liquidambarus* Takahashi, *Rep. Dept. Agric. Govt. Res. Inst. Formosa*, **16** : 42.1982. *Longistigma liquidambarus* (Takahashi); Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, pt. 2, Subfamily Lachninae, Z.S.I. : 99.*Material examined* : 5 alatae and nymphs.*Host plant and locality* : *Berchemia floribunda*, Shillong, 4.11.1976, A. K. Ghosh.*Distribution* : India : Meghalaya (Shillong). Elsewhere : Formosa.Genus 99. *Maculolachnus* Gaumont1920. *Maculolachnus* Gaumont, *Bull. Soc. ent. Fe.*, **25** : 30.Type species : *Aphis submacula* Walker (= *Lachnus rosae* Cholod.)225. *Maculolachnus rubi* Ghosh and Raychaudhuri1972. *Maculolachnus rubi* Ghosh, A. K. and Raychaudhuri, D. N. *Proc. zool. Soc. Calcutta*, **25** : 101.1982. *Maculolachnus rubi* Ghosh and Raychaudhuri : Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, pt. 2, Subfamily Lachninae : 104.*Material examined* : 3 apterae and nymphs.*Host plant and locality* : *Rubus* sp., Shillong, 9.6.1970, S. Sarker.*Distribution* : India : Meghalaya (Shillong).*Remarks* : This species is so far known from Meghalaya only.Genus 100. *Nippolachnus* Matsumura1917. *Nippolachnus* Matsumura, *F. Coll. Agric. Tohoku imp. Univ.*, **7**(6) : 382.Type species : *Nippolachnus piri* Matsumura, 1917Key to the species of *Nippolachnus**Apterous viviparous females* :1(2) U.r.s. with 9 to 14 accessory hairs, p.t. with only a few terminal setae, without any hairs.....
..... *bengalensis*2(1) U.r.s. with 18-20 accessory hairs; p.t. with a few fine hairs besides terminal setae..... *pyri*226. *Nippolachnus bengalensis* Basu and Hille Ris Lambers1968. *Nippolachnus bengalensis*, Basu, A. N. and Hille Ris Lambers, *Ent. Ber. Amst.*, **28** : 9.1974. *Nippolachnus bengalensis* Ghosh, A. K., *Orient. Insects*, **8**(2) : 171.*Material examined* : One apterous viviparous female and two nymphs.*Host plant and locality* : *Pyrus pashia*, Shillong, 18.6.1973, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong), West Bengal.

227. *Nippolachnus pyri* (Matsumura)

1917. *Nippolachnus pyri* Matsumura, *J. Coll. Agric. Tohoku Univ.*, 7(6) : 8382.

1952. *Nippolachnus pyri* Ghosh, A. K. and Raychaudhuri, D. N., *J. Asiat. Soc. Beng.*, 14 (3 & 4) : 107.

Material examined : 6 apterae and 2 alatae.

Host plant and locality : *Pyrus communis*, Shillong, 8.10.1972.

Distribution : India : Meghalaya (Shillong), West Bengal. Elsewhere : Korea, Japan, Taiwan and Malaya.

Genus 101. *Pyrolachnus* Basu and H.R.L.

1968. *Pyrolachnus* Basu, A. N. and Hille Ris Lambers, *Ent. Ber. Amst.*, 28 : 13.

Type species : *Lachnus pyri* Buckton, 1899

228. *Pyrolachnus Pyri* (Buckton)

1899. *Lachnus pyri* Buckton, G. B. *Indian Mus. Notes*, 4(5) : 274

1982. *Pyrolachnus pyri* (Buckton) ; Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, pt. 2, Subfamily Lachninae : 131.

Material examined : 3 apterae and nymphs.

Host plant and locality : *Pyrus communis*, Shillong, 25.5.1970, S. Biswas.

Distribution : India : Meghalaya (Shillong), Tamil Nadu, West Bengal.

Genus 102. *Tuberolachnus* Mordvilko

1968. *Tuberolachnus* Mordvilko, *Ezheg. zool. Muz.*, 13 : 374.

Type species : *Aphis viminalis* B. d. Fonscolombe

229. *Tuberolachnus salignus* (Gmelin)

1790. *Aphis salignus* Gmelin, *Syst. Nat.* (13 ed.), 1 : 2209.

1982. *Tuberolachnus salignus* (Gmelin): Ghosh, A. K., *Fauna India (Homoptera : Aphididae)*, pt. 2, Subfamily Lachninae, Z.S.I. : 140.

Material examined : 5 apterae, 3 alatae and nymphs.

Host plant and locality : *Salix babylonica*, Shillong, 10.12.1975, A. K. Sukla.

Distribution : India : Meghalaya (Shillong), widely distributed throughout the country and virtually cosmopolitan except in Australia.

Subfamily VII. PEMPHIGINAE

Key to the tribes of Pemphiginae

1(2) Siphunculi present as cones or as rings, surrounded by a few hairs; wax glands present.....

..... *Eriosomatini*

- 2(1) Siphunculi absent or very feebly developed, without any hair; wax glands may be present or absent..... 3
- 3(4) U.r.s. with a few or without accessory hairs; wax gland groups in apterae each bearing a hair, long or inconspicuous *Pemphigini*
- 4(3) U.r.s. with 2-many accessory hairs (up to 20); wax glands absent or inconspicuous, in apterae never with hair..... *Fordini*

Tribe Eriosomatini

Genus 103. *Eriosoma* Leach

1818. *Eriosoma* Leach, *Trans. Hort. Soc. Lond.*, 3 : 60.

Type species : *Eriosoma mali* Leach = *Aphis lanigera* Hausmann

230. *Eriosoma lanigerum* (Hausmann)

1802. *Aphis lanigerum* Hausmann, *Illig. Mag. Insekt.*, 1(3-4) : 440.

1990. *Eriosoma lanigerum* (Hausmann); Ghosh, A. K., *Fauna India (Homoptera : Aphidoidea)*, Subfamily Pemphiginae, Z.S.I., pt. 3 : 25.

Material examined : Many apterae and nymphs.

Host plant and locality : Apple tree, Laban, Shillong, 12.4.1968, S. Biswas; pyrus Polycarpa, Risa Colony, Shillong, 18.8.1972, A. C. Sukla.

Distribution : India : Meghalaya (Shillong), widely distributed Cosmopolitan.

Remarks : Fotedar and Kapur (1943) described about the life cycle of the species in Kashmir.

Tribe Pemphigini

Genus 104. *Prociphilus* Koch

1857. *Prociphilus* Koch, *Die Pflanzenlause Aphiden* : 279.

Type species : *Aphis buneliae* Schrank, 1801.

231. *Prociphilus osmanthae* Essig & Kuwana

1918. *Prociphilus osmanthae* Essig and Kuwana, *Proc. Calif. Acad. Sci.*, 8 (3) : 105.

1990. *Prociphilus osmanthae* Essig and Kuwana: Ghosh, A. K. *Fauna India (Homoptera : Aphidoidea)*, Subfamily Pemphiginae, Z. S. I., pt. 3 : 276.

Material examined : 2 alatae and 1 nymph.

Host plant and locality : Unidentified plant, Shillong, 25.5.1962, A. K. Ghosh.

Distribution : India : Meghalaya (Shillong); Elsewhere : Japan.

Tribe Fordini

Genus 105. *Geoica* Hartig

1894. *Geoica* Hart., *Rep., Ill. St. Ent.*, 18 : 101

Type species : *Geoica quamosa* Hart 1894 = *Pemphigus urticularius* Passerini, 1856.

232. *Geoica lucifuga* (Sehntner)

1898. *Tetraneura lucifuga* zehntner, *Arch. Suikerind. Ned. Ind.*, 6 : 555.

Table : Distribution of Aphid species/subspecies in different districts of Meghalaya

Systematic List of Aphididae of Meghalaya Name of Species/Subspecies	East Garo hills	West Garo hills	South Garo hills	East Khasi hills	West Khasi hills	Ribhoi	Jayantia hills
	1	2	3	4	5	6	7

Subfamily I. Anoeciinae

Tribe Aiceonini

Genus 1. *Aiceona* Takahashi1. *A. robustiseta* Ghosh and Raychaudhuri

+

Subfamily II. Aphidinae

Tribe *Aphidini*

Subtribe Aphidina

Genus 2. *Aphis* Linnaeus2. *Aphis citricola* Patch

+ + + + + + +

3. *A. craccivora* Koch4. *A. fabae solanella* Theobald

+

5. *A. gossypii* Glover

+ + + + + + +

6. *A. kurosawai* Takahashi7. *A. longisetosa* Basu

+

8. *A. nasturtii* Kaltenbach

+

+

9. *A. nerii* Boyer de Fonscolombe

+

+

10. *A. polygonaceae* Matsumura

+

11. *A. punicae* Passerini

+

Genus 3. *Toxoptera* Koch12. *Toxoptera anrantii* B.d.F.

+

13. *T. citricidus* (Kirkaldy)

+

14. *T. odinae* (van der Goot)

+

15. *Hyalopterus atriplicis* (Linn.)16. *Hyalopterus pruni* (Geoffroy)Genus 5. *Hysteroneura* Davis17. *Hysteroneura setariae* (Thomas)

+

+

Genus 6. *Melanaphis* van der Goot18. *Melanaphis arundinariae* (Takahashi)

+

19. *M. donacis* (Passerini)

+

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	20. <i>M. meghalayensis meghalayensis</i> Raychaudhuri & Banerjee			+			
	21. <i>Melanaphis sacchari</i> (Zehntner)			+			
Genus 7.	<i>Rhopalosiphum</i> (Koch)						
	22. <i>Rhopalosiphum maidis</i> (Fitch)			+		+	+
	23. <i>R. nymphaeae</i> (Linnaeus)			+			
	24. <i>R. padi</i> (Linnaeus)			+			
	25. <i>R. rufiabdominalis</i> (Sasaki)			+			
	26. <i>R. yoksumi</i> Ghosh <i>et al.</i>			+			
	27. <i>Schizaphis graminum</i> (Rondani)			+			
	28. <i>S. punjabipyri</i> (Das)			+			
	29. <i>S. rotundiventris</i> (Signoret)			+			
Tribe	MACROSIPHINI						
Genus 9.	<i>Acutosiphon</i> Basu, Ghosh and Raychaudhuri						
	30. <i>Acutosiphon obliquoris</i> Masu <i>et al.</i>			+			
Genus 10.	<i>Acyrtosiphon</i> Bordvilko						
	31. <i>Acyrtosiphon pisum</i> (Harris)			+			
Genus 11.	<i>Akkaia</i> Takahashi						
	32. <i>Akkaia bengalensis</i> Basu			+			
Genus 12.	<i>Amphorophora</i> Buckton						
	33. <i>Amphorophora ampullata bangalensis</i> H.R.L.			+			
Genus 13.	<i>Anthracosiphoniella</i> Basu						
	34. <i>Anthracosiphoniella macula</i> Basu			+		+	
Genus 14.	<i>Aulacorthum</i> Mordvilko						
	35. <i>Aulacorthum cornaceae</i> Ghosh			+			
	36. <i>A. dasi</i> Ghosh, Basu and Raychaudhuri			+			
	37. <i>A. magnoliae</i> (Essig & Kuwana)			+			
	38. <i>A. nipponicum</i> (Essig & Kuwana)			+			

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39. <i>A. rhamni</i> Ghosh <i>et al.</i>				+			
40. <i>A. scirpi</i> van der Goot				+			
41. <i>A. solani</i> (Kaltenbach)				+			
Genus 15. <i>Brachycaudus</i> van der Goot							
42. <i>Brachycaudus hilichrysi</i> (Kaltenbach)				+			
43. <i>Brachycaudus persicaecola</i> (Boisduval)				+			
Genus 16. <i>Brevicoryne</i> Linnaeus							
44. <i>Brevicoryne brassicae</i> (Linnaeus)				+			
Genus 17. <i>Capitophorus</i> van der Goot							
45. <i>Capitophorus archangelskii</i> Nevsky				+			
46. <i>Capitophorus carduinus</i> (Walker)				+			
47. <i>C. elaeagni</i> (del Guercio)				+			
48. <i>C. formosartemisiae</i> (Takahashi)				+			
49. <i>C. hippophaes javanicus</i> H.R.L.				+			
50. <i>C. h. mitegoni</i> Eastop							
51. <i>C. indicus</i> Ghosh & Raychaudhuri				+			
52. <i>C. meghalayensis</i> Basu and Raychaudhuri				+			
53. <i>C. vernoniae</i> Ghosh & Raychaudhuri				+		+	
Genus 18. <i>Cavariella</i> del Guercio							
54. <i>Cavariella araliae</i> Takahashi				+			
55. <i>C. aegopodii</i> (Scopoli)				+			
56. <i>C. biswasi</i> Ghosh <i>et al.</i>				+			
57. <i>C. salicicola</i> (Matsumura)				+		+	
Genus 19. <i>Chaetomyzus</i> Ghosh and Raychaudhuri							
58. <i>Chaetomyzus rhododendri</i> Ghosh & Raychaudhuri						+	
Genus 20. <i>Coloradoa</i> Wilson							
59. <i>Coloradoa rufomaculata</i> (Wilson)				+			
Genus 21. <i>Cryptomyzus</i> Oestlund							
60. <i>Cryptomyzus taoi</i> H.R.L.				+			

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- Genus 22. *Cryptosiphum* Buckton
61. *Cryptosiphum artemisiae* Buckton +
- Genus 23. *Dactynotus* Rafinesque
62. *D. sonchi* (Linnaeus) +
63. *D. pseudotanaceti* Verma +
64. *D. (Uromelan) compositae* Theob. +
- Genus 24. *Diphorodon* Börner
65. *Diphorodon cannabis* (Passerini) +
- Genus 25. *Dysaphis* Börner
66. *Dysaphis pyri* (Boyer de Fonscolombe) +
- Genus 26. *Hayhurstia* del Guercio
67. *Hayhurstia atriplicis* (Linnaeus) +
- Genus 27. *Hyadaphis* Kirkaldy
68. *Hyadaphis coriandri* (Das) +
- Genus 28. *Hyperomyzus* Börner
69. *Hyperomyzus carduellinus* (Theobald) +
- Genus 29. *Indumasonaphis* Raychaudhuri *et al.*
70. *Indumasonaphis inulae* (Ghosh & Raychaudhuri) +
- Genus 30. *Liosomaphis* Walker
71. *Liosomaphis himalayensis* Basu +
- Genus 31. *Lipaphis* Mordvilko
72. *Lipaphis erysimi* Kaltenbach +
- Genus 32. *Macromyzus* Takahashi
73. *Macromyzus woodwardi* Takahashi +
- Genus 33. *Macrosiphoniella* del Guercio
74. *Macrosiphoniella formosartemisiae* Takahashi +
75. *M. matsumurana* Ghosh *et al.* +
76. *M. pseudoartemisiae* Shinji +

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Name of Species/Subspecies		1	2	3	4	5	6	7
	77. <i>M. sanborni</i> (Gillette)	+	+	+	+	+	+	+
	78. <i>M. spinipes</i> Basu				+			
	79. <i>M. yomogifoliae</i> (Shinji)				+			
Genus 34.	<i>Macrosiphum</i> Passerini							
	80. <i>Macrosiphum</i> (<i>M.</i>) <i>aulacorthoides</i> David, Narayanan & Rajasingh				+			
	81. <i>M.</i> (<i>M.</i>) <i>pachysiphon</i> H.R.L.				+			
	82. <i>M.</i> (<i>M.</i>) <i>rosae</i> Linnaeus				+			
	83. <i>M.</i> (<i>M.</i>) <i>spinipes rhododendri</i> (Ghosh, Basu & Raychaudhuri)				+			
	85. <i>M.</i> (<i>M.</i>) <i>spinotibium</i> Ghosh & Raychaudhuri				+			
	86. <i>M.</i> (<i>M.</i>) (<i>Sitobion</i>) <i>africanum</i> H.R.L.				+			
	87. <i>M.</i> (<i>S.</i>) <i>avenae</i> (Fabricious)				+			
	88. <i>M.</i> (<i>S.</i>) <i>fagopyri</i> Ghosh and Raychaudhuri				+			
	89. <i>M.</i> (<i>S.</i>) <i>ibarae</i> Matsumura							
	90. <i>M.</i> (<i>S.</i>) <i>indicum</i> (Basu)				+			
	91. <i>M.</i> (<i>S.</i>) <i>luteum</i> Buckton				+			
	92. <i>M.</i> (<i>S.</i>) <i>mimosae</i> Ghosh <i>et al.</i>				+			
	93. <i>M.</i> (<i>S.</i>) <i>miscanthi</i> (Takahashi)				+		+	
	94. <i>M.</i> (<i>S.</i>) <i>plectranthi</i> Ghosh <i>et al.</i>				+			
	95. <i>M.</i> (<i>S.</i>) <i>rosaeiformis</i> (Das)				+		+	
	96. <i>M.</i> (<i>S.</i>) <i>sikkimensis</i> Ghosh & Raychaudhuri				+			
	97. <i>M.</i> (<i>S.</i>) <i>smilacifoliae</i> (Takahashi)				+		+	
	98. <i>M.</i> (<i>S.</i>) <i>takahashii</i> Eastop				+			
Genus 35.	<i>Matsumuraja</i> Schumacher							
	99. <i>Matsumuraja capitophoroides</i> H.R.L.				+			
Genus 36.	<i>Metaphorodon</i> Takahashi							
	100. <i>Metaphorodon polygoni</i> (v.d. Goot)				+		+	
Genus 37.	<i>Metopolophium</i> Mordvilko							

Table : Distribution of Aphid species/subspecies in different districts of Meghalaya

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	1	2	3	4	5	6	7
101. <i>Metopolophium</i> (<i>Metopolophium</i>) <i>euryae</i> (Takahashi)				+			
Genus 38. <i>Micromyzodium</i> David							
102. <i>Micromyzodium filicium</i> David				+			
Genus 39. <i>Micromyzus</i> van der Goot							
103. <i>Micromyzus kalimpongensis</i> Basu				+			
104. <i>M. mawphlangensis</i> Ghosh				+			
105. <i>Micromyzus</i> sp.							
Genus 40. <i>Myzus</i> Passerini							
106. <i>Myzus ascalonicus</i> Doncaster				+			+
107. <i>M. brevisiphon</i> Basu				+			
108. <i>M. cerasi</i> (Fabricius)				+			
109. <i>M. cymballarielus</i> Stroyan				+			
110. <i>M. dycei</i> Carver				+			
111. <i>M. indicus</i> Basu & Raychaudhuri				+			
112. <i>M. meghalayensis</i> Basu & Raychaudhuri				+			
113. <i>M. monoji</i> Basu & Raychaudhuri				+			
114. <i>M. obtusirostris</i> David <i>et al.</i>				+			
115. <i>M. ornatus</i> Laing	+	+	+	+	+	+	+
116. <i>M. persicae</i> (Sulzer)	+	+	+	+	+	+	+
117. <i>M. siegesbeckicola</i> Strand	+	+	+	+	+	+	+
Genus 41. <i>Neohyalomyzus</i> Basu <i>et al.</i>							
118. <i>Neohyalomyzus raoi</i> (H.R.L.)				+			
Genus 42. <i>Neomegouropsis</i> Ghosh <i>et al.</i>							
119. <i>Neomegouropsis cajanae</i> Ghosh & Raychaudhuri				+			
Genus 43. <i>Neomyzus</i> van der Goot							
120. <i>Neomyzus</i> (<i>Neomyzus</i>) <i>circumflexus</i> Buckton	+	+	+	+	+	+	+
121. <i>N. (N.) primulum</i> Ghosh <i>et al</i>				+			
Genus 44. <i>Ovatus</i> van der Goot							
122. <i>Ovatus minutus</i> van der Goot				+			

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- Genus 45. *Packzoskia* Mordvilko
 123. *Paczoskia budhium* Banerjee *et al.*
 Genus 46. *Pentalonia* Caquerel
 124. *Pentalonia nigronervosa* Coquerel
 Genus 47. *Perillaphis* Takahashi
 125. *Perillaphis perillae* (Shinji)
 Genus 48. *Pleotrichophorus* Börner
 126. *Pleotrichophorus chrysanthemi* (Theobald)
 Genus 49. *Pseudoacyrthosiphon* Ghosh and Raychaudhuri
 127. *Pseudoacyrthosiphon* (P.) *holsti* Takahashi
 Genus 50. *Rhodobium* Hille Ris Lambers
 128. *Rhodobium porosum* (Sanderson)
 Genus 51. *Rhopalosiphoninus* Baker
 129. *Rhopalosiphoninus latysiphon* (Davidson)
 Genus 52. *Scleromyzus* Basu, Ghosh & Raychaudhuri
 130. *Scleromyzus corylopsi* (Basu, Ghosh & Raychaudhuri)
 Genus 53. *Semiaphis* van der Goot
 131. *Semiaphis heraclei* (Takahashi)
 Genus 54. *Shinjia* Takahashi
 132. *Shinjia orientalis* (Mordv.)
 Genus 55. *Sinomegoura* Takahashi
 133. *Sinomegoura citricola* (van der Goot)
 134. *S. photinae* (Takahashi)
 135. *S. pyri* Ghosh & Raychaudhuri
 136. *S. rhododendri* (Takahashi)
 Genus 56. *Subovatomyzus* Basu
 137. *Subovatomyzus leucosceptri* Basu
 Genus 57. *Tricaudatus* Tao

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138. <i>Tricaudatus polygona</i> (Narzikulov)				+			
Genus 58. <i>Trichosiphonaphis</i> Takahashi							
139. <i>Trichosiphonaphis gerbarae</i> Ghosh & Raychaudhuri				+			
140. <i>T. lonicerae</i> (Uye)				+		+	
Genus 59. <i>Tuberocephalus</i> Shinji							
141. <i>Tuberocephalus sasaki</i> (Matsumura)				+			
Genus 60. <i>Vesiculaphis</i> del Guercio							
142. <i>Vesiculaphis kuwanis</i> Ghosh <i>et al.</i>					+		
143. <i>V. pieridis</i> Basu				+			+
144. <i>V. verbasci</i> Chawdhuri <i>et al.</i>				+			
Genus 61. <i>Xenomyzus</i> Aizenberg							
145. <i>X. scabripes</i> Basu <i>et al.</i>				+			
Subfamily III. Drepanosiphinae							
Genus 62. <i>Betacallis</i> Matsumura							
146. <i>Betacallis prunicola</i> Basu <i>et al.</i>				+			
147. <i>B. querciphaga</i> Basu <i>et al.</i>						+	
Genus 63. <i>Clethrobius</i> Mordvilko							
148. <i>Clethrobius drybius</i> Chakrabarti & Raychaudhuri						+	
Genus 64. <i>Machailaphis</i> Takahashi							
149. <i>Machailaphis machili</i> (Takahashi)				+			
Genus 65. <i>Mesocallis</i> Matsumura							
150. <i>Mesocallis alnicola</i> Ghosh				+			
Genus 66. <i>Neobetulaphis</i> Basu							
151. <i>Neobetulaphis immaculata</i> Ghosh				+			
Genus 67. <i>Shivaphis</i> Das							
152. <i>Shivaphis celti</i> Das				+	(?)		
Genus 68. <i>Subtakecallis</i> Raychaudhuri and Pal							

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153. <i>Subtakecallis pilosus</i> (David <i>et al.</i>)				+			
Genus 69. <i>Takecallis</i> Matsumura							
154. <i>Takecallis arundinariae</i> (Essig)				+			
Genus 70. <i>Taoia</i> Quednau							
155. <i>Taoia indica</i> (Ghosh & Raychaudhuri)				+			
Genus 71. <i>Tinocallis</i> Matsumura							
156. <i>Tinocallis magnoliae</i> Ghosh and Raychaudhuri				+			
Genus 72. <i>Tinocalloides</i> Basu							
157. <i>Tinocalloides montanus</i> Basu				+			
Genus 73. <i>Tuberculatus</i> Mordvilko							
158. <i>Tuberculatus indicus</i> Ghosh				+			
159. <i>T. nervatus</i> Chakrabarti & Raychaudhuri				+			
160. <i>T. paiki</i> Hille Ris Lambers				+			
Subfamily IV. Greenideinae							
Tribe <i>Cervaphidini</i>							
Genus 74. <i>Cervaphis</i> van der Goot							
161. <i>Cervaphis quercus</i> Takahashi				+			
162. <i>C. schouteniae</i> van der Goot				+			
Genus 75. <i>Schoutedenia</i> Rubsaamen							
163. <i>Schoutedenia emblica</i> (Patel and Kulkarni)				+			
164. <i>S. ralumensis</i> Rubsaamen				+(?)			
Genus 76. <i>Sumatraphis</i> Takahashi							
165. <i>Sumatraphis celti</i> Takahashi				+			
Tribe Greenideini							
Genus 77. <i>Allotrichosiphum</i> Takahashi							
166. <i>Allotrichosiphum assamense</i> Raychaudhuri <i>et al.</i>				+			
Genus 78. <i>Brevitrichosiphon</i> Raychaudhuri <i>et al.</i>							
167. <i>Brevitrichosiphon mukerjii</i> Raychaudhuri <i>et al.</i>				+			

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Genus 79. *Eutrichosiphum* Essig & Kuwana

168. *Eutrichosiphum alnicola* Basu +
 169. *E. assamense* Ghosh *et al.* +
 170. *E. blackmanum* Agarwala and Ghosh +
 171. *E. dubium* (van der Goot) +
 172. *E. flavum* Takahashi +
 173. *E. khasyanum* Ghosh & Raychaudhuri +
 174. *E. makii* Raychaudhuri & Chatterjee +
 175. *E. neotattakanum* Agarwala and Ghosh +
 176. *E. pseudopasaniae* Szelegiewicz + +
 177. *E. pyri* Chakrabarti, Ghosh & Raychaudhuri +
 178. *E. rameshi* (Raychaudhuri *et al.*) +
 179. *E. raychaudhurii* Ghosh +
 180. *E. russellae* (Ghosh *et al.*) +
 181. *E. sankari* Raychaudhuri *et al.* +
 182. *E. sensoriatum* (Ghosh) +
 183. *E. subinoyi* Raychaudhuri *et al.* +
 184. *E. tattakanum* (Takahashi) +

Genus 80. *Greenidea* Schouteden

185. *Greenidea (Greenidea) artocarpi* (Westwood) +
 186. *G. (G.) decaspermi* Takahashi +
 187. *G. (G.) himansui* Raychaudhuri *et al.* +
 188. *G. (G.) longicornis* (Ghosh & Raychaudhuri) +
 189. *G. (G.) lonirostris* Basu +
 190. *G. (Paragrennidea) symplacosis* Ghosh *et al.* +
 191. *G. (Trichosiphum) bucktonis* Ghosh *et al.* +
 192. *Greenidea (Trichosiphum) camelliae* +
 Agarwala and Ghosh
 193. *G. (T.) formosana formosana* (Maki) +(?)

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Name of Species/Subspecies	1	2	3	4	5	6	7

193A. *G. (T.) manii* Ghosh *et al.*194. *G. (T.) prunicola* Ghosh *et al.*195. *G. (T.) quercicola* Basu and Raychaudhuri196. *G. (T.) sikkimensis* Raychaudhuri *et al.*Genus 81. *Greenideoida* van der Goot197. *Greenideoida (Neogreenideoida) bengalensis*
Raychaudhuri and Chatterjee198. *Greenideoida (Paragreenideoida)*
ceyloniae van der Goot199. *G. (Pentatrichosiphon) luteum* (Basu)Genus 82. *Mollitrichosiphum* Suenaga200. *Mollitrichosiphum (Mollitrichosiphon)*
tenuicarpus Okajima201. *M. (M.) montanum* (van der Goot)202. *M. (M.) rhusae* Ghosh

Subfamily V. Hormaphidinae

Tribe *Cerataphidini*Genus 83. *Aleurodaphis* van der Goot203. *Aleurodaphis blumeae* van der GootGenus 84. *Astegopteryx* Karsch204. *Astegopteryx bambusae* (Buckton)Genus 85. *Ceratovacuna* Zehntner205. *Ceratovacuna perglandulosa* Basu *et al.*206. *C. silvestri* (Takahashi)207. *C. spinulosa* Ghosh and RaychaudhuriGenus 86. *Glyphinaphis* van der Goot208. *Glyphinaphis bambusae* van der GootGenus 87. *Pseudoregma* Doncaster209. *Pseudoregma alexanderi* (Takahashi)

1862-281199-16

Table : Distribution of Aphid species/subspecies in different districts of Meghalaya

Systematic List of Aphididae of Meghalaya Name of Species/Subspecies	East Garo hills	West Garo hills	South Garo hills	East Khasi hills	West Khasi hills	Ribhoi	Jayantia hills
	1	2	3	4	5	6	7

210. <i>P. bucktoni</i> Ghosh, Pal and Raychaudhuri				+(?)			
211. <i>P. panicola</i> (Takahashi)				+		+	
Genus 88. <i>Tuberaphis</i> Takahashi							
212. <i>Tuberaphis loranthe</i> (van der Goot)				+			
Tribe Nipponaphidini							
Genus 89. <i>Neothoracaphis</i> Takahashi							
213. <i>Neothoracaphis sutepe</i> (Takahashi)				+			
Genus 90. <i>Nipponaphis</i> Perga.							
214. <i>Nipponaphis</i> (P.) <i>himalayensis</i> Ghosh & Raychaudhuri							+
215. <i>N. (P.) machiliphaga</i> Takahashi							+
Genus 91. <i>Indonipponaphis</i> Ghosh and Raychaudhuri							
216. <i>Indonipponaphis tuberculata</i> Ghosh and Raychaudhuri				+			
Genus 92. <i>Metanipponaphis</i> Takahashi							
217. <i>Metanipponaphis assamensis</i> Ghosh & Raychaudhuri				+			
218. <i>M. echinata</i> Ghosh						+	
Genus 93. <i>Sinonipponaphis</i> Tao							
219. <i>Sinonipponaphis monzeni</i> (Takahashi)				+			
Genus 94. <i>Thoracaphis</i> van der Goot							
220. <i>Thoracaphis quercifoliae</i> Ghosh				+			
Subfamily VI. Lachninae							
Tribe <i>Cinarini</i>							
Subtribe <i>Cinarina</i>							
Genus 95. <i>Cinara</i> Curtis							
221. <i>Cinara atrotibialis</i> David & Rajasingh				+			

Table : Distribution of Aphid species/subspecies in different districts of Meghalaya

Systematic List of Aphididae of Meghalaya Name of Species/Subspecies	East Garo hills	West Garo hills	South Garo hills	East Khasi hills	West Khasi hills	Ribhoi	Jayantia hills
	1	2	3	4	5	6	7

Subtribe *Eulachnina*Genus 96. *Eulachnus* del Cuercio222. *Eulachnus thunbergii* Wilson +Tribe *Lachnini*Genus 97. *Lachnus* Burmeister223. *Lachnus tropicalis* (van der Goot) +Genus 98. *Longistigma*224. *Longistigma liquidambarus* (Takahashi) +Genus 99. *Maculolachnus* Gaumont225. *Maculolachnus rubi* Ghosh & Raychaudhuri +Genus 100. *Nippolachnus* Matsumura226. *Nippolachnus bengalensis* Basu and H.R.L. +227. *N. piri* (Matsumura) +Genus 101. *Pyrolachnus* Basu and H.R.L.228. *Pyrolachnus piri* (Buckton) +Genus 102. *Tuberolachnus* Mordvilko229. *Tuberolachnus salignus* (Gmelin) +Subfamily VII. *Pemphiginae*Tribe *Eriosomatini*Genus 103. *Eriosoma* Leach230. *Eriosoma lanigerum* (Hausmann) +Tribe *Pemphigini*Genus 104. *Prociphilus* Koch231. *Prociphilus osmanthae* Essig & Kuwana +Tribe *Fordini*Genus 105. *Geoica* Hartig232. *Geoica lucifuga* (Zehntner) +

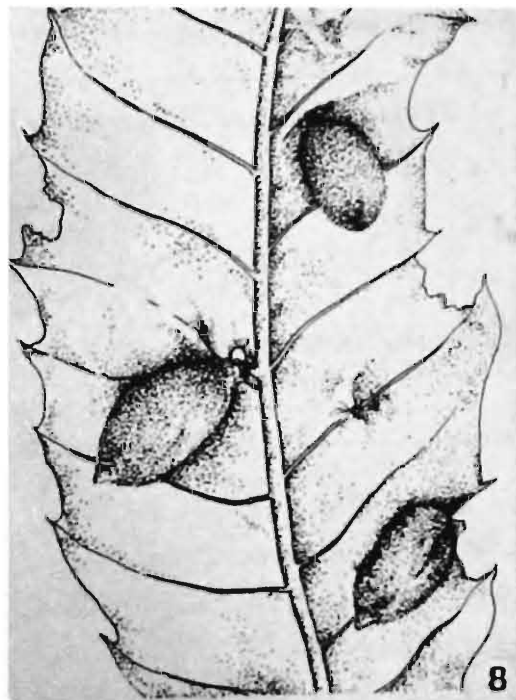


Fig. 7. Damage due to aphid infestation (Leaves curled and growth stunted);

Fig. 8. Leaf gall; Fig. 9. Stem gall;

Fig. 10. Seriously damaged host plant heavily infested with aphids;

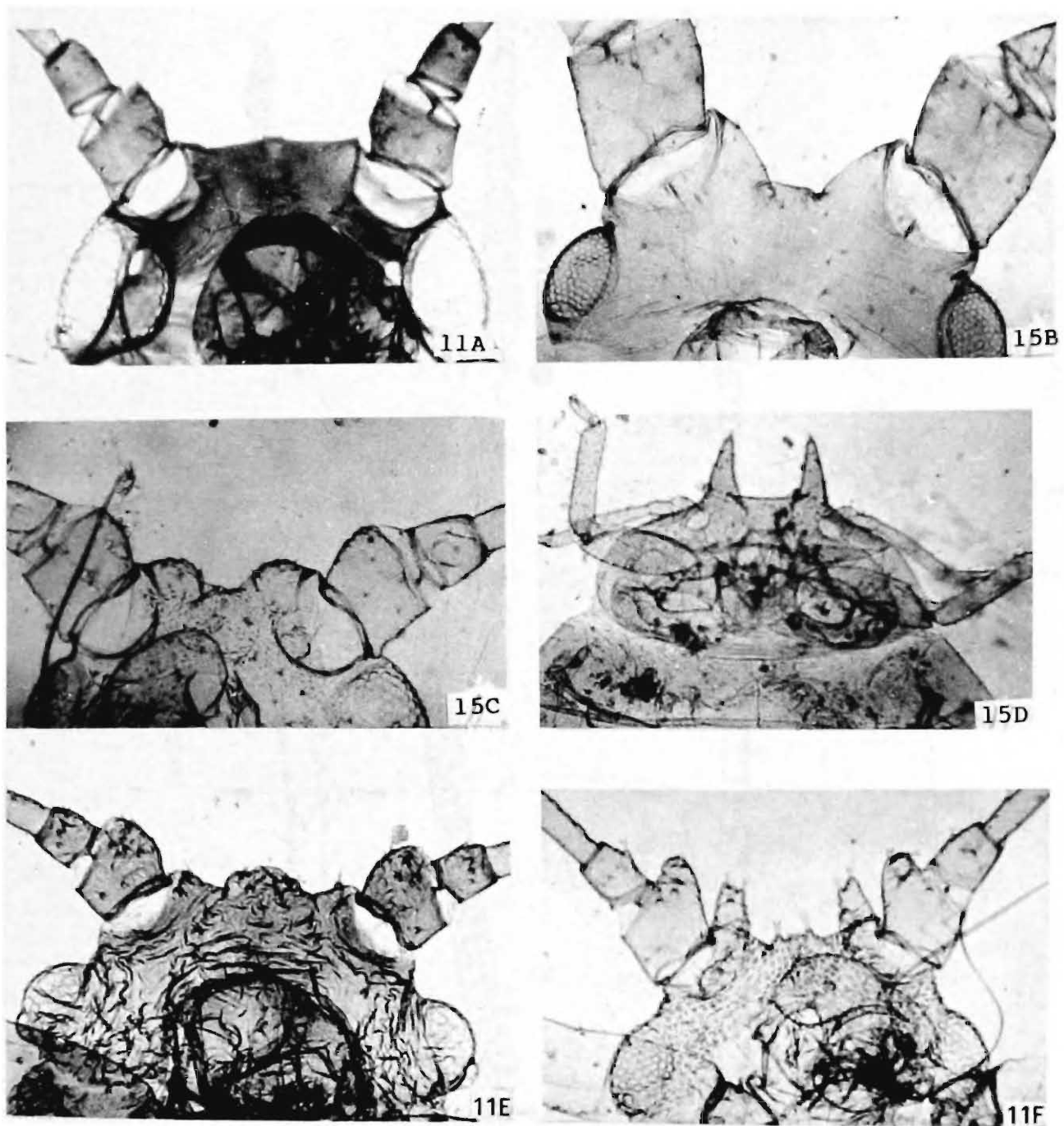


Fig. 11. (A-F) Types of Frons :-

A. *Rhopalosiphum padi* (Linn.); B. *Acyrthosiphon pisum* (Harris); C. *Myzus persicae* (Sulzer); D. *Ceratoglyphina bambusae* v.d.G.; E. *Vesiculaphis pieridis* Basu; F. *Paraphorodon cannabidis* (Passerini);

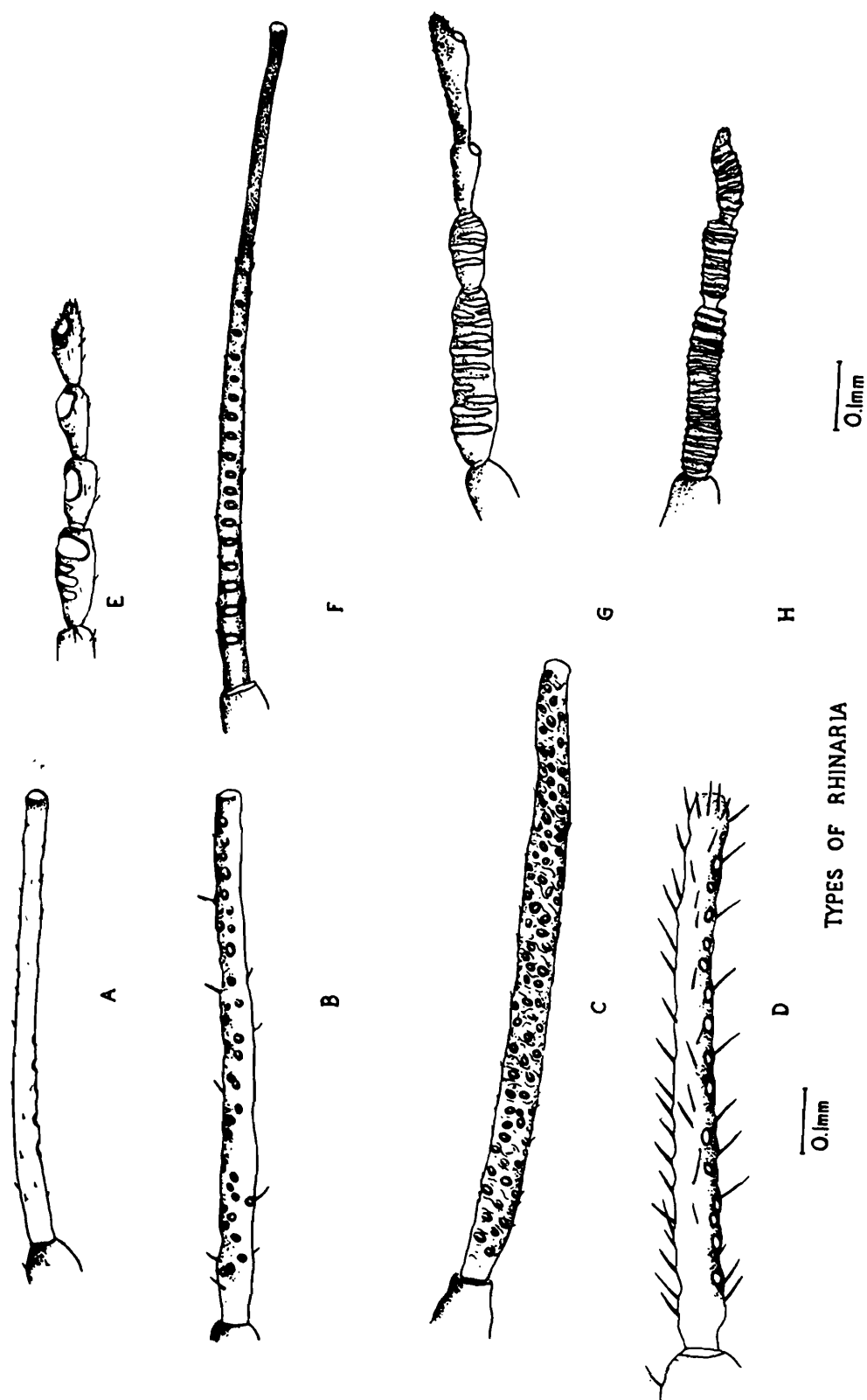


Fig. 12. (A-H) Types of Rhinaria :-

A. *Macrosiphum plectranthi* Ghosh *et al.* B. *Dactynotus pseudotanaceti* Verma C. *Pseudoacyrthosiphon holsti* (Takahashi) D. *Lachnus tropicalis* (v.d. Goot) E. *Goeica lucifuga* (Zehntner) F. *Betacallis odaiensis* Takahashi G. *Pemphigus immunis* Buckton H. *Pseudoregma subglandulosa* (H.R.L. and Basu)

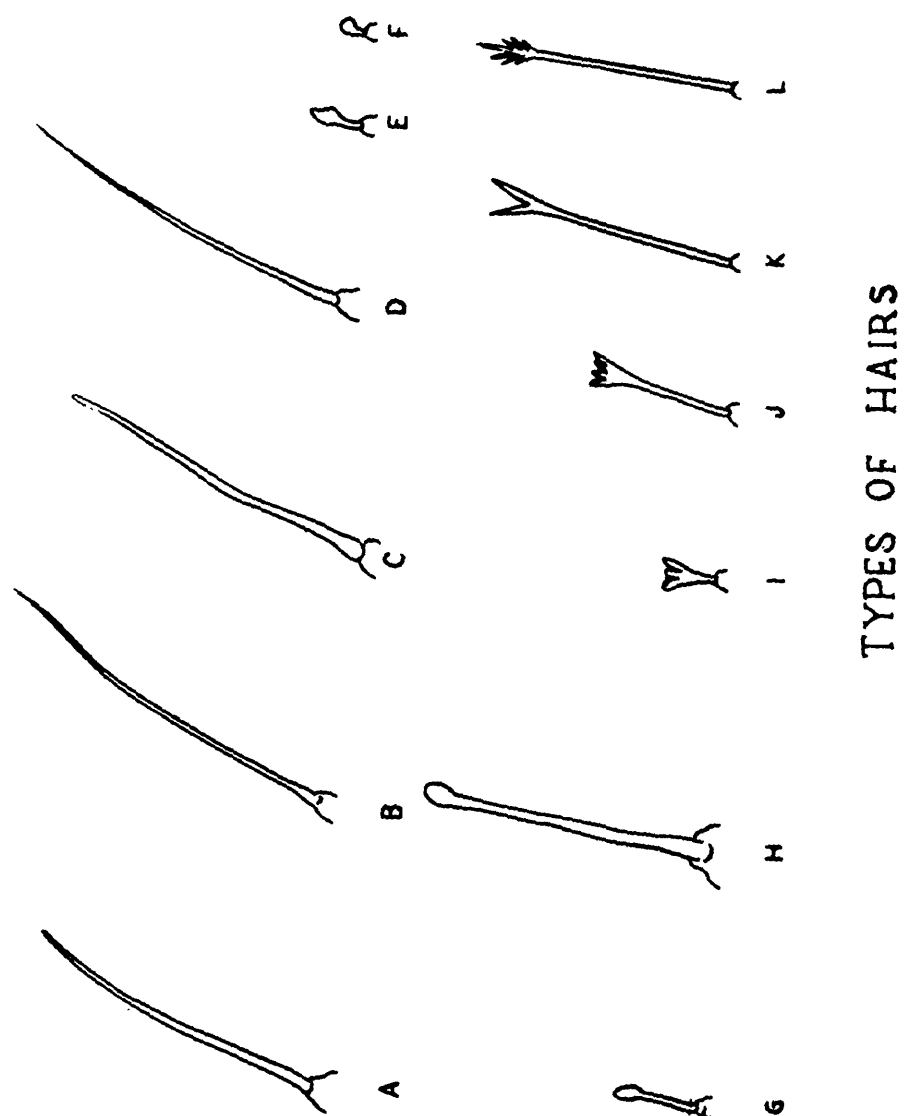
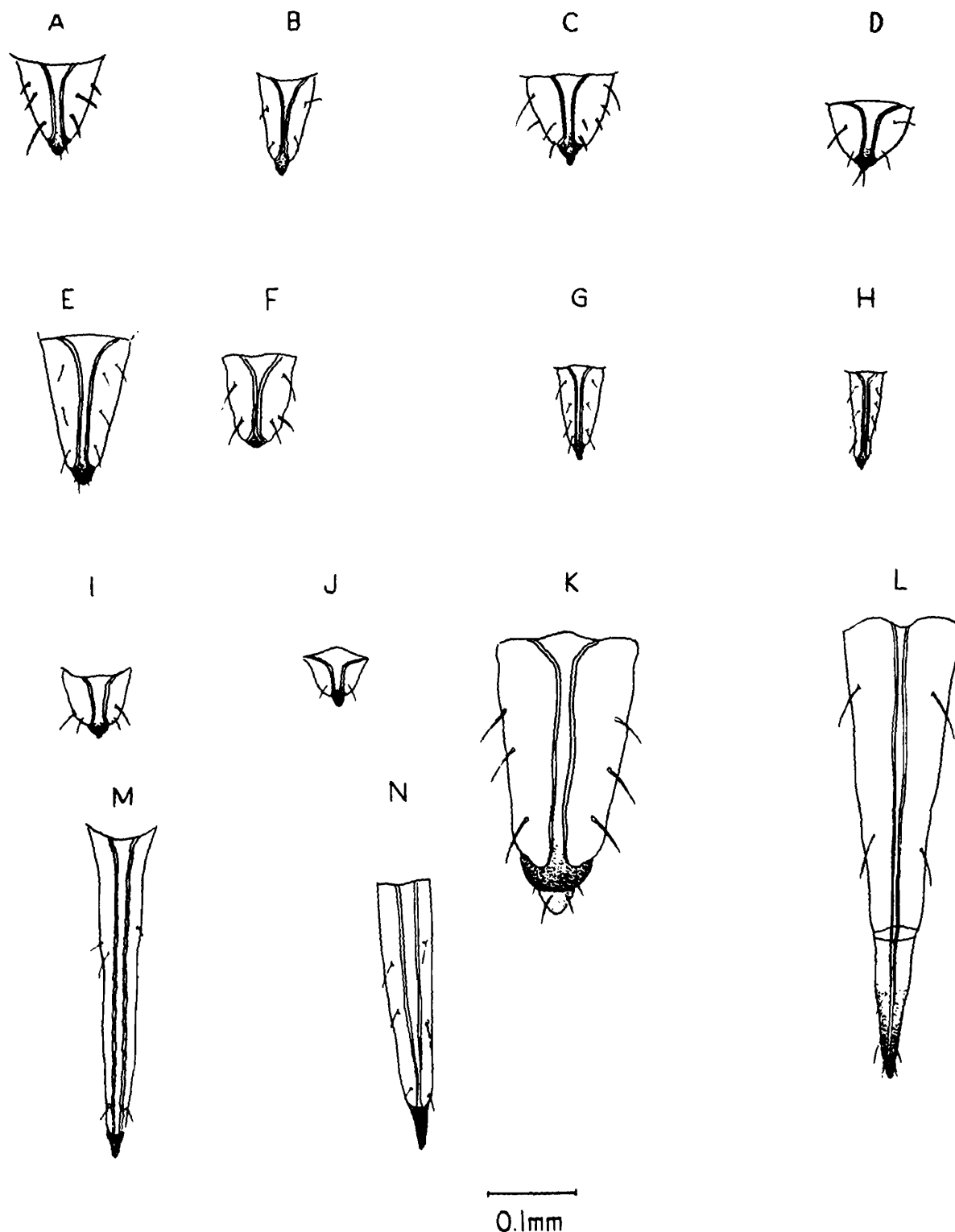


Fig. 13 (A-L) : Types of Hairs

A. Acuminate apex B. Incrassate apex C. Blunt apex D. Acute apex E-H. Spatulate to expanded apices I-J. Fan-shaped apices K-L. Furcated to multifid apices

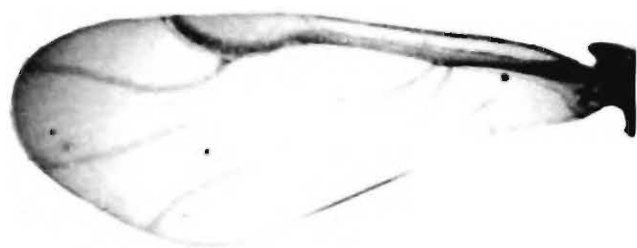


TYPES OF ULTIMATE ROSTRAL SEGMENTS

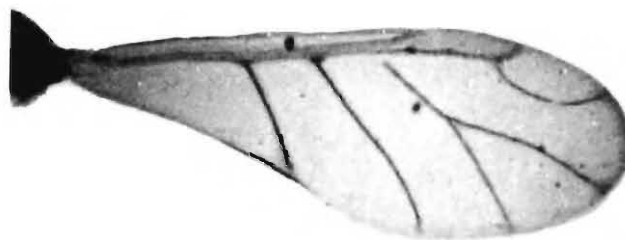
Fig. 14. (A-N) : Types of ultimate rostral segments :-

14

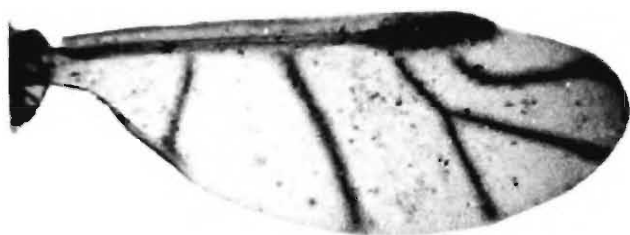
A. *Macrosiphum (Sitobion) rosaeiformis* (Das) B. *Toxoptera aurantii* (B.d.F.) C. *Macrosiphum (Sitobion) smilacifoliae* (Takahashi) D. *Melanaphis sacchari* (Zehntner) E. *Aulacorthum dasi* Ghosh et al. F. *Vesiculaphis kuwanis* Ghosh et al. G. *Capitophorus hippophaes javanicus* Hille Ris Lambers I. *Ceratovacuna silvestri* (Takahashi) J. *Ghyphinaphis bambusae* v.d. Goot K. *Lachnus tropicalis* (v.d. Goot) L. *Cinara atrotibialis* David and Rajasingh M. *Paczoskia budhium* Banerjee et al. N. *Eutrichosiphum assamense* Ghosh et al.



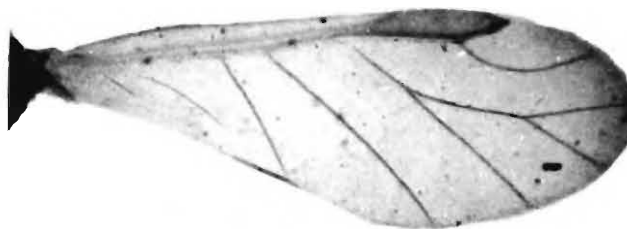
15A



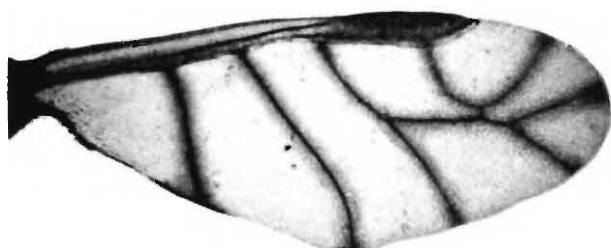
15B



15C



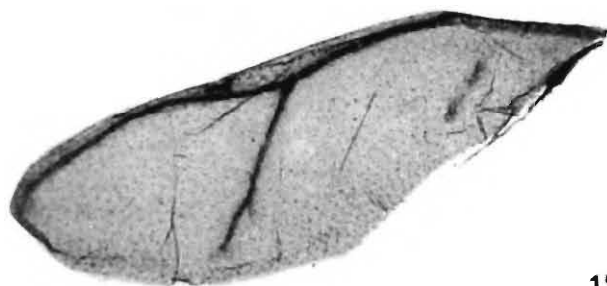
15D



15E



15F



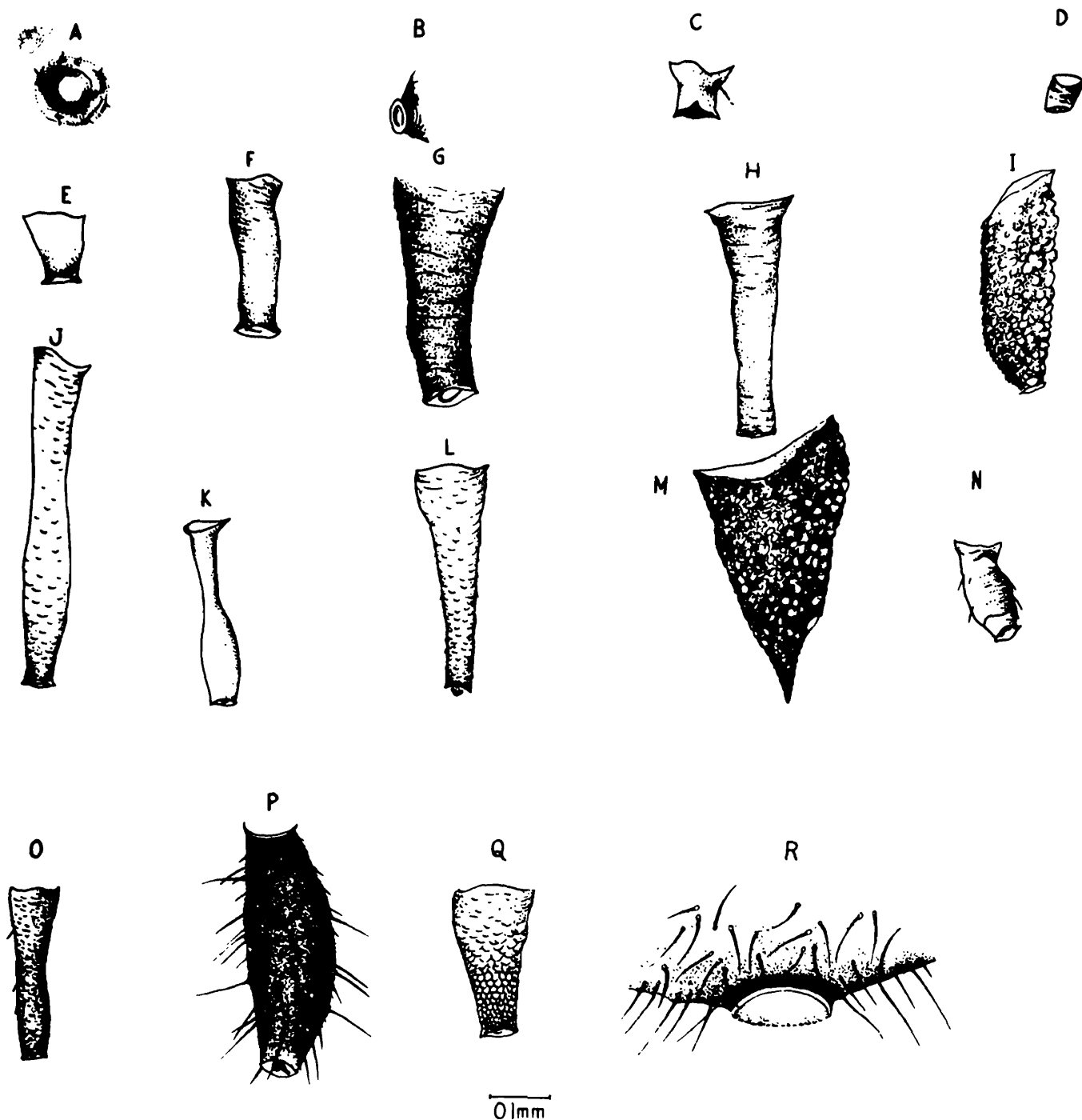
15G



15H

Fig. 15. (A-H) : Types of Wing Venation

A. *Tetraneura nigriabdominalis* (Sasaki) : Forewing B. *Hyalopterus atriplicis* (Linn.) : Forewing
 C. *Schoutedenia ralumensis* Rubsaamen : Forewing D. *Hyadaphis coriandri* (Das) : Forewing E.
Micromyzus kalimpongensis Basu : Forewing F. *Lachnus tropicalis* (v.d.Goot) : Forewing G.
Hyalopterus atriplicis (Linn.) : Hindwing H. *Aulacorthum dasi* Ghosh *et al.* : Hindwing



TYPES OF SIPHUNCULI

16

Fig. 16. (A-R) : Types of Siphunculi

A. *Eriosoma lanigerum* (Hausmann) B. *Tetraneura nigriabdominalis* (Sasaki) C. *Betacallis querciphaga* Basu et al. D. *Semiaphis heraclei* (Tak.) E. *Brachycaudus helichrysi* (Kaltenbach) F. *Rhopalosiphum padi* (Linn.) G. *Toxoptera citricidus* (Kirk.) H. *Aulacorthum rhamni* Ghosh et al. I. *Vesiculaphis pieridis* Basu J. *Myzus (Nectarosiphon) persicae* (Sulzer) K. *Myzus (Sciomyzus) ascalonicus* (Doncaster) L. *Metaphorodon polygoni* (v.d. Goot) M. *Acutosiphon obliquoris* Basu et al. N. *Sumatrphis celti* Tak. O. *Trichosiphonaphis lonicerae* (Uye) P. *Holotrichosiphon russellae* (Ghosh et al.) Q. *Macrosiphoniella sanborni* (Gillette) R. *Lachnus tropicalis* (v.d. Goot)

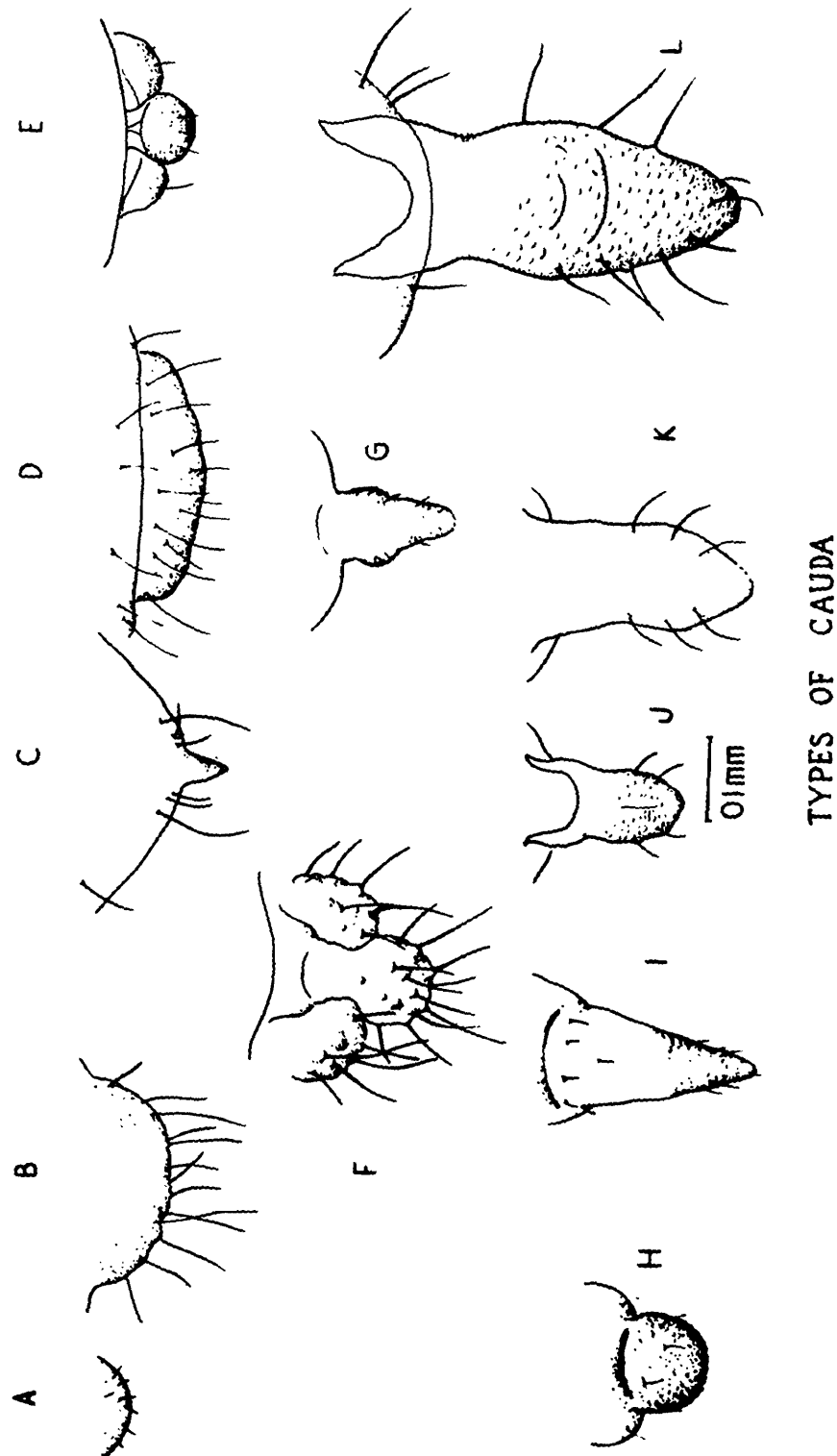


Fig. 17. (A-L) : Types of Cauda :-

A. *Eriosoma lanigerum* (Hausmann) B. *Paratrichosiphum* (*Neoparatrichosiphum*) *raychaudhurii* Ghosh C. *Greenidea longirostris* Basu D. *Nippolachnus pyri* Matsumura E. *Aleurodaphis blumae* v.d. Goot F. *Tuberculatus nervatus* Chakrabarti and Raychaudhuri G. *Micromyzus kalimpongensis* Basu H. *Brachycaudus helichrysi* (Kalt.) I. *Semiaphis heraclei* Tak. J. *Aphis gossypii* Glover K. *Myzus* (*Nectarosiphon*) *persicae* (Sulzer) L. *Macrosiphoniella sanborni* (Gillette)

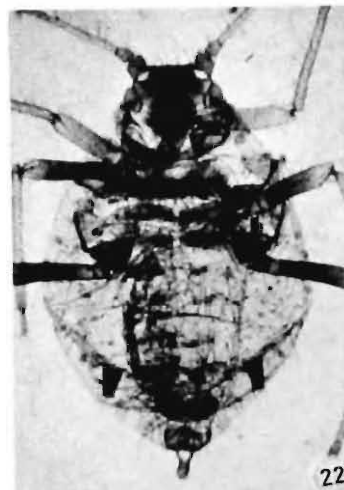
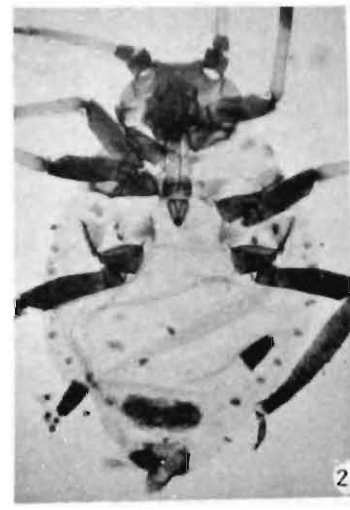


Fig. 18. *Aphis nasturtii* Kalt : Apterous oviparous female X 46

Fig. 19. *Toxoptera aurantii* (b.d.F.) : Stridulatory apparatus X 90

Fig. 20. *Hyalopterus atriplicis* (Linn.) : Alate viviparous female X 44

Fig. 21. *Hysteroneura setariae* (Thomas) : Apterous viviparous female X 48

Fig. 22. *Melanaphis aurandinariae* (Takahashi) : Apterous viviparous female X 44

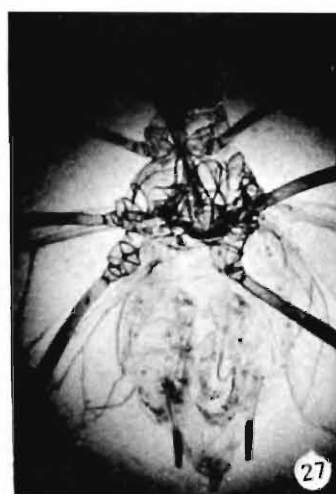
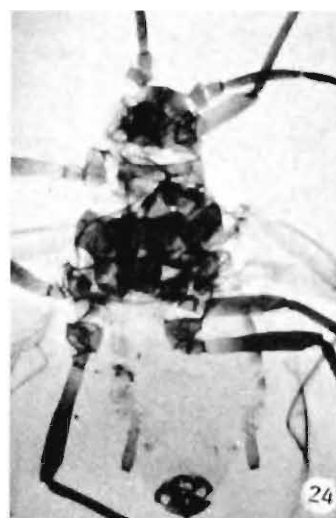


Fig. 23. *Rhopalosiphum nymphaeae* (Linn.) : Apterous viviparous female X 45

Fig. 24. *Rhopalosiphum nymphaeae* (Linn.) : Alate male X 38

Fig. 25. *Schizaphis cyperi* (v.d.Goot) : Alate male X 46

Fig. 26. *Acutosiphon obliquoris* Basu et al. : Apterous viviparous female X 30

Fig. 27. *Amphorophora ampullata bengalensis* H.R.L. and Basu : Alate viviparous female X 17

Fig. 28. *Anthracosiphoniella maculatum* Basu : Apterous viviparous female X 29

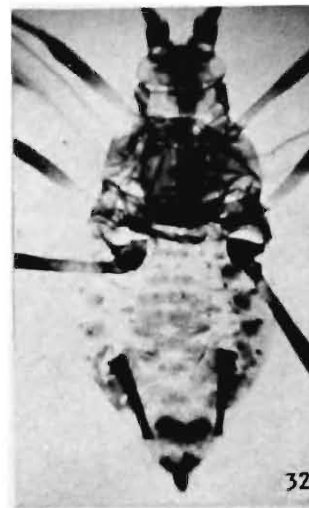
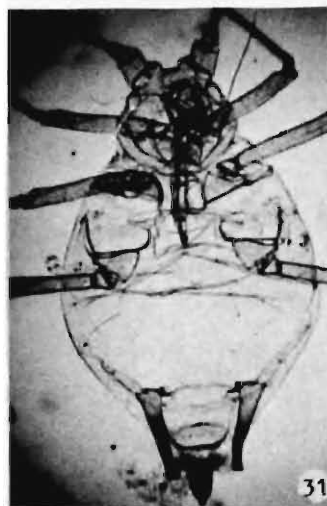
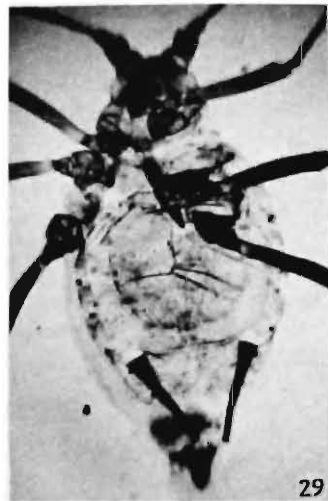


Fig. 29. *Aulacorthum dasi* Ghosh *et al.* : Apterous viviparous female X 26

Fig. 30. *Aulacorthum dasi* Ghosh *et al.* : Alate viviparous female X 25

Fig. 31. *Aulacorthum rhamni* Ghosh *et al.* : Apterous viviparous female X 37

Fig. 32. *Capitophorus archangelskii* Nevsky : Apterous viviparous female X 42

Fig. 33. *Cavariella biswasi* Ghosh *et al.* : Apterous viviparous female X 38

Fig. 34. *Cavariella biswasi* Ghosh *et al.* : Alate viviparous female X 40

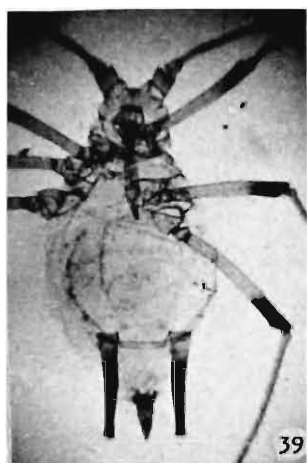
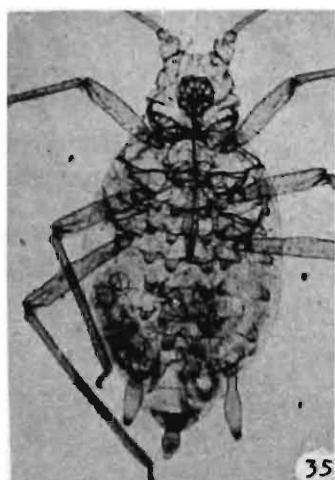


Fig. 35. *Chaetomyzus rhododendri* Ghosh and Raychaudhuri : Apterous viviparous female X 30

Fig. 36. *Coloradoa rufomaculata* (Wilson) : Apterous viviparous female X 46

Fig. 37. *Cryptosiphum artemisiae* Buckton : Alate viviparous female X 41

Fig. 38. *Macrosiphoniella matsumurana* Ghosh *et al.* : Apterous viviparous female X 26

Fig. 39. *Macrosiphum plectranthi* Ghosh *et al.* : Apterous viviparous female X 25

Fig. 40. *Macrosiphum* (*Sitobion*) *rosaeiformis* (Das) : Apterous oviparous female X 46

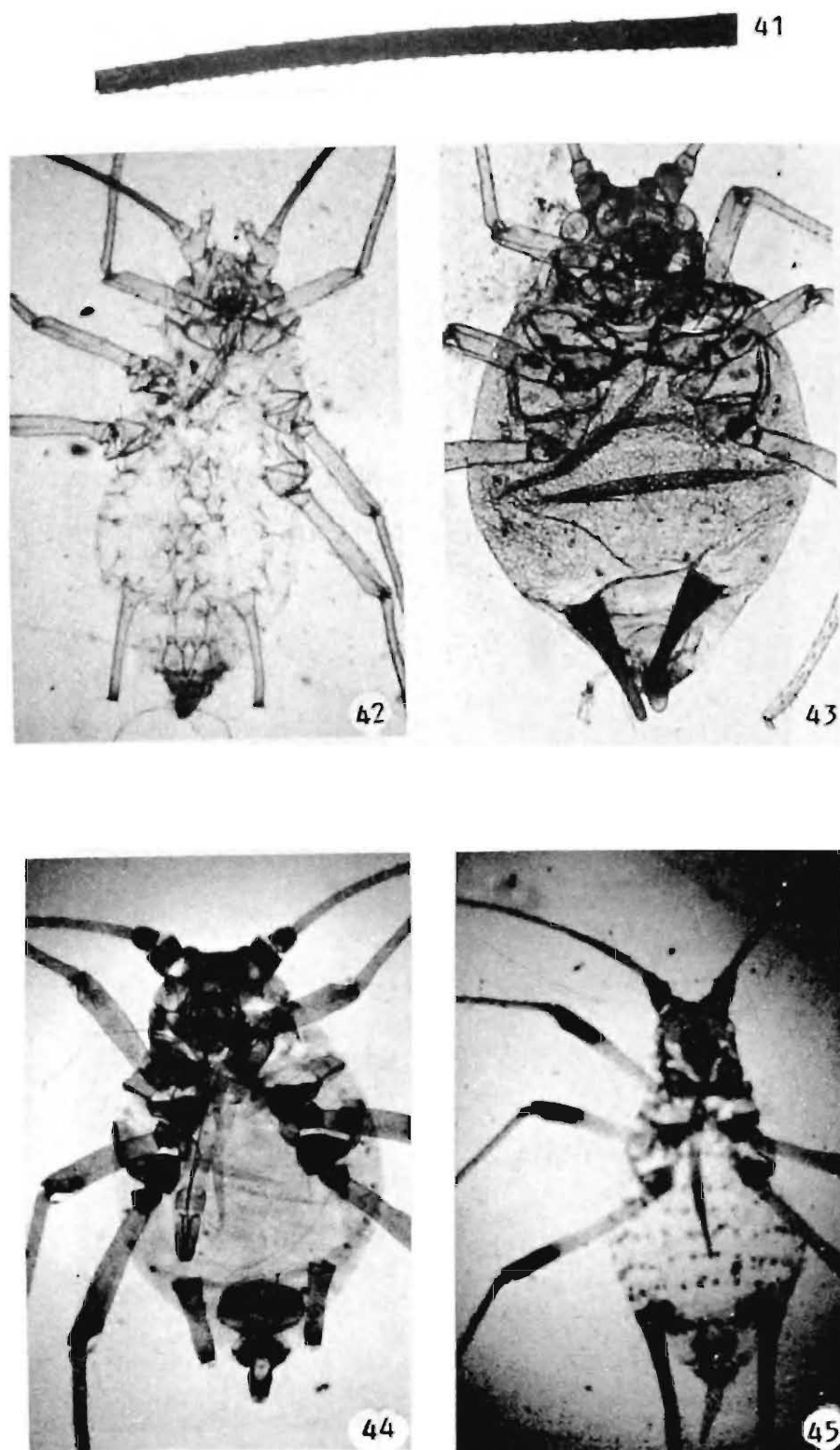


Fig. 41. *Macrosiphum spinipes* Basu : Pegs on hind tibia X 57

Fig. 42. *Matsumuraja capitophoroides* H.R.L. : Apterous viviparous female X 47

Fig. 43. *Metaphorodon polygoni* (v.d.Goot) : Apterous viviparous female X 44

Fig. 44. *Micromyzus kalimpongensis* Basu : Apterous viviparous female X 44

Fig. 45. *Paczoskia budhium* Banerjee et al. : Apterous viviparous female X 20

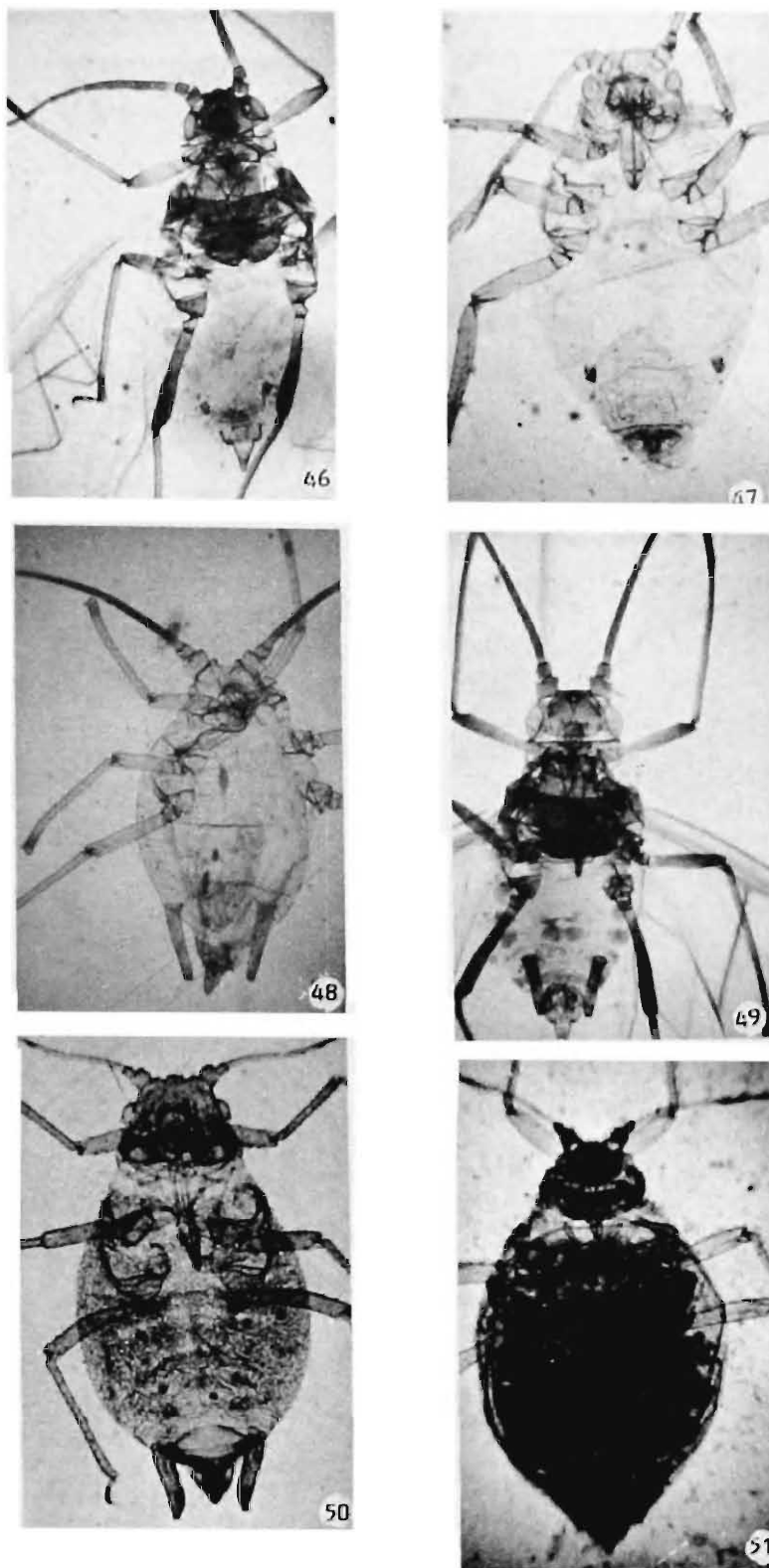


Fig. 46. *Semiaphis heraclei* Takahashi : Alate viviparous female X 32

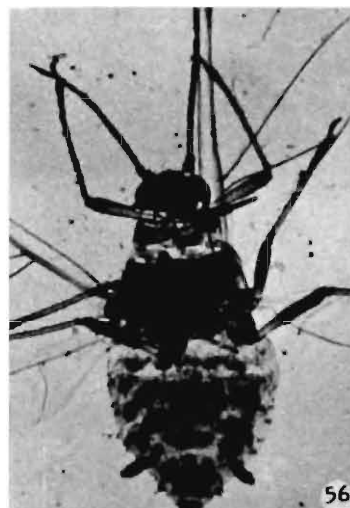
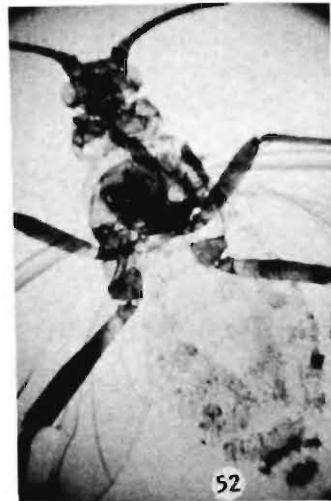
Fig. 47. *Semiaphis heraclei* Kakahashi : Apterous oviparous female X 47

Fig. 48. *Shinjia pteridifoliae* Shinji : Apterous viviparous female X 37

Fig. 49. *Shinjia pteridifoliae* Shinji : Alate male X 38

Fig. 50. *Vesiculaphis kuwanis* Ghosh *et al.* : Apterous viviparous female X 28

Fig. 51. *Vesiculaphis pieridis* Basu : Apterous female X 32



- Fig. 52. *Clethrobius dryobius* Chakrabarti and Raychaudhuri : Alate viviparous female X 21
Fig. 53. *Tinocalloides montanus* Basu : Alate viviparous female X 27
Fig. 54. *Tuberculatus nervatus* Chakrabarti and Raychaudhuri : Alate viviparous female X 24
Fig. 55. *Pemphigus immunis* Buckton : Alate viviparous female X 37
Fig. 56. *Sumtraphis celti* Takahashi : Alate viviparous female X 31

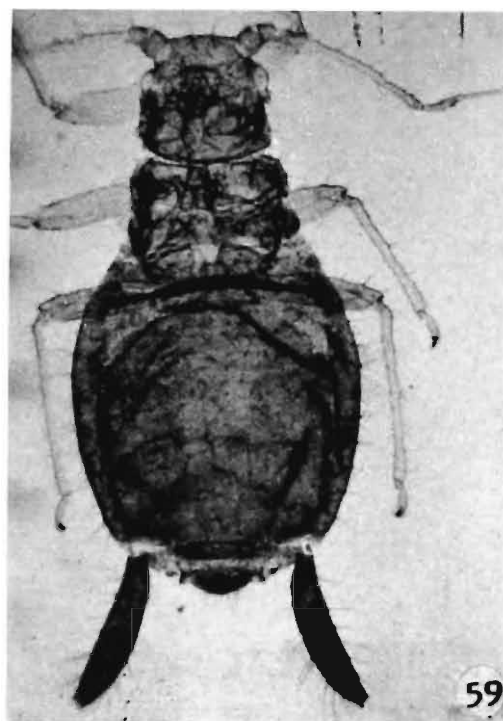
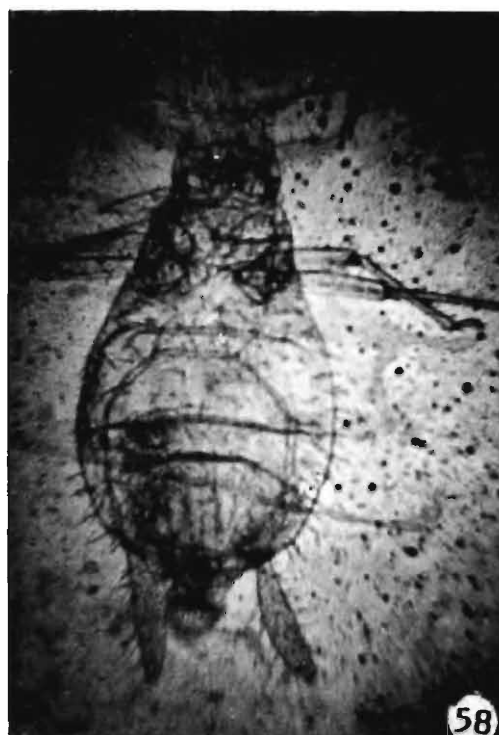
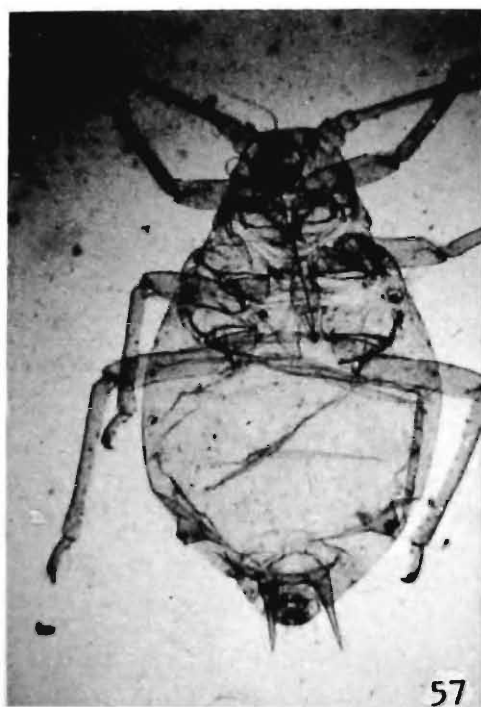


Fig. 57. *Schoutedenia bonganvelliiae* (Theob.) : Apterous viviparous female X 33

Fig. 58. *Eutrichosiphum assamense* Ghosh et al. : Apterous viviparous female X 33

Fig. 59. *E. pseudopasaniae* Szelegiewicz : Apterous viviparous female X 37

Fig. 60. *E. assamense* Ghosh et al. : Apterous viviparous female X 24

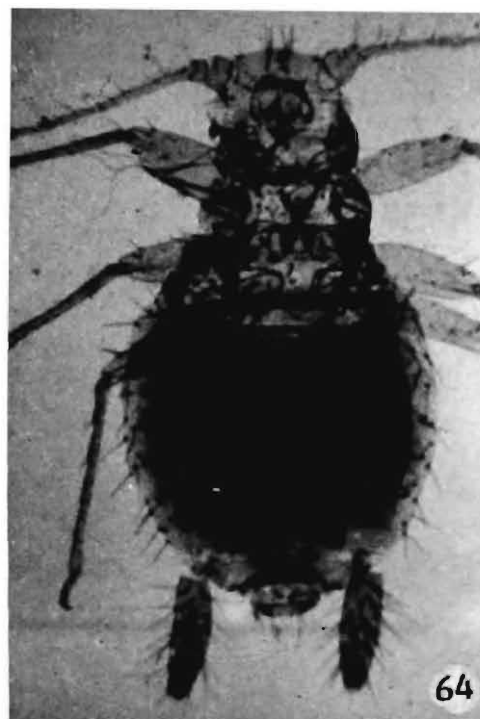
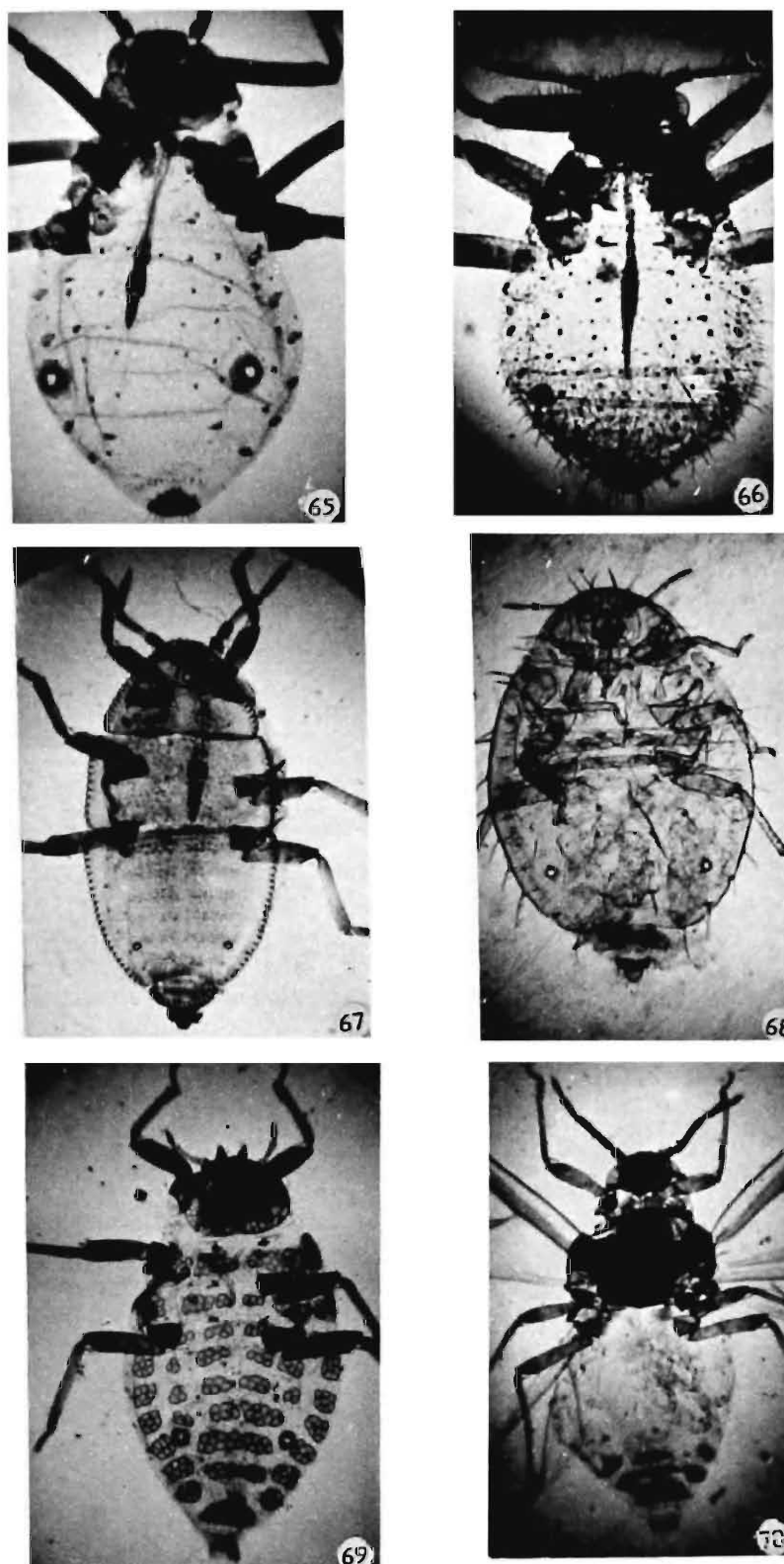


Fig. 61. *Greenidea (Trichosiphum) bucktonis* Ghosh *et al.* : Apterous viviparous female X 44

Fig. 62. *G. (T.) manii* Ghosh *et al.* : Apterous viviparous female X 22

Fig. 63. *G. (T.) quercicola* Basu *et al.* : Apterous viviparous female X 33

Fig. 64. *Eutrichosiphum russellae* Ghosh *et al.* : Apterous viviparous female X 33



- Fig. 65. *Lachnus tropicalis* v.d. Goot : Apterous viviparous female X 15
 Fig. 66. *Cinera atrotibialis* David and Rajasingh : Apterous viviparous female X 20
 Fig. 67. *Aleurodaphis blumae* v.d. Goot : Apterous viviparous female X 44
 Fig. 68. *Glyphinaphis bambusae* v.d. Goot : Apterous viviparous female X 37
 Fig. 69. *Ceratovacuna silvestri* (Takahashi) : Apterous viviparous female X 30
 Fig. 70. *Ceratovacuna silvestri* (Takahashi) : Alate viviparous female X 26

1990. *Geoica lucifuga* (Zehntner): Ghosh, A. K. Fauna India (Homoptera : Aphidoidea), Subfamily Pemphiginae, Z.S.I., pt. 3 : 389.

Material examined : 1 alata.

Host plant and locality : From yellow Pan trap, Shillong, 2.4.1969 (C.U. Coll.).

Distribution : India : Meghalaya (Shillong), Manipur, Sikkim, West Bengal. Elsewhere : Pakistan, Sri Lanka, Malaya, Central Asia, China, Java, Philippines, Australia, Middle East (Egypt, Israel).

Remarks : In Meghalaya apterae appear to be common throughout the year on the roots of graminaceous plants. The aphids are always associated with ants.

ENDEMISM

Analysis of data on the aphids of Meghalaya reveals that out of 232 species belonging to 105 genera so far known from the state, altogether 50 species (21.5% of total species) and 35 genera (33.3% of total genera) are found to be endemic. On the other hand, aphids of Meghalaya represent endemism of about 7% species and 16.5% genera of total known Indian fauna. Similarly, aphid fauna of Meghalaya represents 5% endemism in species level and 13.8% in generic level so far as Oriental fauna is concerned.

Again, out of 8 subfamilies represented in Meghalaya the subfamily Aphidinae represents maximum number of endemic species as 25 out of 144 and 18 out of 60 genera so far known from the state. This is followed by 10 species and 4 genera out of 42 and 9 respectively in the subfamily Greenideinae, equal number (4) of species and genera out of 18 species and 12 genera in the subfamily Hormaphidinae. The subfamily Lachninae shows rather poor aphid fauna with 2 endemic genera and species. The subfamilies Anoeciinae and Pemphiginae represents apparently no such endemism. However, extensive and intensive surveys in all the districts in the state of Meghalaya may reveal many more species and genera including endemic ones.

Table 1. Number of aphid genera and species under different subfamilies of Aphididae from the state of Meghalaya. (Number in parenthesis shows endemic genera and species).

Aphid subfamilies		Genus/Genera	Species/Subspecies
Aphididae			
I.	Anoeciinae	1	1
II.	Aphidinae	60 (18)	144 (25)
III.	Drepanosiphinae	12 (07)	15 (9)
IV.	Greenideinae	9 (4)	42 (10)
V.	Hormaphidinae	12 (4)	18 (4)
VI.	Lachninae	8 (2)	9 (2)
VII.	Pemphiginae	3	3
Total		105 (35)	232 (50)

SUMMARY AND CONCLUSION

A retrospect of the work reveals that a total of 232 species / subspecies of aphids belonging to 105 genera distributed over 7 subfamilies of the family Aphididae occur in the State of Meghalaya. The family Aphididae, as understood here, includes Anoeciinae, Aphidinae, Drepanosiphinae, Greenideinae, Hormaphidinae, Lachninae and Pemphiginae. A consolidated account of the aphid fauna of Meghalaya is provided in this contribution.

A look into host plant association clearly depicts polyphagism for some of these species and host restriction for the quite a few.

A critical analysis of the data reveals that aphids of Meghalaya constitute about 6% of the total species known from the world, 23% of the species from the oriental (1015 species in 253 genera : Agarwala and Ghosh, 1985) and 30% of the species from the Indian fauna.

In conclusion, it may be said that Meghalaya presents a rather rich aphid fauna and these insects resemble more closely the oriental fauna. Further, endemism of the state can well be judged from the aphids so far reported from there. Moreover, the present work has helped in extending the knowledge of distribution of already known species.

Consideration of the available data, reveals that maximum intrusion has taken place from eastern palaearctic region and from countries of South East Asia. The diverse climatological conditions together with rich floral assemblage prevailing in Meghalaya and Eastern Himalaya helped these insects to represent 6% of world fauna and 30% of Indian fauna.

ACKNOWLEDGEMENT

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INSECTA : HEMIPTERA : COCCOIDEA

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INTRODUCTION

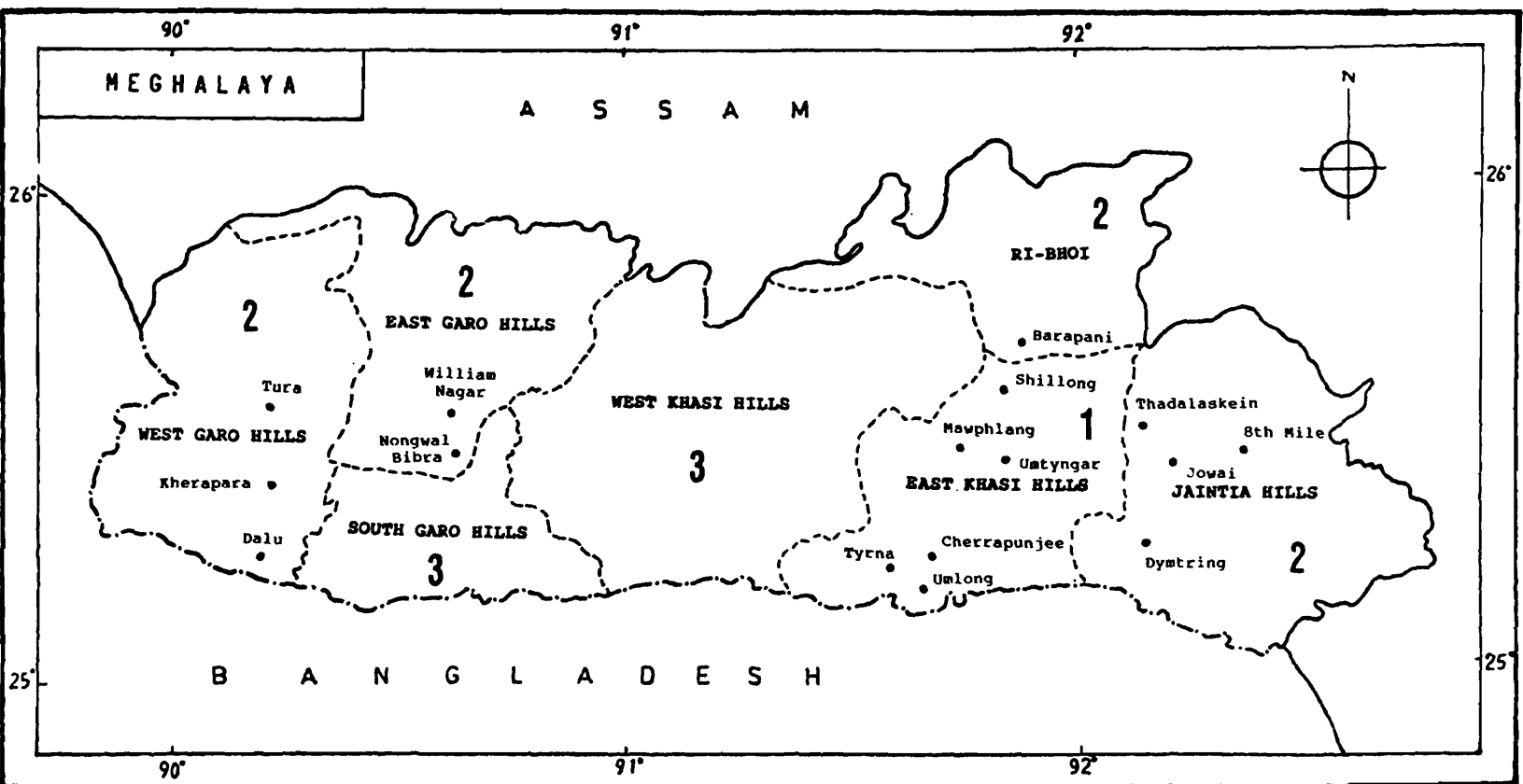
Located in the tropical rain forest of the North-eastern India, Meghalaya state is very rich in vegetation. One can see all around pine, *Pinus khasiensis*, on higher altitudes, even *Rhododendron* in highlands like Upper Shillong, and variety of ferns and other flora in lower reaches. Plantations of pineapple, apple, orange, pear, peach are plenty. Some reserve forests, like Mawphlang, are still dense and home to many beautiful orchids and butterflies. Although the increased human population and consequent urbanization has taken huge toll of populations of birds, fishes and other groups, it is a point to make that Meghalaya, like Sikkim, is still one of the best habitat in India for diversity of animal and plant species.

The coccids of Meghalaya have not been listed at one place so far. Therefore, the present paper is first report on these insects of Meghalaya. Altogether 21 species are reported here, which are undoubtedly only a small fraction of the total species that may be occurring there. For lack of adequate exploration (see Map) and neglect of these insects by insect collectors, one has to wait for more records.

Identification of genus and species of the coccids continues to be a tough task in our country. There are almost negligible identified collections in India to compare material with. Secondly, there is lack of training in the methodology of preparation of material for study, and particularly for the study of characters for identification. Till such expertise is built up and number of students take up the taxonomic study of these interesting insects, one has to depend on the available published records, which are also much scattered and sometimes not easily accessible. A literature survey has shown that there are 624 species of coccids reported from the Indian region (Varshney, 1985).

The first report of a coccid from Shillong has been probably that of the San Jose Scale, *Qudraspidiotus perniciosus*, which occurs on the twigs, leaves and even on fruits, causing formation of pink colouration at the place of attachment, on the trees of apple, plum, peach and pear. It was reported by Rao & Chatterjee (1950) from Meghalaya, who also reported some other scale insects usually mistaken for the San Jose Scale. Borchsenius (1964, 1967) reported a few new species from Shillong. Varshney (1968) reported a new lac insect, *Paratachardina mithila*, from the Ward's Lake Gardens in Shillong.

The author conducted a short field survey in August-September 1991, in the then 5 districts namely East Khasi Hills, Ri-Bhoi, Jaintia Hills, East Garo Hills and West Garo Hills. With the addition of two new districts Meghalaya has now seven districts (see Map). A few lots of collections brought by



Map showing areas surveyed by the author and the district-wise extent of Coccoidea exploration.
 ● = Localities surveyed; 1 = Underexplored; 2 = Once explored; 3 = Unexplored.

other survey parties were also made available to author. However, the majority of reports in the present paper are from earlier published accounts.

The figures given in this paper have been reoriented after some earlier publications of the author and some other coccidologists. Only the female specimen, as visible on slide, has been figured, with indicated portions enlarged. Data on the host plants is of Meghalaya only and the detailed distribution has been confined to the Indian material only. Although no report of Family Pseudococcidae is available at present, but this family must be occurring in Meghalaya.

The coccids (scale insects and mealybugs) of Oriental region have been catalogued by Ali (1969-1974). Later on Varshney (1992) has prepared a check-list for 15 families, excluding diaspidoids. In the North-eastern India, Das & Ganguli (1962) listed coccids on tea plant; Ganguli & Ghosh (1964) and Agarwala & Varshney (1988) listed coccids of Tripura. On Meghalaya, however, this paper seems to be the first consolidated report.

A key to separate the families of Indian coccids has been published earlier in Varshney (1985) and also as relevant in the 'Fauna of West Bengal' (Varshney, 1994). It is therefore not repeated here.

SYSTEMATIC ACCOUNT

I. Family MONOPHLEBIDAE

Genus *Icerya* Signoret

1875. *Icerya* Signoret, *Ann. Soc. Ent. de France*, (5) 5 : 350.

Type species : *Dorthisia seychellarum* Westwood.

1. *Icerya zimmermani* Green

1932. *Icerya zimmermani* Green, *Stylops*, 1(2) : 32.

1951. *Icerya zimmermani*; Rao, *Indian J. Ent.*, 12(2) : 44(142).

1992. *Icerya zimmermani*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 16.

Diagnosis : Adult female ca. 3 mm in length and 2 mm in breadth; brown in colour; dorsum covered with white wax powder and waxy tussels of uniform length all around margin. Antenna 11 segmented. Legs well built. No prominent ovisac. Body covered with setae of various sizes. Abdominal spiracles 3 pairs. On the dorsal margin and the rest of dorsum prominent large pores with bilocular centre and with two rim loculi on each side present. Other pore details as given in Rao (1951).

Host plants : *Melostoma* sp., and *Citrus* sp.

Distribution : India : Meghalaya : Dawki and Tangla (Rao, 1951); and Bihar : Bhagalpur. Originally described from Indonesia : Java.

Remark : This species is not included in catalogue by Ali (1970).

Genus *Crypticerya* Cockerell

1895. *Crypticerya* Cockerell, *Psyche*, (Sup.). 7 : 15.

Type species : *Icerya rosae* Riley & Howard.

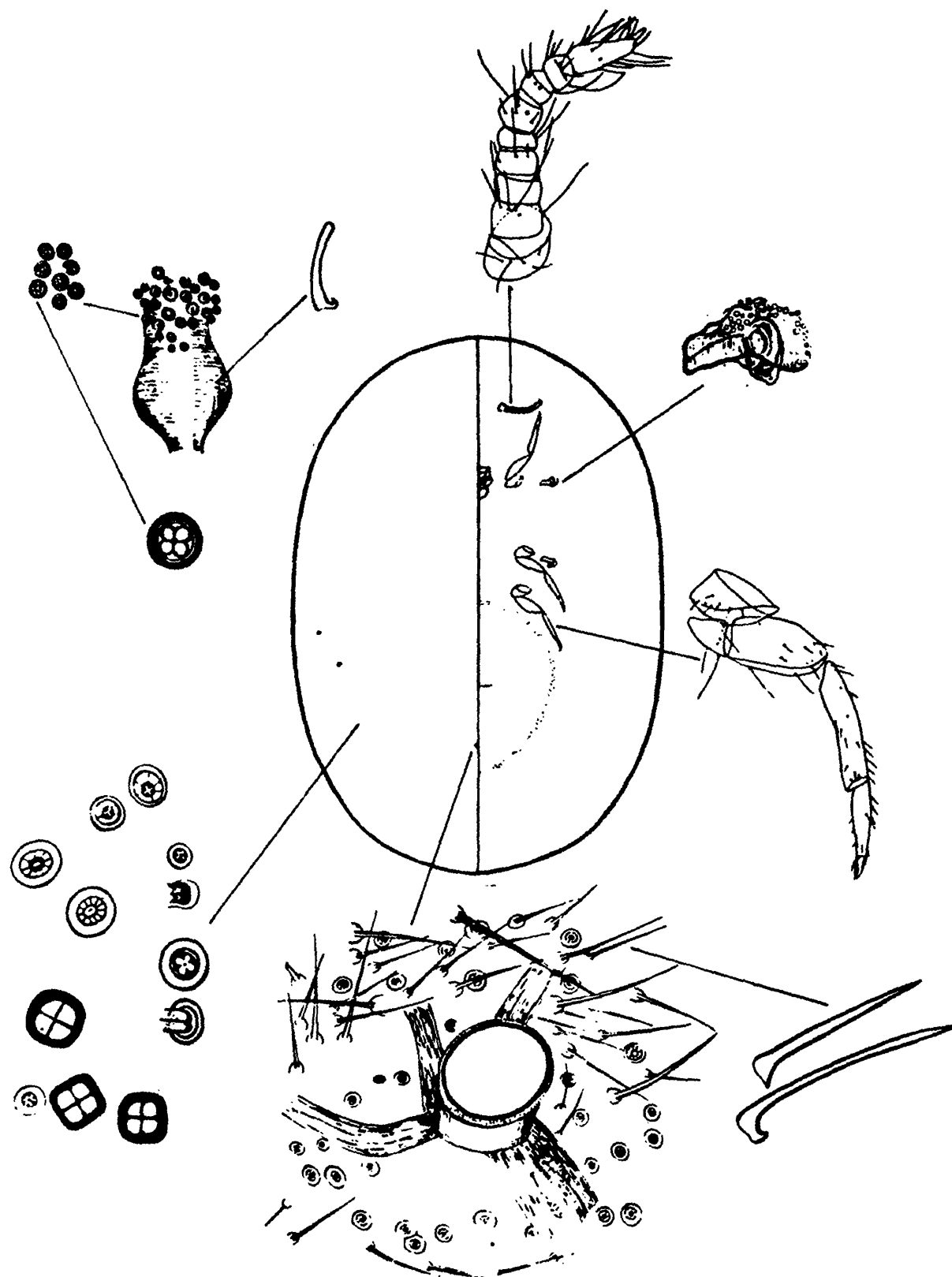


Fig. 1. *Misracoccus assamensis* Rao

2. *Crypticerya* sp.

Material examined : (i) One lot, Sl. No. 5 (dry + wet); Shillong, Polo, Indira Gandhi Instt. ground; 19.9.1991; on 'Tagar'; coll. R. K. Varshney. (ii) One lot, Sl. No. 15 (dry + wet); mild infection; Shillong, Ward's Lake ground (1500 m); 20.9.1991; on a garden bush; coll. R.K. Varshney.

Diagnosis : Adult female ca. 5 mm in length and 4 mm in breadth. Body cuticle covered by setae of various sizes, those in margin being long and those in posterior region small. Antenna 11 segmented. Abdominal spiracles two pairs. At maturity not producing an ovisac. Ventrums without ovisac band of pores. Pores on dorsum and margin, with various type of margin and centre, as detailed by Rao (1951). Test of material yellow sculptured.

Host plants : *Ervatamia coronaria* and another garden bush.

Distribution : India : Meghalaya : Shillong; Assam; Orissa; Kerala; Karnataka and Tamil Nadu. Varshney (1992) reported 3 species of this genus in the Indian region.

Genus *Drosicha* Walker

1855. *Drosicha* Walker, *List of the specimens of Homopterous insects in the collection of the British Museum*, Suppl. : 306.

Type species : *Drosicha contrahens* Walker.

3. *Drosicha* sp.

Material examined : (i) One lot, Sl. No. 17 (dry + wet); E. Khasi Hills, Cherrapunjee, Mawsmi (1150 m); 21.9.1991; on an evergreen wild bush growing by roadside; coll. R.K. Varshney. (ii) One lot, Sl. No. 20 (dry + wet); Same locality as in (i); 22.9.1991; on a wild tree; coll. R.K. Varshney.

Diagnosis : Female body large; length upto approx. 25.0 mm. Key characters include as follows : Female : Atrium or outer chamber of the abdominal spiracles is without multilocular pores; Dorsal setae may be minute or long and slender to moderately stout in different species. Male : Expanse of wings 10 - 16 mm. Four pairs of abdominal tussels, occasionally with a fifth very short tussel on the preceding segment (cf. Green, 1924).

Host plants : On undetermined wild bush and tree.

Distribution : India : Meghalaya : Mawsmi; and widely in North India. Also in Pakistan, Bangladesh and Sri Lanka. Varshney (1992) reported 10 species of this genus in the Indian region.

Genus *Steatococcus* Ferris

1921. *Steatococcus* Ferris, *Stanford Univ. Pubs., Univ. Ser., Biol. Sci.*, 1 : 69.

Type species : *Palaeococcus morrilli* Ckll.

4. *Steatococcus assamensis* Rao

1951. *Steatococcus assamensis* Rao, *Indian J. Ent.*, 12(2) : 56(154).

1992. *Steatococcus assamensis*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 16.

Diagnosis : Adult female ca. 3 mm long and 2 mm broad. Antenna 11 segmented. Legs well developed. Body cuticle with large number of setae, those in the posterior region margin longer. Body developing an internal marsupium at maturity. Band of pores present on ventrum of abdomen

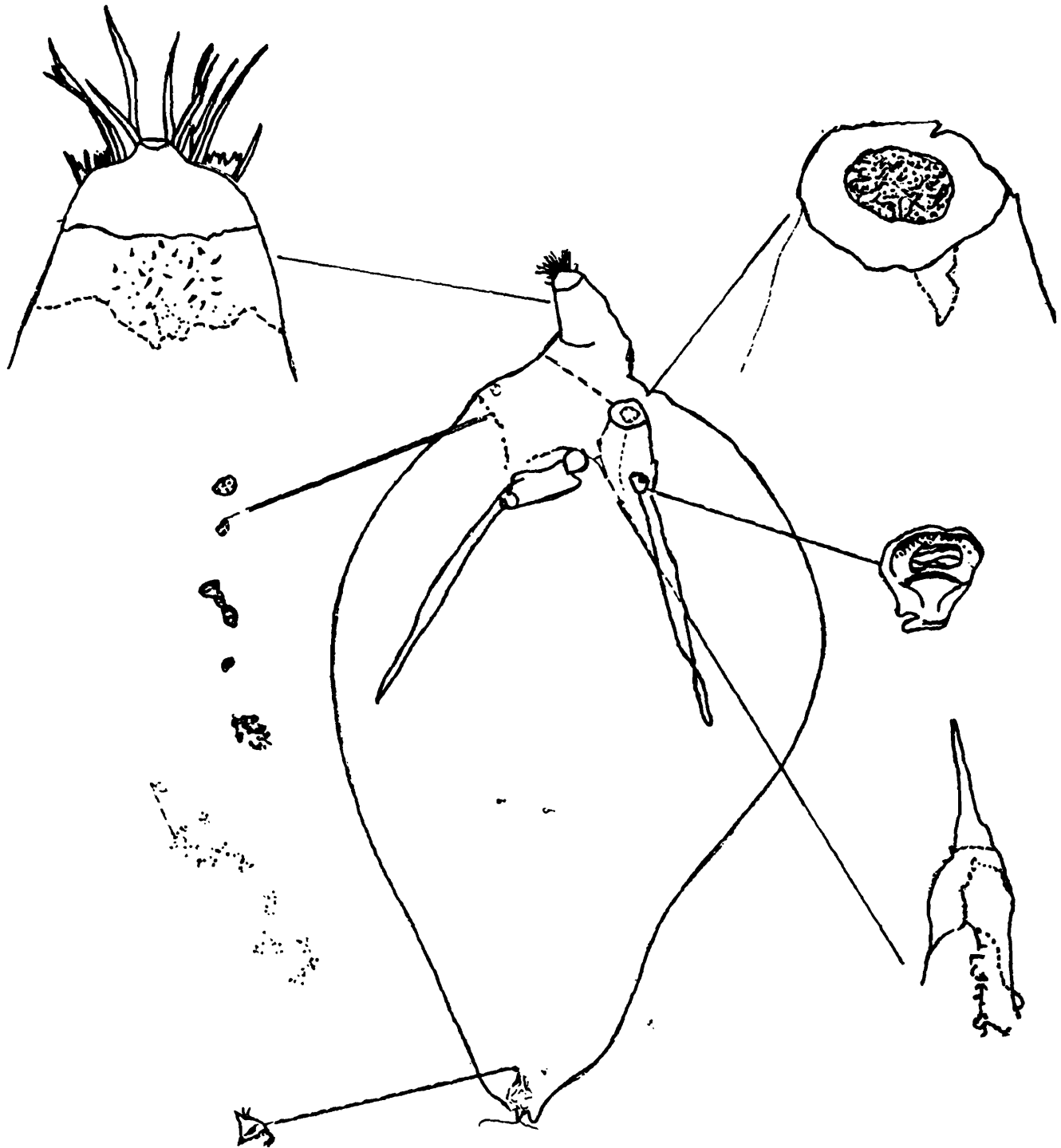


Fig. 2. *Kerria chinensis chinensis* (Mahdihassan)

forming a small circle around opening of marsupium. Body cuticle with a large number of pores of variety as detailed by Rao (1951).

Host plant : *Citrus* sp.

Distribution : India : Meghalaya : Dawki (Rao, 1951). Genus reported from Nearctic, Australasian and Ethiopian regions. Species known from original record only.

Genus *Misracoccus* Rao

1950. *Misracoccus* Rao, *Proc. R. ent. Soc. London*, B 19 : 115.

Type species : *Lophococcus convexus* Morrison.

5. *Misracoccus assamensis* Rao (Fig. 1)

1950. *Misracoccus assamensis* Rao, *Proc. R. ent. Soc. London*, B 19 : 117.

1992. *Misracoccus assamensis*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 21.

Diagnosis : Female : Body large, about 10 - 12 mm in length and 5 - 7 mm in width and 4 - 5 mm in height. Antenna 9 segmented, basal segment widest and apical segment longest. Legs well developed with a few setae on all segments. Two pairs of thoracic spiracles and 7 pairs of abdominal spiracles. Anal tube short with a double row of pores at the opening.

This species is close to *M. xyliae* but differentiates in number of antennal segments; in the shape of marginal setae; and in different pores on ventrum (Rao, 1950).

Host plant : Undetermined wild tree; females attached to twigs.

Distribution : India : Meghalaya : Shillong. Genus and species known from original record only.

II. Family TACHARDIIDAE

(Syn. Kerriidae : Gill, 1993)

Genus *Kerria* Targioni Tozzetti

1884. *Kerria* Targioni Tozzetti, *Ann. di Agr. 1884, Min. di Agr. Indus. & Com. Italy* : 410.

1977. *Kerria*; Varshney, *Oriental Ins. Suppl.*, No. 5 (1976) : 19.

Type species : *Coccus lacca* Kerr.

6. *Kerria chinensis chinensis* (Mahd.) (Fig. 2)

1923. *Lakshadia chinensis* Mahdihassan, *J. Sci. Asso., Maharaja College, Vizianagaram*, 1(2 - 3) : 98.

1925. *Laccifer chinensis*; Chamberlin, *Bull. ent. Res.*, 16 (1) : 39.

1977. *Kerria chinensis chinensis*; Varshney, *Oriental Ins. Suppl.*, No. 5 (1976) : 28.

Material examined : "From old lac samples; India : Assam; coll. R.K. Varshney"; slides and wet colln.

Diagnosis : Female body length 6.6 - 7.1 mm, width 3.85 - 4.2 mm of mounted specimen. Female body comparatively very long. Anal tubercle with supra anal plate longer than broad. Branchia moderately elevated with minute dimples. Anterior spiracles far away from branchial plate, with a long sclerotized trail. Dorsal spine and its pedicel long. Antennae small with 2 - 3 segments. Other details as in Varshney (1977).

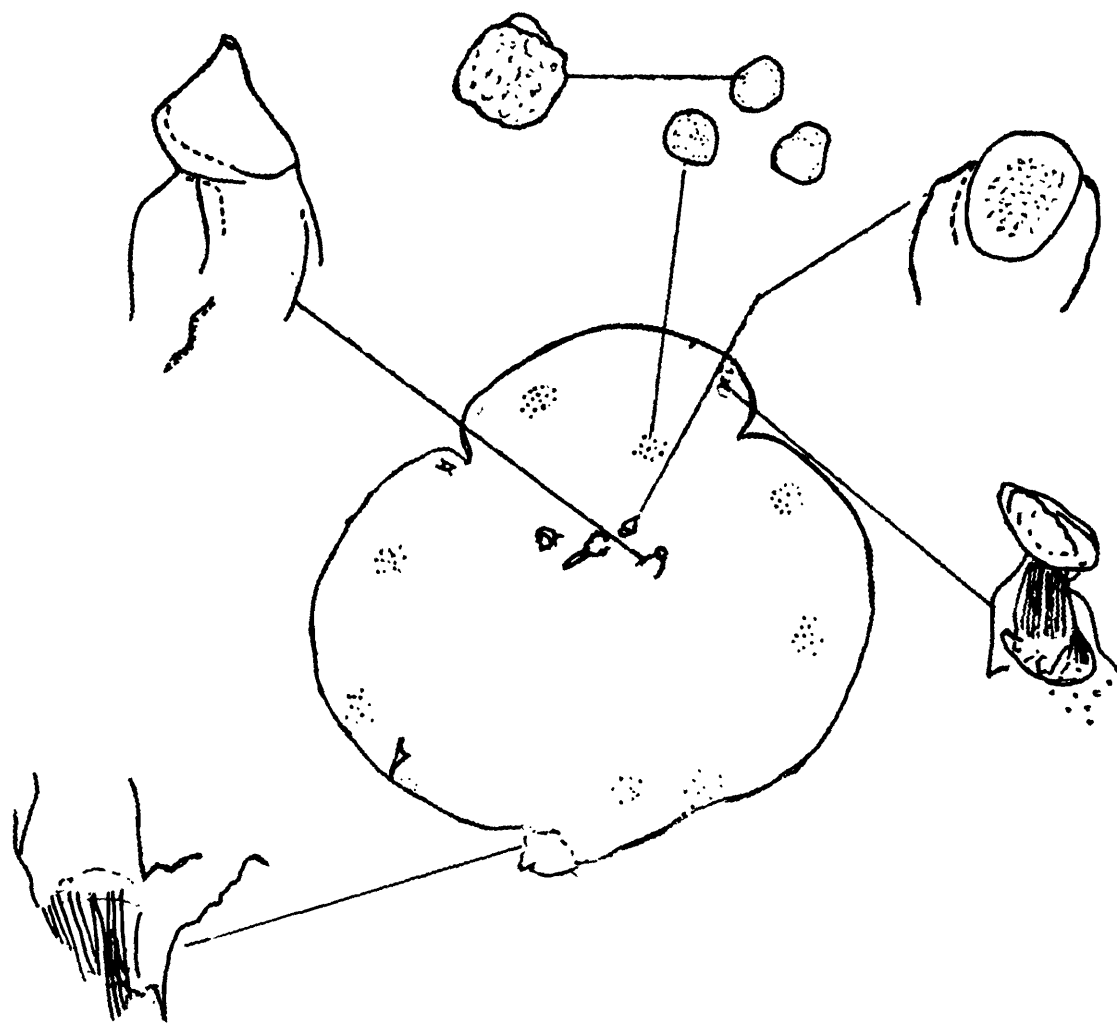


Fig. 3. *Paratachardina mithilae* Varshney

Host plants : Many including *Samanea saman*, *Cajanus cajan*, *Schleichera* sp. etc.

Distribution : India : North-Eastern India including Meghalaya : Garo Hills; Assam and West Bengal Hills. Also in Myanmar, Thailand, Nepal, Bhutan, China and South-East Asian countries.

Genus *Paratachardina* Balachw.

1950. *Paratachardina* Balachowsky, *Eos*, **26** (1 - 2) : 8.

1977. *Paratachardina*; Varshney, *Oriental Ins. Suppl.*, No. **5** (1976) : 54.

Type species : *Carteria decorella* Maskell.

7. *Paratachardina mithilae* Varshney, n. emend. (Fig. 3)

1968. *Paratachardina mithila* Varshney, *Proc. 55th Indian Sci. Cong.*, (iii) : 489.

1977. *Paratachardina mithila*; Varshney, *Oriental Ins. Suppl.*, No. **5** (1976) : 58.

Material examined : "On *Photinia notoniana* var. *macrophylla*; from India : Assam : Shillong : In the gardens of Ward lake; coll. R. K. Varshney; January 1967"; on slides, wet and dry colln.

Holotype - one ex. on a slide; Regd. No. 33/H15, in the Zoological Survey of India, Calcutta. **Paratypes** in the Smithsonian Institution, Washington.

Diagnosis : Female body length 2.5 - 3.0 mm, width 2.8 - 3.0 mm. Lac cell or test of female almost circular, brownish-black, with 16 conspicuous longitudinal ridges.

Female body trilobed and in mounted specimens having well developed anal tubercle; anal ring not divided in sectors. Anal setae short, reaching just upto anal fringe. Branchia short; branchial plate oval; pseudospines on it numbering 44 - 50. Anterior spiracles situated far away from branchial plates. Dorsal spine small. Marginal duct clusters 8 pairs, distributed all over body near margin each cluster round in shape. Antennae very minute. Other details as in Varshney (1977).

Host plant : *Photinia notoniana* var. *macrophylla*.

Distribution : India : Meghalaya : Shillong. This species is known from original record only.

Remark : Specific epithet *mithila* is emended here to *mithilae* in accordance with the nomenclature rules.

III. Family KERMESIDAE

Genus *Pseudopulvinaria* Atkinson

1889. *Pseudopulvinaria* Atkinson, *J. Asiat. Soc. Bengal*, **58** (2/1) : 4.

Type species : *Pseudopulvinaria sikkimensis* Atkinson.

8. *Pseudopulvinaria sikkimensis* Atkinson

1889. *Pseudopulvinaria sikkimensis* Atkinson, *J. Asiat. Soc. Bengal*, **58** (2/1) : 1.

1992. *Pseudopulvinaria sikkimensis*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 36.

Diagnosis : Female with 6 - 7 segmented antennae, in which third segment may have two partial divisions. Species described in detail by Ferris (1950) from China. Rao & Kumar (1952) collected it at Shillong.

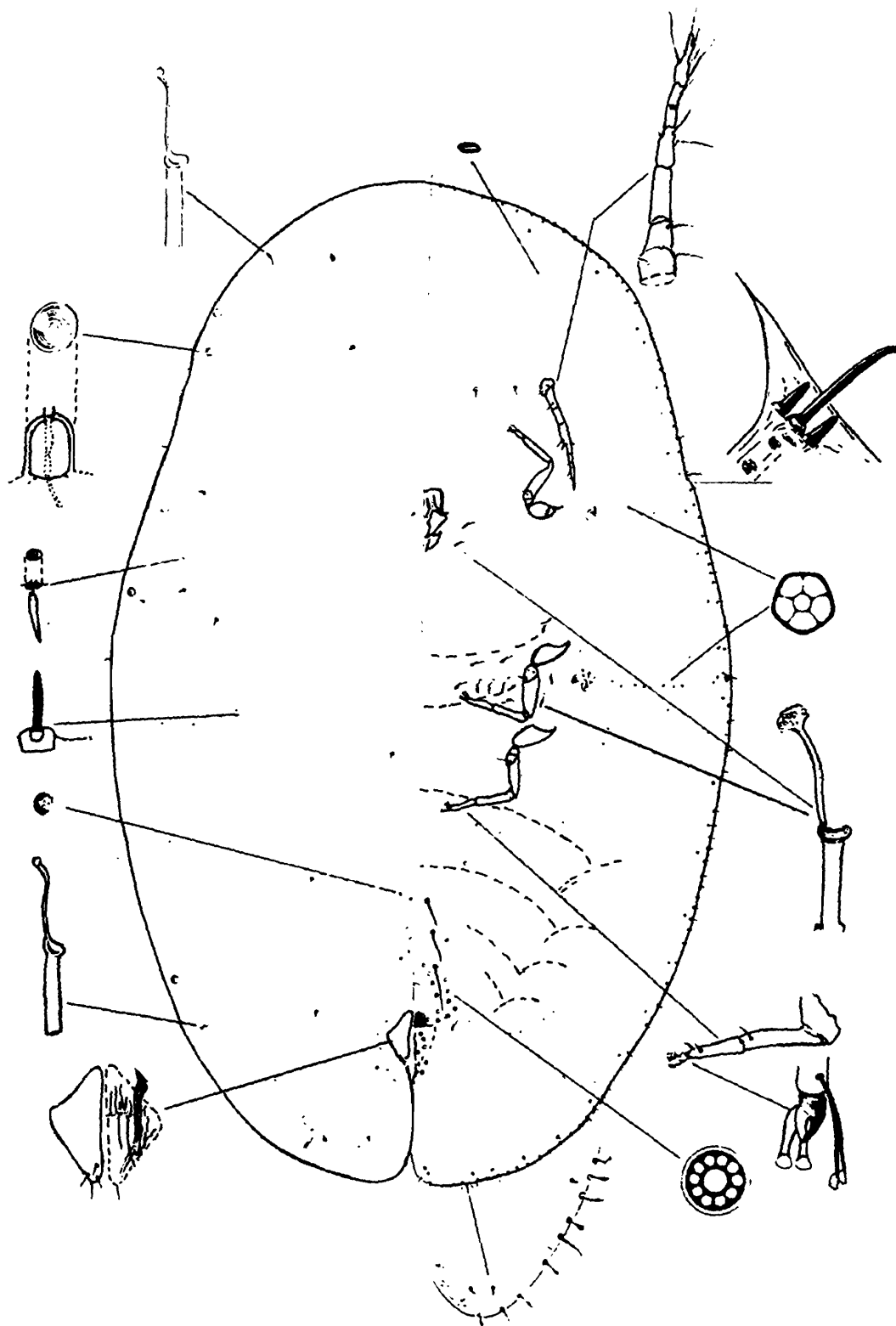


Fig. 4. *Coccus hesperidum* Linnaeus

Host plants : *Quercus incana*, *Castanea indica* and *C. tribuloides*.

Distribution : India : Meghalaya (earlier Assam) : Shillong. Also in China.

Remark : Genus *Lefroyia* and its type-species *L. castaneae* proposed by Green (1908) are synonymous with this.

IV. Family COCCIDAE

Genus *Ceroplastes* Gray

1828. *Ceroplastes* Gray, *Spicilegia Zoologica*, Pt. 1 : 7.

1974. *Ceroplastes*; Gimpel et al., *Misc. Publ., Agric. Expt. Stn., Univ. Maryland*, No. 841 : 16 - 18.

Type species : *Coccus (Ceroplastes) chilensis* Gray.

9. *Ceroplastes* sp.

Material examined : (i) One mixed lot, Sl. No. 16 (dry + wet); Shillong, Ward's Lake, opposite A. G. Office (1500 m); 20.9.1991; on a bush; coll. R. K. Varshney. (ii) One ex. (dry), Sl. No. 19; E. Khasi Hills, Tyrna (850 m); 22.9.1991; ex wild tree; coll. R.K. Varshney.

Diagnosis : Adult female roughly oval; length of body between 1.0 - 20.0 mm. Derm membranous in young and sclerotized in old females. Two well developed anal plates borne at apex of heavily sclerotized anal tubercle. Antennae well developed with 6 - 7 segments. Legs well developed. Stigmatic setae confined to marginal area. Only one long pair of setae in the inter-antennal space. Bristle shaped setae present along body margin. Dorsal setae variable in shape and size. A systematic revision of the genus has been published by Gimpel et al. (1974).

Host plants : Undetermined tree and bush.

Distribution : India : Meghalaya : East Khasi Hills : Shillong and Tyrna. Genus widely distributed elsewhere. Varshney (1985) reported 4 species of the genus from the Indian region.

Genus *Coccus* Linnaeus

1758. *Coccus* Linnaeus, *Syst. Nat.*, Ed. 10 (1) : 455.

1835. *Lecanium* Burmeister, *Handb. der Ent.*, 2 (1) : 69.(Syn.)

Type species : *Coccus hesperidum* Linn.

10. *Coccus hesperidum* Linnaeus (Fig. 4)

1758. *Coccus hesperidum* Linnaeus, *Syst. Nat.*, Ed. 10 (1) : 455.

1992. *Coccus hesperidum*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 84.

Material examined : (i) One lot, Sl. No. 4; mild infection; Shillong, Polo, Indira Gandhi Instt. ground; 19.9.1991; on 'tagar'; coll. R.K. Varshney. (ii) One lot, Sl. No. 11, mild infection on leaves and shoots; Shillong, Barapani (Umiyam), Lum Nehru Park (1000 m); 19.9.1991; coll. R.K. Varshney. (iii) One mixed lot, Sl. No. 21; mild infection; Shillong, Polo, Indira Gandhi Instt. ground; 24.9.1991; on 'tagar'; coll. R.K. Varshney. (iv) One mixed lot, Sl. No. 39; moderate infection; Tura, Orchid Lodge ground; 5.10.1991; on garden bush; coll. R.K. Varshney. All material dry + wet preserved.

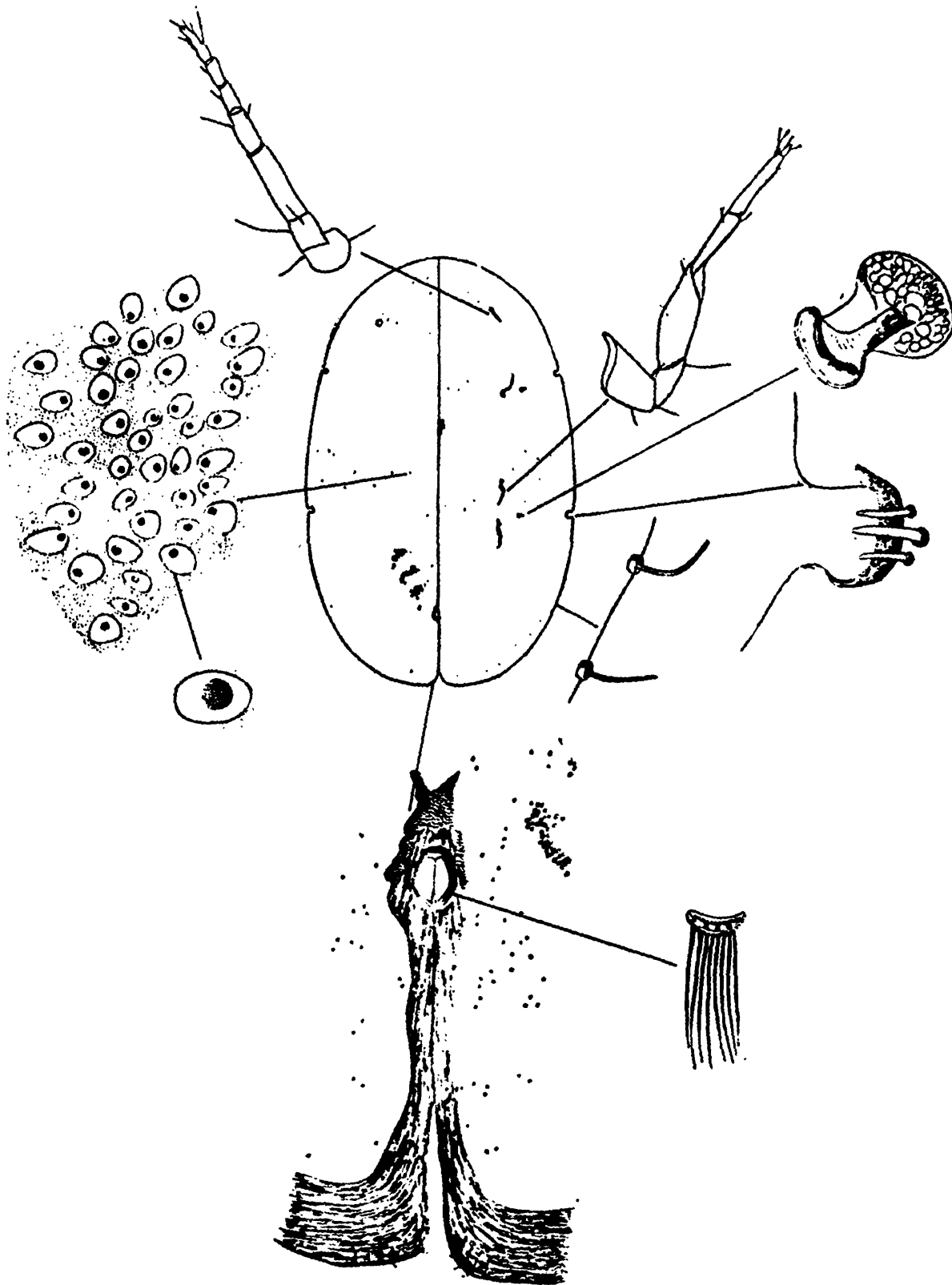


Fig. 5. *Coccus watti* (Green)

Diagnosis : Adult female ca. 2–4.5 mm long and 1–3 mm broad, elliptical, moderately convex body. Colour pale brown to brown. Derm membranous or slightly sclerotic; dorsal setae short, rod like; marginal setae long, pointed or furcate; fringe setae of anal fold. Antennae 7–8 segmented, seta on all segments; Legs developed with tibio-tarsal articulatory sclerosis; tarsal digitules 2; claw digitules 2; inner side of legs with few tubular ducts; multilocular pores distributed on vaginal area.

Species described and illustrated in many publications, e.g. Gill (1988).

Host plants : Polyphagous. On *Ervatamia coronaria* and other garden bushes.

Distribution : India : Meghalaya : E. Khasi Hills : Shillong; and W. Garo Hills: Tura. A cosmopolitan species.

11. *Coccus watti* (Green) (Fig. 5)

1900. *Lecanium watti* Green, *Indian Mus. Notes*, 5 : 6.

1992. *Coccus watti*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 88.

Diagnosis : Adult female ca. 7–8 mm long and 4–5 mm broad, brown to dark brown in colour. Very thin film-like wax plates cover the dorsum. Body broadly elliptical, with prominent spiracular clefts. Margin with a few scattered simple setae. Spiracles prominent, with setae, and large number of circular pores at inner end. Antennae and legs comparatively very small. Antenna 7 segmented. Tarsus and tibia more or less equal in length. Anal valves with a small seta at posterior end. Anal ring with 8 setae. Other details of setae and pores as in Rao & Kumar (1952). They have also illustrated the species.

Host plants : Tea and Citrus species.

Distribution : India : Meghalaya : Dawki; Assam: Sibsagar; and West Bengal : Krishnanagar (Rao & Kumar, 1952).

Remark : Avasthi (1993) has proposed in this family three new genera, namely *Varshneococcus*, *Prococcus* and *Sharanococcus* recently and placed the above species in the last genus.

Genus *Saissetia* Deplanche

1859. *Saissetia* Deplanche, *Bull. Linn. Soc. Normandie*, 4 : 206.

1974. *Parasaissetia*; Ali, *Indian Mus. Bull.*, 6 (2) : 39.

Type species : *Saissetia coffeae* Deplanche.

12. *Saissetia* sp.

Material examined : One lot, Sl. No. 34, heavy infestation (dry + wet); W. Garo Hills, Khera Para (210 m); 4.10.1991; On a garden bush with milky sticking secretion, probably *Tabernaemontana*; coll. R. K. Varshney.

Diagnosis : Adult female body length 1–6 mm, circular, moderate to strongly convex. Old females' test dark brown to black, young females' and nymphs' yellow or yellowish grey. Convex hemispherical shape of fully mature adults and a distinctive "H" pattern of nymphs and adults conspicuous. Body has the large discal (central) setae on each operculum; cell-like areas dorsally; conical or spine-like dorsal setae; and ventral submarginal tubular duct bands.

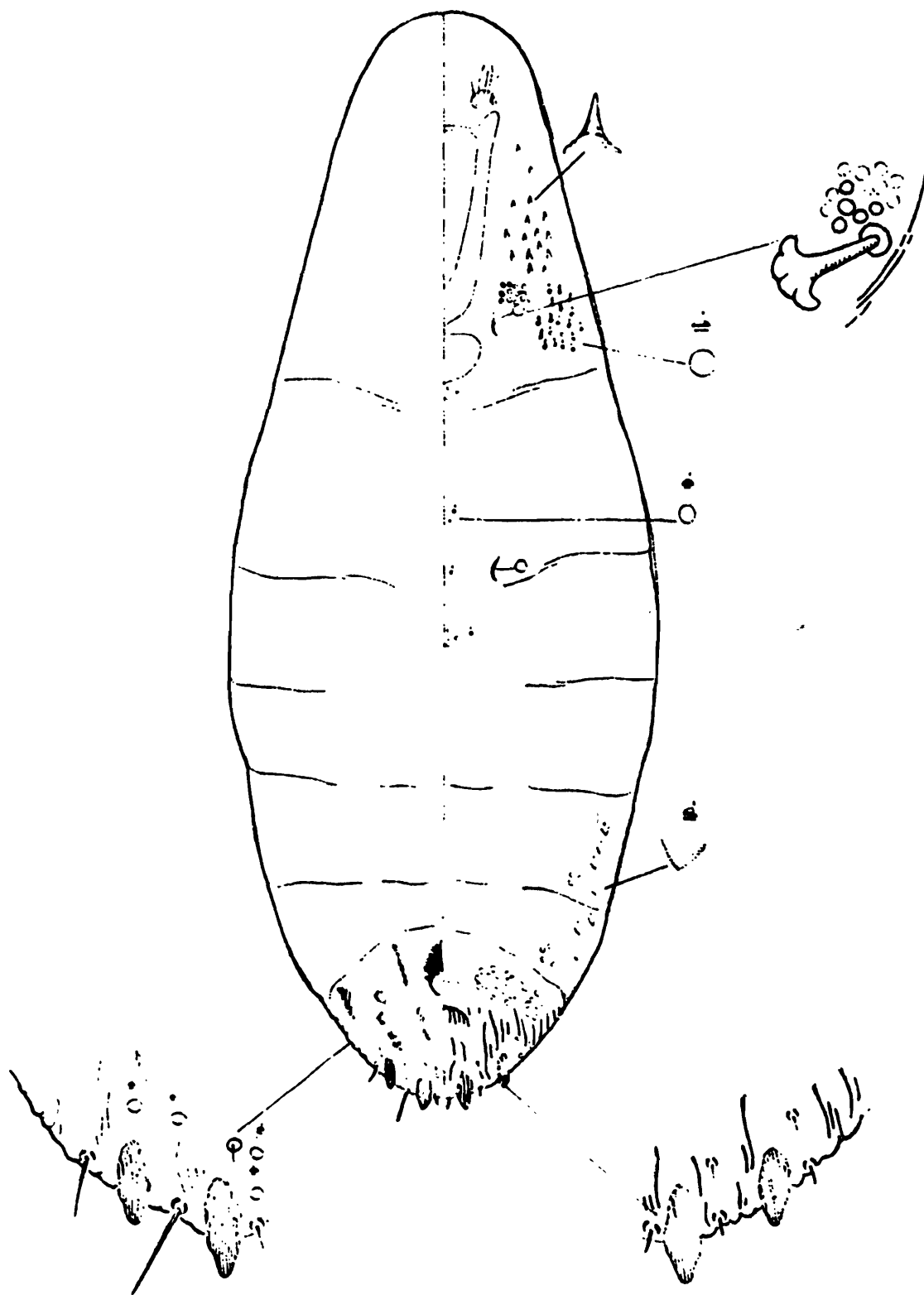


FIG. 6. *Leucaspis manii* (Borchsenius)

Host plant : ? *Tabernaemontana* sp. (= *Ervatamia* sp.).

Distribution : India : Meghalaya : West Garo hills : Khera Para (on road to Dalu) (see Map).
Genus widely distributed. Varshney (1985) reported 8 species from the Indian region.

Remark : Curiously, while some bushes were heavily infected, some others present nearby were not infected at all.

V. Family DIASPIDIDAE

Subfamily PARLATORIINAE

Genus *Leucaspis* Signoret

1870. *Leucaspis* Signoret, *Ann. Soc. Ent. Fr.*, (4) 10 : 100.

1964. *Maniaspis* Borchsenius, *Revue d'Entomologie de l'URSS*, 43 (4) : 869. (Syn.)

Type species : *Aspidiotus pini* Hartig.

13. *Leucaspis manii* (Borchsenius) (Fig. 6)

1964. *Maniaspis manii* Borchsenius, *Revue d'Entomologie de l'URSS*, 43 (4) : 869.

1969. *Leucaspis manii*; Takagi, *Ins. Matsum.*, 32 (1) : 25.

Diagnosis : Female body without gland spines apically, dentate between pygidial lobes; with two pairs of strongly sclerotized pygidial lobes, without strong hairs between median lobes; without a row of conical gland spines along the body; with perivulvar pores on 3rd and 4th abdominal segments.

Host plant : Twigs of undetermined tree.

Distribution : India : Meghalaya : Shillong : Upper Shillong. Species known from original record only.

Remark : Species described in Russian and illustrated by Borchsenius (1964).

Subfamily ASPIDIOTINAE

Genus *Chrysomphalus* Ashmead

1880. *Chrysomphalus* Ashmead, *Amer. Ent.*, 3 : 267.

1988. *Chrysomphalus*; Williams & Watson, *Armoured Scales* : 90.

Type species : *Chrysomphalus ficus* Ashmead.

14. *Chrysomphalus dictyospermi* (Morgan) (Fig. 7)

1889. *Aspidiotus dictyospermi* Morgan, *Ent. mon. Mag.*, 25 : 352.

1970. *Chrysomphalus dictyospermi*; Ali, *Indian Mus. Bull.*, 5 (1) : 39.

1985. *Chrysomphalus dictyospermi*; Varshney, *Oriental Ins.*, 19 : 33.

Diagnosis : Test of female circular, flat, reddish to brown, with exuviae subcentrally placed. Female body with prosomatic region membranous. Circumgenital pores present in 4 groups of 2 or 4 in each. Four pairs of pygidial lobes present, first 3 well developed, 4th represented by a

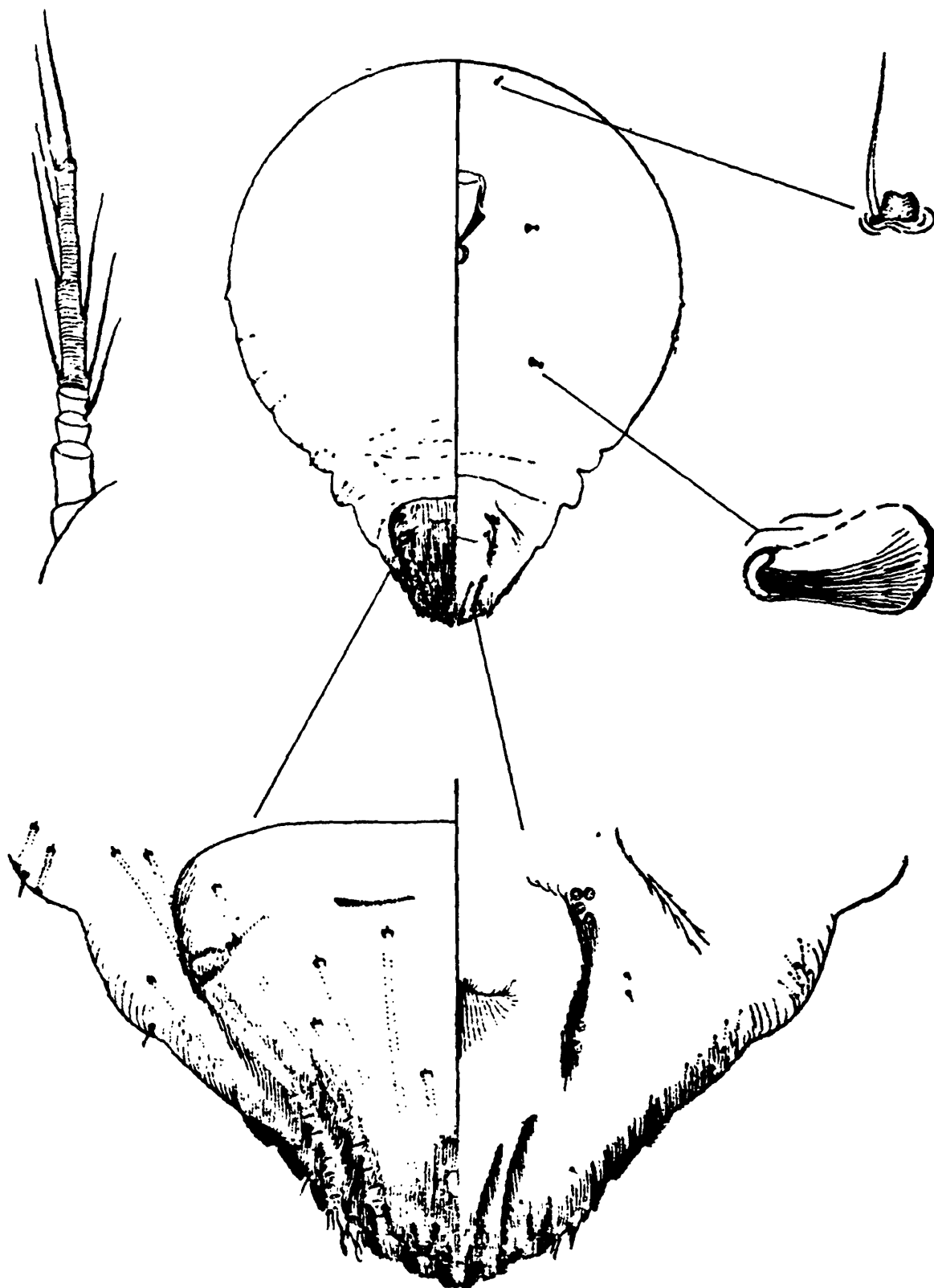


Fig. 7. *Chrysomphalus dictyospermi* (Morgan). On upper left, antenna of immature stage.

sclerotised point; beyond 4th lobe the margin is heavily sclerotised and with two notches. Dorsal ducts on pygidium few. Fimbriate spur on thoracic region. Other details as in Rao & Chatterjee (1950). Illustrated by Ferris.

Host plant : Apple.

Distribution : India : Meghalaya : Shillong; and Assam, Karnataka and Tamil Nadu. Also in Sri Lanka, Thailand, Indonesia and British Guiana.

Genus *Hemiberlesia* Cockerell

1897. *Hemiberlesia* Cockerell in Leonardi, *Riv. di Patol. Veg.*, 5 : 375.

1988. *Hemiberlesia*; Williams & Watson, *Armoured Scales* : 130.

Type species : *Aspidiotus rapax* Comstock.

15. *Hemiberlesia rapax* (Comstock) (Fig. 8)

1881. *Aspidiotus rapax* Comstock, *Report U.S. Deptt. Agr.* 1880 : 307.

1970. *Hemiberlesia rapax*; Ali, *Indian Mus. Bull.*, 5 (1) : 47.

1985. *Hemiberlesia rapax*; Varshney, *Oriental Ins.*, 19 : 33.

1988. *Hemiberlesia rapax*; Williams & Watson, *Armoured Scales* : 135.

Diagnosis : Test of female grey in colour, circular, convex, with exuviae on one side. Female body resembles *Q. perniciosus* but differentiated by presence of a sclerotised knob on the margin of thoracic region on each side; different shape of pygidial lobes and conspicuously coarse & serrated or divided plates between the lobes. Circumgenital pores absent. Median (first pair) lobes large with a single notch on outer margin. Second and third pairs of lobes merely triangular projections. Dorsal ducts few. Ventral microducts numerous towards margin. Anal opening large. Illustrated by Ferris and described in detail by Rao & Chatterjee (1950).

Host plants : Apple, peach, plum and pear.

Distribution : India : Meghalaya: Shillong; Assam, West Bengal, Orissa and Tamil Nadu.

Genus *Quadraspidotus* MacGillivray

1921. *Quadraspidotus* MacGillivray, *The Coccidae* : 388.

1966. *Quadraspidotus*; Borchsenius, *Catalogue Diaspidoidea of World* : 327.

Type species : *Aspidiotus ostreaeformis* Curtis.

16. *Quadraspidotus perniciosus* (Comstock) (Fig. 9)

1881. *Aspidiotus perniciosus* Comstock, *Report U.S. Deptt. Agr.*, 1880 : 304.

1977. *Quadraspidotus perniciosus*; Ali, *Indian Mus. Bull.*, 5 (1) : 53.

1985. *Quadraspidotus perniciosus*; Varshney, *Oriental Ins.*, 19 : 34.

Diagnosis : Yellow to grey, circular, slightly convex test, with exuviae subcentral. Female body having derm membranous except pygidium. Circumgenital pores absent. First and second pairs of lobes well developed, third pair indicated as a slight triangular projection. Dorsal ducts few and slender and present upto third abdominal segment. Other details as in Rao & Chatterjee (1950). Illustrated by Ferris.

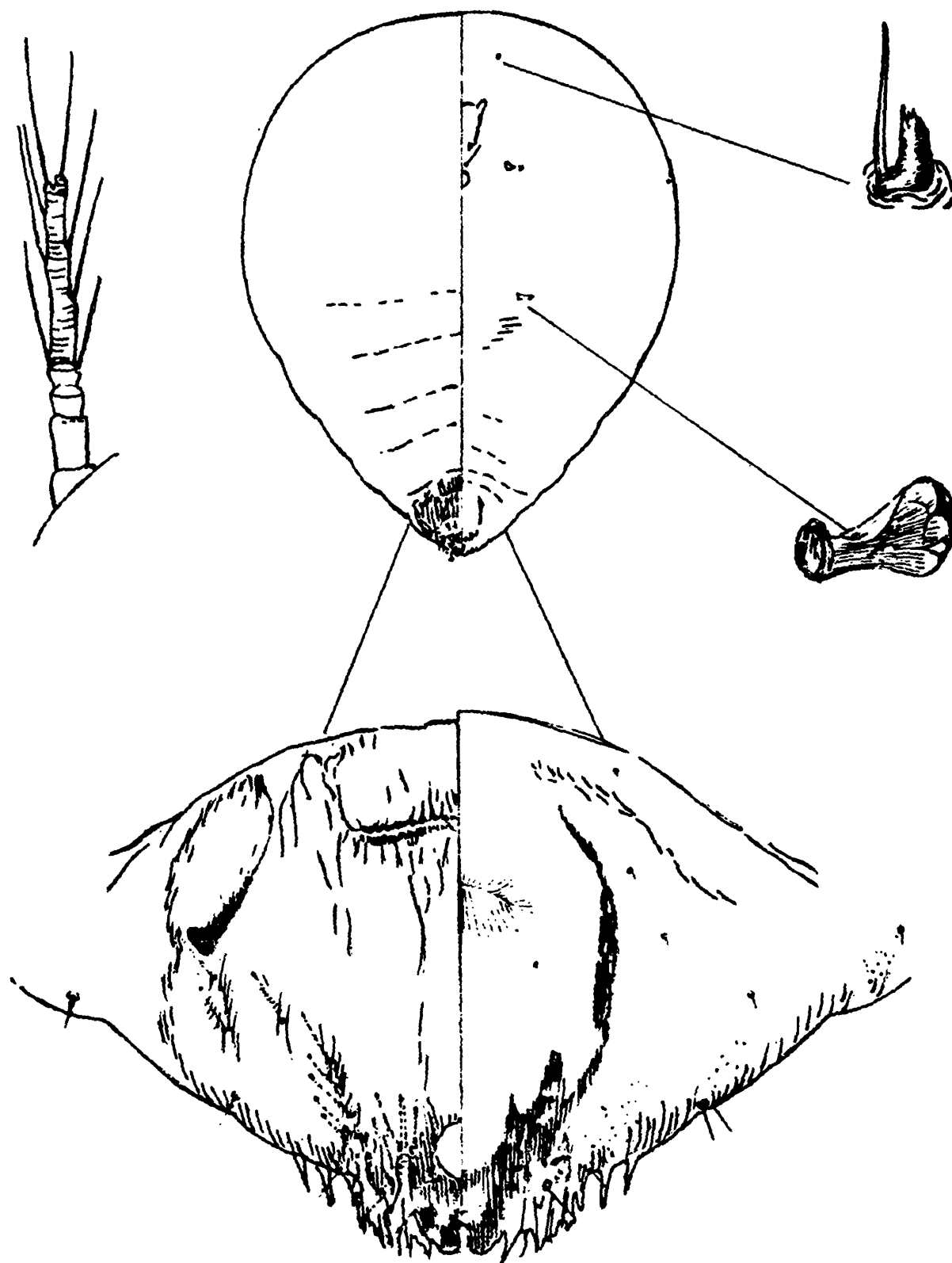


Fig. 8. *Hemiberlesia rapax* (Comstock). On upper left, antenna of immature stage.

Host plants : Apple, peach, plum and pear.

Distribution : India : Meghalaya : Shillong : Upper Shillong and Sonapani; Orissa, West Bengal, Karnataka, Tamil Nadu and Maharashtra.

Subfamily DIASPIDINAE

Genus *Andaspis* MacGillivray

1921. *Andaspis* MacGillivray, The Coccidae : 275.

1967. *Raoaspis* Borchsenius, *Revue d'Entomologie de l'URSS*, **46** (3) : 725. (Syn.)

Type species : *Mytilaspis flava* var. *hawaiiensis* Maskell.

17. *Andaspis betulae* (Borchsenius), **comb. nov.** (Fig. 10)

1967. *Raoaspis betulae* Borchsenius, *Revue d'Entomologie de l'URSS*, **46** (3) : 730.

1985. *Raoaspis betulae*; Varshney, *Oriental Ins.* **19** : 36.

Borchsenius (1967) described this species in russian and illustrated. Figure is reproduced here, but the brief description and a key to differentiate this species from four other species : *dasi* (Williams), *indica* (Borchs.), *leucophleae* (Rao) and *raoi* Borchs., could not be translated for me as yet.

Host plant : *Betula* sp.

Distribution : India : Meghalaya : Shillong. Species known from original record only.

Remark : *Raoaspis* has been merged with the *Andaspis* by Takagi (1970). However, this species is reported under *Andaspis* for the first time here.

Genus *Lepidosaphes* Shimer

1868. *Lepidosaphes* Shimer, *Trans. Amer. Ent. Soc.*, **1** (1868) : 372, 373.

1971. *Lepidosaphes*. Williams, *Bull. ent. Res.*, **61** : 7.

Type species : *Coccus conchiformis* Gmelin (= *C. ulmi* Linn.).

18. *Lepidosaphes* sp.

Material examined : One mixed lot, Sl. No. 21 (dry + wet); mild infection; Shillong, Polo, Indira Gandhi Instt. ground; 24.9.1991; on 'Tagar'; coll. R.K. Varshney.

Diagnosis : Adult female body elongate and fusiform. Median lobes normally parallel, each with inner and outer edges of same length; Paraphyses on lobes vertical and normal. Other important characters are the presence of a rounded pygidium, bosses, abdominal tubercles with or without spines and small dorsal ducts, but the absence of ventral paraphyses on the lobes. Other characters as detailed in Williams & Watson (1988 : 143).

Host plant : *Ervatamia coronaria*.

Distribution : India : Meghalaya : Shillong. Genus widely distributed elsewhere. Varshney (1985) recorded 12 species of this genus from the countries of Indian region.

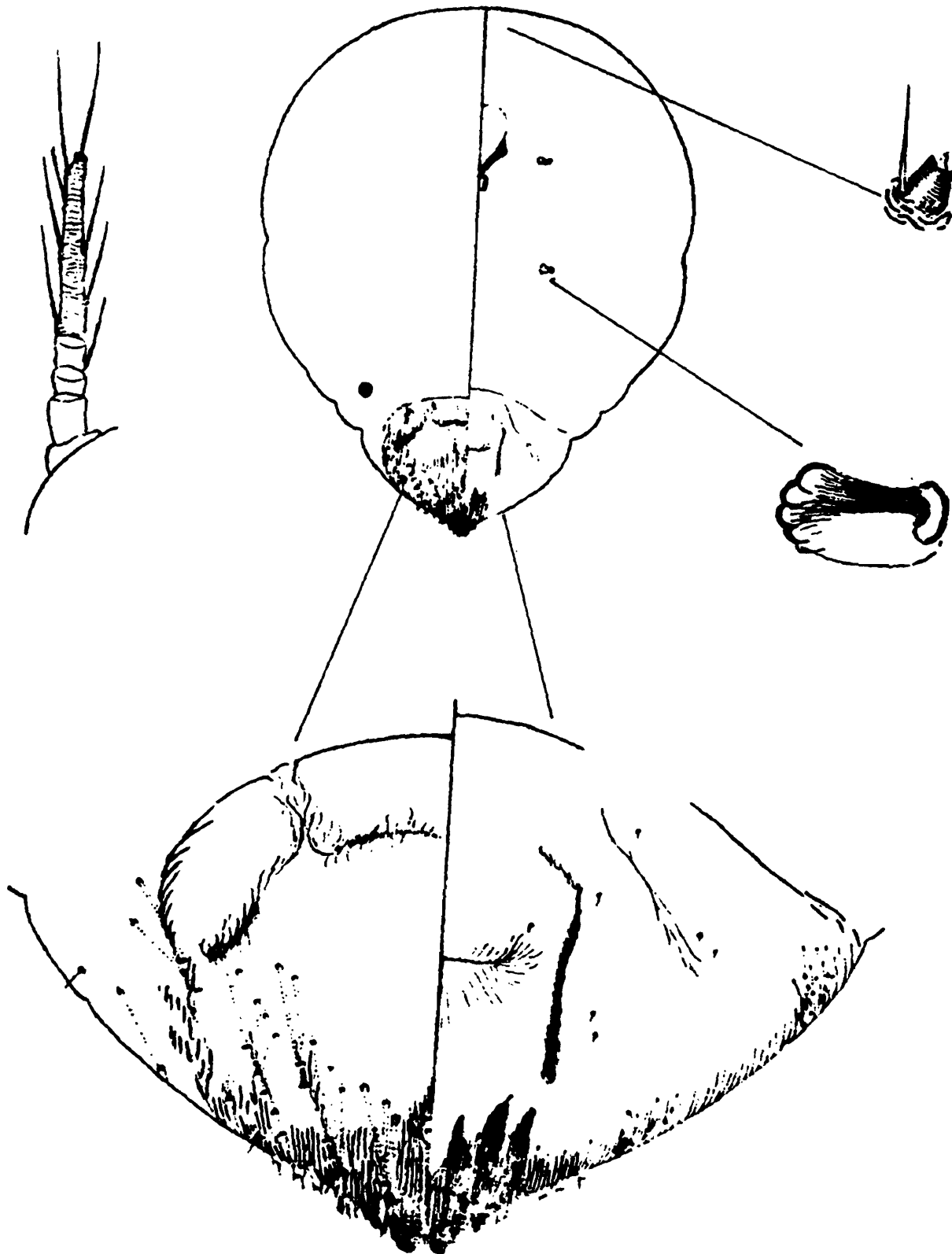


Fig. 9. *Quadraspidiotus perniciosus* (Comstock). On upper left, antenna of immature stage.

Genus *Fiorinia* Targioni Tozzetti

1868. *Fiorinia* Targioni-Tozzetti, *Atti Soc. Ital. di Sci. Nat.*, **11** : 42.

1970. *Fiorinia*; Takagi, *Ins. Matsum.*, **33** (1) : 53.

Type species : *Fiorinia pellucida* Targioni Tozzetti (= *Diaspis fiorinae* Targ.)

19. *Fiorinia multipora* Lindinger

1911. *Fiorinia odinae* var. *multipora* Lindinger, *Ztschr. f. Wiss. Insektenbiol.*, **7** : 126.

1919. *Fiorinia odinae* var. *multipora*; Green, *Rec. Indian Mus.*, **16** : 448.

1921. *Fiorinia odinae* var. *multipora*; Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 355.

1971. *Fiorinia multipora*; Ali, *Indian Mus. Bull.*, **4** (2) : 46.

1985. *Fiorinia multipora*; Varshney, *Oriental Ins.*, **19** : 38.

Diagnosis : Note : Unfortunately the description of *multipora* is not traceable. Lindinger's paper is not available to the author and above cited other papers have not provided even one line of description.

Host plant : *Taxus wallichiana*.

Distribution : India : Meghalaya ("Khasia, India"). Distribution in other places not known.

20. *Fiorinia proboscidea* Green (Fig. 11)

1900. *Fiorinia proboscidea* Green, *J. Bombay nat. Hist. Soc.*, **13** : 256.

1970. *Fiorinia proboscidea*; Takagi, *Ins. Matsum.*, **33** (1) : 65.

1985. *Fiorinia proboscidea*; Varshney, *Oriental Ins.*, **19** : 38.

Diagnosis : Adult female length : 1.5 mm. Membraneous long narrow body with almost parallel sides. Angled head narrowing almost to a point. Antennae prominent, each with a single long seta and a minute seta. Anterior spiracles each with one or no disc pores. Pygidium not membraneous, with medium lobes slightly divergent. Marginal ducts numbering 5 pairs. Other details as in Takagi (1970) and Williams & Watson (1988).

Host plants : *Gelonium lanceolatum*, *Piper* sp., *Citrus* sp., *Eugenia* sp., *Rosa* sp.

Distribution : India : Meghalaya. Widespread in whole southern Asia. Originally described from Sri Lanka. Later also recorded from Taiwan, Fiji and some south Pacific islands.

Genus *Pseudaulacaspis* MacGillivray

1921. *Pseudaulacaspis* MacGillivray, *The Coccidae* : 305.

1970. *Pseudaulacaspis*; Takagi, *Ins. Matsum.*, **33** (1) : 41.

Type species : *Aulacaspis pentagona* Targ.

21. *Pseudaulacaspis pentagona* (Targioni Tozzetti) (Fig. 12)

1886. *Diaspis pentagona* Targioni - Tozzetti, *Rev. di Bacchioculture*, **18** (1885) : 1.

1966. *Pseudaulacaspis pentagona*; Borchsenius, *Catalogue Diaspidoidea of World* : 175.

1970. *Pseudaulacaspis pentagona*; Ali, *Indian Mus. Bull.*, **5** (1) : 24.

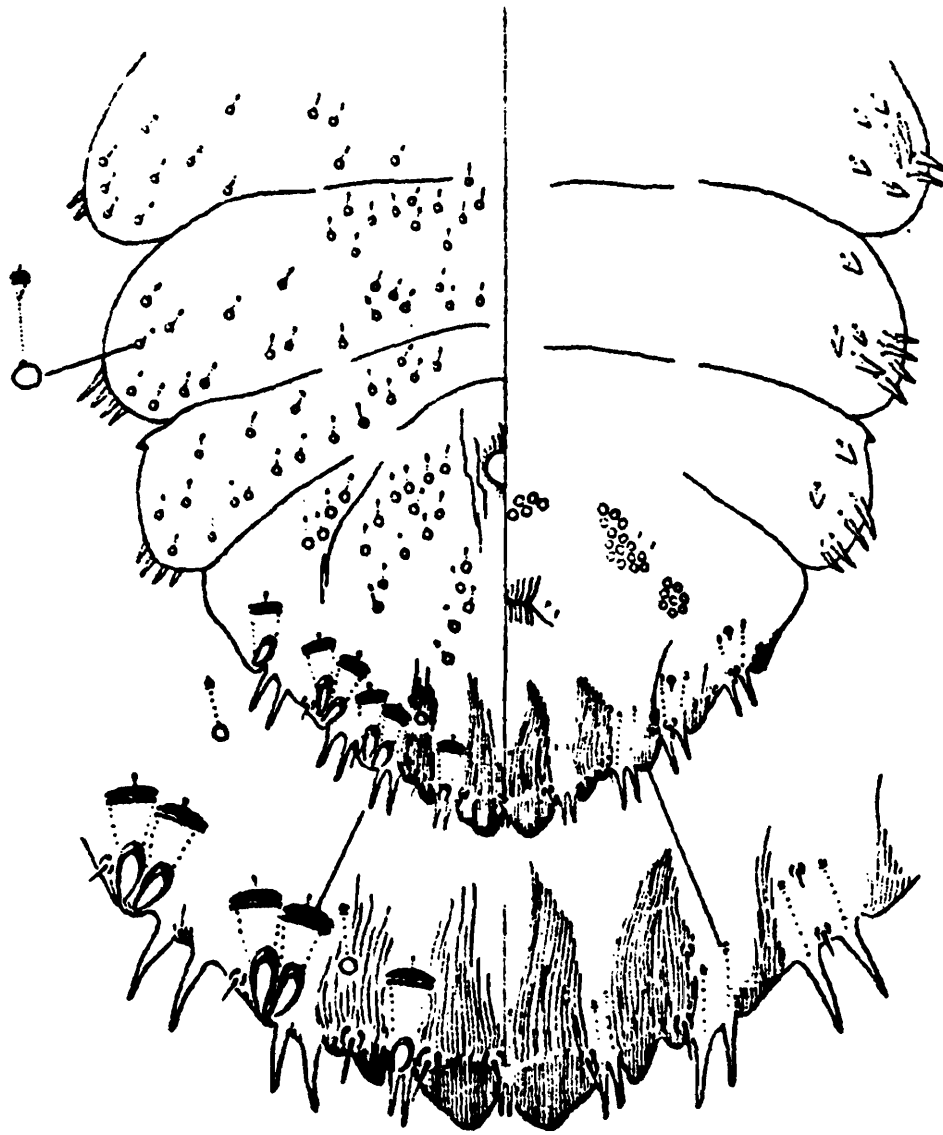


Fig. 10. *Andaspis betulae* (Borchsenius) Varshney

1985. *Pseudaulacaspis pentagona*; Varshney, *Oriental Ins.*, **19** : 39.

1993. *Diaspis lanatus* Ckll.; Varshney, *Oriental Ins.*, **27** : 271. (Syn.)

Diagnosis : Test of female subcircular, white, exuviae near the margin at one end, even sometimes projecting outside margin. Female body broadly oval; margin strongly lobed; dorsal ducts present from 3rd to 5th abdominal segment. Median (first pair) pygidial lobes large, conspicuous and strongly zygotic; second pair well developed, bilobed and sclerotised; third pair also bilobed but vestigial; and 4th and 5th lobes represented by four sclerotised points. Circumgenital pores present in 5 large groups. Other details as in Rao & Chatterjee (1950). Species illustrated by Ferris.

Host plants : Apple, plum, peach and cherry. Polyphagous.

Distribution : India : Meghalaya : Shillong (Upper Shillong, Sonapani and Maungep); Assam, West Bengal and Uttar Pradesh. Occurs widely in North & South Americas, Africa, Europe, Asia and Australia.

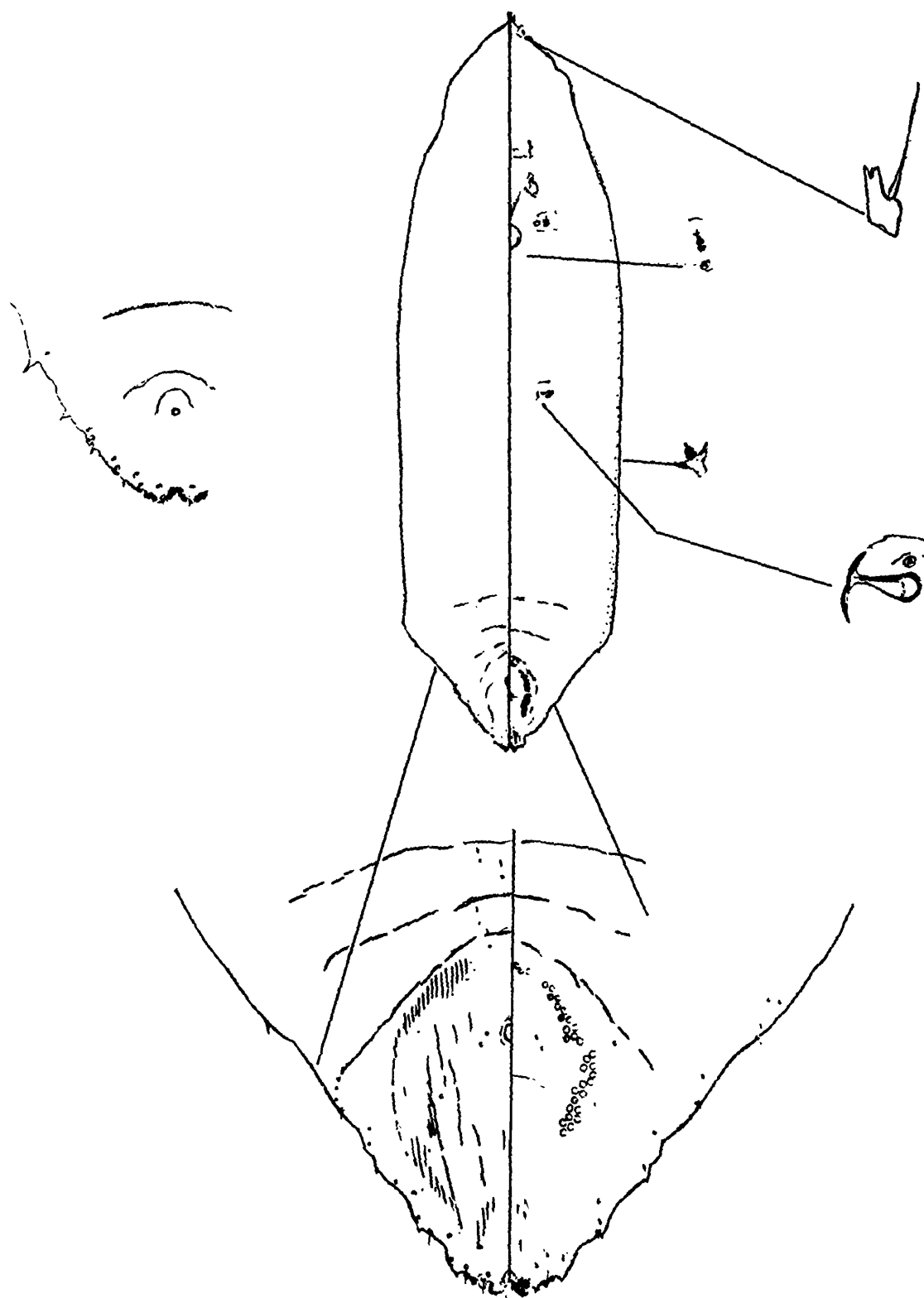


Fig. 11. *Fiorinia proboscidea* Green. On upper left, pygidium of second instar female.

Table showing the district-wise distribution of coccoids in Meghalaya

	West Garo hills	East Garo hills	South Garo hills	West Khasi hills	East Khasi hills	Ribhoi	Jayantia hills
FAMILY MONOPHLEBIDAE							
1. <i>Icerya zimmermani</i>	-		-	-	+		
2. <i>Crypticerya sp.</i>	-	-	-		+		
3. <i>Drosicha sp</i>					+		-
4. <i>Steatococcus assamensis</i>			-	-	+		
5. <i>Misracoccus assamensis</i>	-		-		+	-	-
FAMILY TACHARDIIDAE							
6. <i>Kerria c. chinensis</i>	+	+	-	-	-	-	-
7. <i>Paratachardina mithilae</i>	-	-		-	+		
FAMILY KERMESIDAE							
8. <i>Pseudopulvinaria sikkimensis</i>		-		-	+	-	
FAMILY COCCIDAE							
9. <i>Ceroplastes sp.</i>	-	-	-	-	+	-	-
10. <i>Coccus hesperidum</i>	+	-	-	-	+	-	-
11. <i>Coccus watti</i>	-	-	-	-	+	-	-
12. <i>Saissetia sp.</i>	+	-	-	-	-	-	-
FAMILY DIASPIDIDAE							
13. <i>Leucaspis manii</i>	-	-	-	-	+		
14. <i>Chrysomphalus dictyospermi</i>	-	-	-	-	+	-	
15. <i>Hemiberlesia rapax</i>	-	-		-	+		
16. <i>Quadraspidiotus perniciosus</i>	-	-			+		-
17. <i>Andaspis betulae</i>	-	-	-	-	+		-
18. <i>Lepidosaphes sp.</i>	-			-	+	-	-
19. <i>Fiorinia multipora</i>	-	-	-	-	?+	-	-
20. <i>Fiorinia proboscidea</i>	-	-	-	-	?+	-	-
21. <i>Pseudaulacaspis pentagona</i>	-		-	-	+	+	

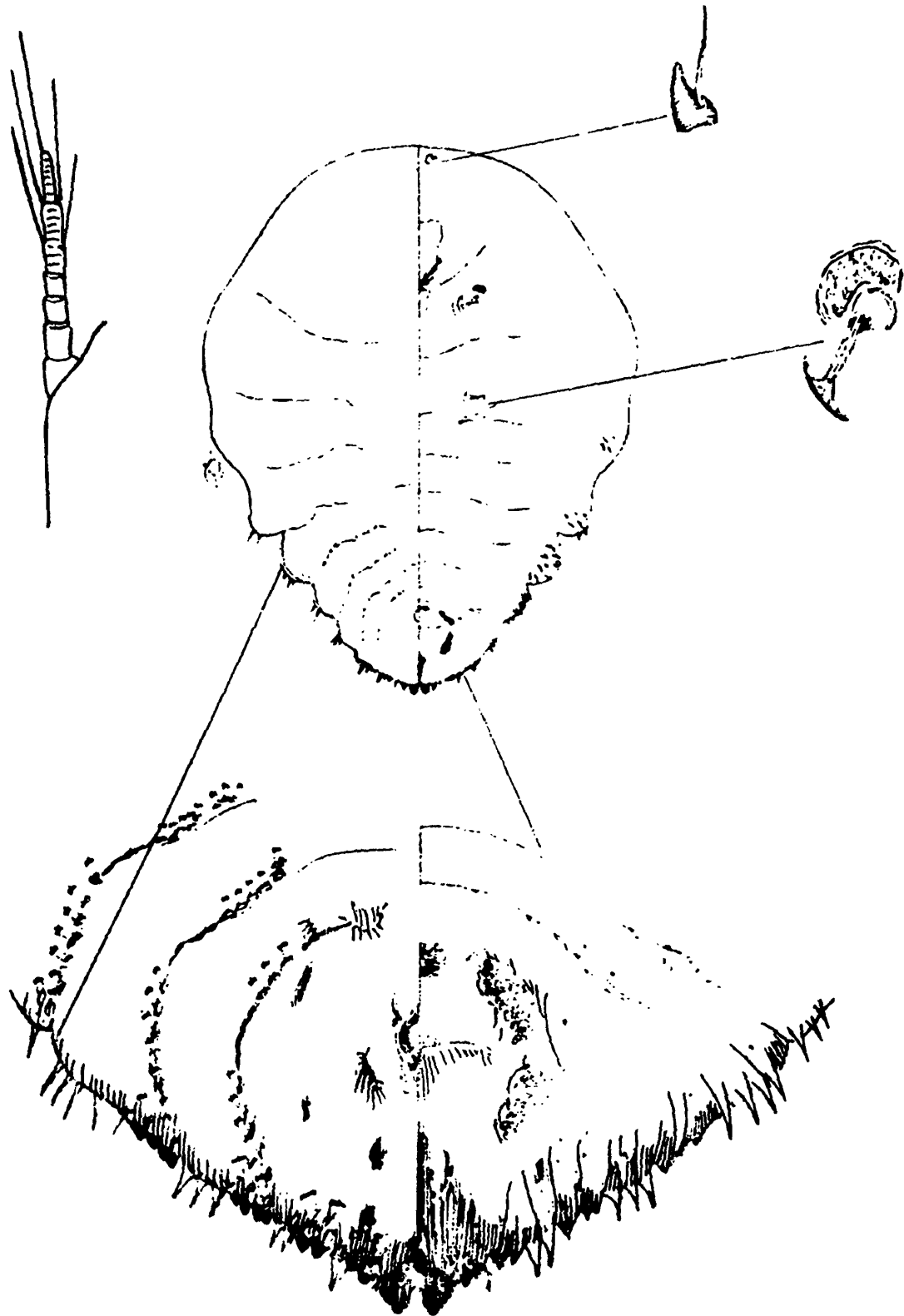


Fig. 12. *Pseudaulacaspis pentagona* (Targioni - Tozzetti).

SUMMARY

The scale insects and mealybugs of the Meghalaya State, North-east India, are reported, based on author's collection and literature records. A total of 21 species in 19 genera under five families are dealt with. One new combination (*Andaspis betulae*) and one new emendation in a species name (*Paratachardina mithlae*) have been proposed. Host-Plants and distribution range within the State have been mentioned and 12 species have been illustrated. The paper is a first consolidated report on the coccids of Meghalaya.

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INSECTA : HOMOPTERA : CICADIDAE

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INTRODUCTION

The Cicadids are forest insects and are well known for the shrill monotonous sound which is confined to the male. The Cicada's "song" (Buzzing sound), usually heard in forest is clearly of a sexual nature. The song is suspended when insect is alarmed. About 1162 species belonging to 131 genera are so far known from the world (Metcalf 1963). Of this, about 206 species are known to occur in oriental region. A perusal of literature reveals that altogether 22 species under 12 genera are so far known from Meghalaya as against a total Indian record of 145 species (Distant 1889, 1890, 1891, 1892, Kato 1932, Mathur 1953, Paiva 1917). The present work is an attempt to provide a comprehensive account of 19 species belonging to 12 genera, in 4 subfamilies of the family Cicadidae from the State of Meghalaya. Of these, 4 species marked '*' are reported for the first time from this State. The account deals with diagnosis of the Family, Subfamilies, keys to various taxa, diagnosis and geographical distribution of each species and literature references. The distribution of these species are indicated in map (1-3). The classification of the family has been mainly adopted after (Distant, 1889, 1890, 1891, 1892, 1906, 1916, Metcalf, 1963, Mathur, 1953).

The work is based on collections represented in Hemiptera Section, Z.S.I., Calcutta.

SYSTEMATIC ACCOUNT

Subfamily	I. Cicadinae
Genus	1. <i>Pomponia</i> Stål
	1. <i>Pomponia fusca</i> (Oliver)
Subfamily	II. Gaeaninae
Genus	2. <i>Gaeana</i> Amyot and Serville
	2. <i>Gaeana maculata</i> (Drury)
Genus	3. <i>Platylomia</i> Stål
	3. * <i>Platylomia radha</i> (Distant)
	4. <i>Platylomia similis</i> (Distant)
	5. <i>Platylomia umbrata</i> (Distant)
Subfamily	III. Tibiceinae

* New record from Meghalaya

- Genus 4. *Cryptotympana* Stål
6. *Cryptotympana corva* (Walker)
7. *Cryptotympana varicolor* Distant
- Genus 5. *Dundubia* Amyot and Serville
8. *Dundubia intermerata* Walker
9. *Dundubia mannifera* (Linnaeus)
- Genus 6. *Haphsa* Distant
10. *Haphsa nicomache* (Walker)
- Genus 7. *Huechys* Amyot and Serville
11. *Huechys sanguinea* (De Geer)
- Genus 8. *Platypleura* Amyot and Serville
12. **Platypleura badia* Distant
13. *Platypleura nobilis* (Germar)
- Genus 9. *Purana* Distant
14. **Purana pryeri* (Distant)
- Genus 10. *Rustia* Stål
15. **Rustia dentivitta* (Walker)
- Genus 11. *Scieroptera* Stål
16. *Scieroptera splendidula* (Fabricius)
- Genus 12. *Tosena* Amyot and Serville
17. *Tosena dives* (Westwood)
18. *Tosena melanopteryx* (Kirkaldy)
19. *Tosena splendida* Distant

GENERAL DIAGNOSIS

Ocelli three in number and placed on the disk of the vertex of head; antennae short, inserted close to the eyes and composed of seven joints. The head is short, broad and transverse, terminating beneath in an elongated rostrum composed of discal furrows on each side; the mesonotum is very large and terminates behind in a small basal cruciform elevation. The abdomen consists of six segments and an anal segmental appendage. The anterior femora are incrassated and more or less spinose beneath. The tegmina are generally hyaline, sometimes opaque; the venation usually distinct and furcate in ramification, but sometimes reticulate.

Key to Subfamilies

1. Tympana entirely or in greater part uncovered in male specimen Tibiceninae
- Tympana entirely or in great part covered in male specimen 2
2. Tympanal covering imperfect, more or less exposing orifices Geaninae
- Tympanal covering concealing orifices Cicadinae

Subfamily I. Cicadinae

Genus 1. *Pomponia* Stål

1866. *Pomponia* Stål, *Hem. Afr.* iv : p. 6.

Body variable, either long or very short and convex. Head, including eyes about equal in width to anterior margin of mesonotum, ocelli much further apart from eyes than from each other, face convex, slightly prominent above. Pronotum with lateral margin moderately amplified and sinuated, posterior angle dilated, a little shorter than mesonotum; mesonotum with the disk moderately convex, abdomen in male longer than space between apex of head and base of cruciform elevation. tympana covered; opercula short and transverse; tegmina and wings hyaline, basal cell of tegmina longer than broad, more or less maculate, apical areas eight; anterior femora distinctly spined.

1. *Pomponia fusca* (Oliver)

1790. *Cicada fusca* Oliver, *Enc. meth.*, v : 749.

1953. *Pomponia fusca* Mathur, *Indian Forest Leaflet*, 121 : 141.

1963. *Pomponia fusca* Metcalf, *General Catalogue Homop.*, viii : 848.

Material examined : 2 exs. India : Meghalaya; 1 ex., Rongram, West Garo Hills. 26.ix.75, coll. N. Muraleedharan.

Diagnosis : Head about as wide as base of mesonotum, greenish in colour, an irregular central alivaceous fascia present on the anterior margin of the front, spot at inner margin of eyes, pronotum with a broad greenish longitudinal fascia and two large oblique spots on each lateral area, a central fascia present on mesonotum; tegmina and wings hyaline, costal membrane of tegmina greenish in colour and apical area infuscated; marginal series small spot; femora and tibiae brackish red, femora with a spot near apices; abdomen brownish red, pilose.

Length : 42 mm (Female)

Distribution : India : Meghalaya (East Garo Hills and West Garo Hills), Assam. Nilgiri, Elsewhere : Japan, Java, Margherita, Philippines.

Key to genera of Subfamily Gaeninae

1. Tegmina with venation dense and furcated, apical area numerous. Head equal in width as pronotum, front not porrectly produced. Tympana completely covered *Platylomia*
- Tegmina with the venation normal, the apical areas eight. Head longer than pronotum, front somewhat porrectly produced. Tympana considerably exposed *Gaeana*

Subfamily II. Gaeaninae

Genus 2. *Gaeana* Amyot and Serville

1843. *Gaeana* Amyot and Serville, *Hemp* : 463

Body long and moderately slender in male, much shorter in the female; head broad including eyes, about equal in width to that of mesonotum at base, longer than pronotum, ocelli about twice the distance from eyes as from each other; face somewhat globosely convex, slightly prominent above; lateral margin of pronotum neither distinctly amplified nor toothed, abdomen in male long moderately slender, in the female only as long as space between apex of head and base of cruciform elevation; tympana considerably exposed, the tympanal covering incomplete and rudimentary anterior femora distinctly spined; tegmina and wings opaque, their outer margin convexly rounded; apical area eight, interior ulnar area a little wider at apex than at base.

2. *Gaeana maculata* (Drury)

1773. *Cicada maculata* Drury, *Ins.*, ii : 68.

1953. *Gaeana maculata* Mathur, *Ind. Forest. Leaflet* (Ent.) 121 (3) : 138 187.

1963. *Gaeana maculata* Metcalf, *General Catalogue Homop.* viii, Part 1 : 590.

Material examined : 5 exs., India : Meghalaya : East Khasi Hills, 7.iv.1927, coll. Gopi Ram.

Diagnosis : Body black, a brownish spot between eyes and ocelli of head; four discal spots on mesonotum and a spot on each lateral margin of mesonotum and an ochraceous spot on each side of cruciform elevation; tegmina wings black, apex of tegmina greyish brown, five ochraceous spots in two transverse series, two near base and three about in the centre, wings with a broad transverse sub basal patch, near costal margin two contiguous spots, abdominal segment ochraceous. Legs black.

Length : 34 mm (Male), 34 mm (Female)

Distribution : India : Meghalaya (East Khasi Hills), Assam, Naga Hills, Sikkim. Elsewhere : China, Dhansiri valley, Marennee, Samagooting, Tonkin.

Genus 3. *Platylomia* Stål

1870. *Platylomia* Stål, *Ofv. Vet-Ak. Forh* : 708.

Head including eyes about as wide or little wider than the base of mesonotum, pronotum centrally about or almost as long as mesonotum excluding basal cruciform elevation, its lateral margins always distinctly, sometime strongly and generally acutely toothed; abdomen considerably longer than space between apex of head and base of cruciform elevation; tympana completely covered; rostrum reaching the posterior coxae; opercula long, concavely sinuate on each side of basal area, their apices subacute reaching centre and sometime the apex of the abdomen; tegmina and wings hyaline, the venation sometimes fuscously spotted.

3. **Platylomia radha* (Distant)

1787. *Tettigonia spinosa* Fabricius, *Obs. des. emen.*, 2 : 1 382.

1881. *Dundubia radha*, Distant, *Tr. E. S.* : 634.

1953. *Platylomia radha* Mathur, Ind. Forest Leaflet 121 (3) : 138 187.

1963. *Platylomia radha* Metcalf, General Catalogue Homp. viii : Part I : 623.

Material examined : 2 exs. India : Meghalaya. 1 ex., Motinagar, Shillong, East Khasi Hills; 18.iii.73, coll. R.S. Giri; 1 ex., Jowai, Jaintia Hills, 21.v.90, coll. M. S. Shishodia.

Diagnosis : Body light brownish; basal area of the head black; pronotum brownish yellow; two black transverse spots near inner margin of pronotum; mesonotum present, two black margined obconical spots, a black small spot present on each side of the anterior margin of mesonotum, five distinct spots present at basal area; tegmina and wings hyaline; its venation fuscous; costal membrane; basal cell, and claval area pale brownish yellow extreme base and claval area of wings dark brownish yellow; leg brownish yellow, abdomen dark castaneous, its segment blackish red.

Length : 52 mm (Female)

Distribution : India : Meghalaya (East Khasi Hills), Assam, 'Bengal' Nagaland, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere; Burma, Indo China, Java, Malay Peninsula, Teinzo.

4. *Platylomia similis* (Distant)

1888. *Dundubia similis* Distant, A. M. N. H. (6), I : 292.

1919. *Platylomia similis* Paiva, Rec. Indian Mus., xvi : 373-377.

1932. *Platylomia similis* Kato, Monograph of Cicadidae : 166.

1963. *Platylomia similis* Metcalf, General Catalogue Homp. viii Part - I : 625.

Material examined : 1 ex., India : Meghalaya. Tura, West Garo Hills, x.1917, coll. Mrs. Kemp.

Diagnosis : Head green in colour, ocelli area pitchy black; thorax olive green, posterior margin and inner edge of anterior margin black, a central longitudinal black linear fascia on mesonotum, a short oblique black fascia on each side of mesonotum, a small anterior black spot and with two black spots in front of cruciform elevation; tegmina and wings hyaline, the venation greenish brown, in some places black, costal membrane of tegmina greenish; abdomen broad oblique chalky white tomentose fascia on each side of basal area; leg greenish in colour.

Length : 50 mm (Male).

Distribution : India : Meghalaya (West Garo Hills), Assam, Sikkim. Elsewhere : Malay Peninsula, Siam.

5. *Platylomia umbrata* (Distant)

1888. *Cosmopsaltra umbrata* Distant, A. M. N. H. 6 I : 293.

1953. *Platylomia umbrata*, Mathur, Indian Forest Leaflet. (Ent) : 121 (3) : 140.

1963. *Platylomia umbrata*, Metcalf, General Catalogue Homp., viii : Part - 1 : 629

Material examined : 1 ex., India : Meghalaya : Balat, East Khasi Hills, 5.viii.1961, coll. M. R. Rinth.

Diagnosis : Body robust, olive green in colour, the lateral area of the vertex with some irregular black spots; a central fascia present between face and eyes, two black central fascia on pronotum,

two obconical black spots on mesonotum, and a central lanceolate fascia, tegmina and wings hyaline; venation fuscous, extreme base and costal membrane fuscous, femora and tibiae black, abdomen above suffused with black shading, beneath olive green in colour.

Length : 45 mm (Female)

Distribution : India : Meghalaya (East Khasi hills), Assam, Northern Bengal, Sikkim, Uttar Pradesh. Elsewhere : Burma, Bhamo.

Genus 4. *Cryptotympana* Stål

1861. *Cryptotympana* Stål, *Ann. Soc. Ent. Fr.* : 613.

Body long and robust. Head broad, more or less transversely truncate between the eyes, and including the eyes a little broader than the base of the mesonotum; ocelli about twice distance from eyes each other; face slightly prominent, pronotum about as long as mesonotum, lateral margin of pronotum slightly amplified, but not angulated or toothed. Anterior femora distinctly and strongly spined. Abdomen in male about as long as space between apex of head and base of cruciform elevation. Tympana covered. Opercula varying in length and pattern, sometime short. Metasternum moderately elevated at middle, and furnished with the posterior process turning backward. Tegmina and wings hyaline or semi opaque, basal cell longer than broad; apical areas eight.

6. *Cryptotympana corva* (Walker)

1850. *Fidicina corvus* Walker, *List. Hom.* 1 : 86.

1917. *Cryptotympana corvus* Paiva, *Rec. Indian Mus.* xvi : 373-377.

1953. *Cryptotympana corvus*, Mathur, *Indian Forest Leaflet* (Ent) **121**(3) : 138-187.

Material examined : 4 exs., India : Meghalaya, Barapani, North Khasi Hills, 6.iv.71, coll. R. Mathew; 3 exs., Barapani, North Khasi Hills, 7.iv.1975, coll. N. Muraleedharan.

Diagnosis : Body robust; head black, thickly greyish, pilose; basal margin of face with a spot; lateral margin of pronotum covered with ochraceously pilose; obconical spot present at mesonotum; tegmina and wings hyaline, venation fuscous; wings with less than basal third black, femora and posterior tibiae reddish; abdomen covered with thickly darkly pilose, with a broad central black fascia.

Length : 46 mm (Female).

Distribution : India : Meghalaya (North Khasi Hills); Assam, Bengal, Eastern Himalayas, Sikkim, Tamil Nadu, Uttar Pradesh.

7. *Cryptotympana varicolor* Distant

1904. *Cryptotympana varicolor* Distant, *A. M. N. H.*, (7) xiv : 430.

1963. *Cryptotympana varicolor*, Metcalf, *General catalogue Homoptera*, vii, Part 1 : 369.

Material examined : 4 exs., India : Meghalaya : above Tura, West Garo Hills, 15.vii-30.vii.1917, coll. S. Kemp.

Diagnosis : Body brownish; head short; pronotum pilose; with curved black spot and two black oblique spots on each lateral area; mesonotum with a pale greenish discal spot; tegmina and wings hyaline; base of tegmina and wings moderately infusate; costal membrane, apical area brownish; anterior femora with two long spines.

Length : 30 mm (Female).

Distribution : India : Meghalaya (West Garo Hills). Elsewhere : Palawan, Sri Lanka, Sumbawa.

Genus 5. *Dundubia* Amyot and Serville

1843. *Dundubia* Amyot and Serville, *Hem.* : 470.

Body long and robust; head somewhat-triangularly elongate including eyes, rather narrower than the base of pronotum at lateral angle; ocelli a little further apart from eyes than from each other. Pronotum almost as long as mesonotum, the lateral margins not prominently amplified but distinctly toothed; abdomen a little longer than space between apex of head and base of cruciform elevation; tympana completely covered; anterior femora spined; tegmina and wings hyaline, the first with venation normal, the apical area eight in-number and the basal cell twice as long as broad.

8. *Dundubia intemerata* Walker

1856. *Dundubia intemerata* Walker, *J. Linn. Soc. Zool.* 1 : 84.

1953. *Dundubia intemerata*, Mathur, *Indian Forest Leaflet* (Ent.) 121 (3) : 138 187.

1963. *Dundubia intemerata*, Metcalf, *General Catalogue Homop.* viii, Part I : 530.

Material examined : 1 ex, India : Meghalaya : Darugiri; East Garo Hills, 10.iv.74, coll. S. Biswas.

Diagnosis : Body long and robust, greenish in colour, head as long as width between eyes, eyes blackish red in colour; rostrum, claws black in colour; tegmina and wings pale hyaline, the base of tegmina and wings and its venation and costal membrane brownish green in colour; coxae, tarsi and tibiae brownish.

Length : 27 mm (Female).

Distribution : India : Meghalaya (Garo Hills); Assam. Elsewhere : Borneo, Burma, Laos, Malay Peninsula, Penand, Perak, Siam, Singapore, Sumatra, Tenasserim.

9. *Dundubia mannifera* (Linnaeus)

1754. *Cicada mannifera* Linnaeus, *Mus. Ad. Fried.* : 84.

1953. *Dundubia mannifera* Mathur, *Ind. Forest Leaflet* (Ent.) 121(3) : 138 187.

1963. *Dundubia mannifera*, Metcalf, *General Catalogue Homop.* viii, Part I : 539.

Material examined : 24 exs., India : Meghalaya : 2 exs., Rangram, West Garo Hills, 26.ix.75, coll. S. Biswas; 5 exs., Silbalgiri, West Garo Hills, 15.x.83, coll. J.R.B. Alfred; 1 ex., Songsok, East Garo Hills, 15.iv.73, coll. S. Biswas; 1 ex., Mawphlong, Shillong, East Khasi Hills, 6.ix.75, coll. N. Muraleedharan; 13 exs., Nongpoh, North Khasi Hills, 29.ix. 3.x.88, coll. A. R. Lahiri; 1 ex.,

Songsok, East Garo Hills, 15.iv.73, coll. *S. Biswas*; 7 exs., William Nagar, East Garo Hills, 12.x.83, coll. *J.R.B. Alfred*.

Diagnosis : Body long and robust, greenish in colour; head elongate, as long as pronotum; pronotum as long as mesonotum, its lateral margin distinctly toothed; abdomen above with some small black distinct spots; tegmina and wings hyaline the venation and costal membrane of tegmina brownish; anterior femora spined.

Length : 38 mm (Male), 31 mm (Female).

Distribution : India : Meghalaya (North Khasi Hill, West Garo Hills, East Khasi Hills); Assam. Elsewhere : Burma, Bamo, Borneo, China, Java, Sumatra.

Genus 6. *Haphsa* Distant

1905. *Haphsa* Distant, *A. M. N. H.* (7) xv : 64.

Body robust; head including eyes about as broad as mesonotum, considerably shorter than breadth between eyes, lateral margin obliquely sinuate from eyes to apex; pronotum distinctly shorter than mesonotum, subacutely toothed before middle of lateral margin; abdomen short, not longer than space between head and base of cruciform elevation; tympana covered, tympanal flaps about as long as broad; opercula in male broad, their inner margins contiguous, nearly broad throughout, their apices convex, their outer margins very obsoletely sinuate; tegmina and wings hyaline.

10. *Haphsa nicomache* (Walker)

1850. *Dundubia nicomache* Walker, *List. Hom.* i : 64.

1953. *Haphsa nicomache* Walker, *Ind. Forest. Leaflet* (Ent.) 121 (3) : 138 187.

1963. *Haphsa nicomache*, Metcalf, *General Catalogue Homp.*, viii, Part I : 573.

Material examined : 3 exs., India : Meghalaya : Songsok, East Garo Hills, 26.ix.75, coll. *N. Muraleedharan*.

Diagnosis : Body brownish yellow, head with lateral black striae, lateral margin of vertex with two transverse black spots; pronotum with two black central longitudinal lines united posteriorly, pronotum with a transverse black spot; mesonotum with three central discal black lines united posteriorly, each side of mesonotum with a small black spot, a broad lateral fascia containing a small brownish yellow spot; tegmina and wings hyaline, its venation dark brown in colour, costal membrane brownish yellow, post costal area and transverse vein smoky in colour; abdomen black, lateral spots and margin brownish yellow.

Length : 26 mm (Female).

Distribution : India : Meghalaya (East Garo Hills), Assam, Nagaland, Sikkim, Uttar Pradesh.

Genus 7. *Huechys* Amyot & Serville

1843. *Heuchys* Amyot & Serville, *Hem.* : 464.

Body moderate size, somewhat slender; head, including eyes, about equal in width to base of mesonotum. Ocelli about equally wide apart from eyes as from each other; front convexly somewhat flatly produced, shorter than vertex, their lateral margin discontinuous; pronotum with the lateral margin more or less convex, narrower in front than behind, the posterior lateral angles in some species distinctly posteriorly produced. Antero femora prominently spinous. Tympana completely exposed and uncovered, opercula small; face more or less longitudinally sulcate. Tegmina more or less opaquely coloured, apical areas more or less eight, sometimes ten; basal cell much longer than broad; wings either transparent or infuscated and partly opaque.

11. *Huechys sanguinea* (De Geer)

1773. *Cicada sanguinea* De Geer, *Mem.*, iii : 221.

1953. *Heuchys sanguinea* Mathur, *Indl. forest. Leaflet* (Ent.) **121** (3) : 138-187.

1963. *Heuchys sanguinea* Metcalf, *General Catalogue Homop.*, viii, Part I : 31.

Material examined : 2 exs., India : Meghalaya; 1 ex., Wageaasi and 1 ex., Nongal, South Garo Hills, 5.iv.73, coll. S. Biswas.

Diagnosis : Body black in colour, face to head and front blood-red in colour; two large blood-red spots on mesonotum; tegmina black, opaque, wings shining blackish red, some specimens blackish interior or anal area almost pale in colour; legs black; abdomen narrowly black.

Length : 21 mm (Female), 18 mm (Male).

Distribution : India : Meghalaya (East Garo Hills), Assam, Orissa, West Bengal. Elsewhere : Borneo, Burma, China, Malay Peninsula, Rangoon, Sumatra, Tennasserim.

Genus 8. *Platypleura* Amyot and Serville

1843. *Platypleura* Amyot and Serville, *Hem.* : 465.

Body robust, somewhat short, head broad anteriorly truncate, head including eyes a little or scarcely broader than the base of the mesonotum; ocelli about twice and sometimes thrice the distance from eyes as from each other; face moderately convex not prominently above; pronotum with the lateral margins amplified or laminately medially angulate, anterior femora not prominently spined; tympana practically concealed by the tympanal flap or covering, abdomen in male about as long as space between apex of head and base of cruciform elevation; opercula in male short, broad, their apices more or less convexly rounded; tegmina either hyaline, more or less opaquely coloured, tegmina with the base cell a little longer than broad; the costal membrane only moderately dilated or arched at base, apical area eight in number.

12. **Platypleura badia* Distant

1758. *Cicada stridula* Linnaeus, *Editio decima, reformata* **1** : 436.

1888. *Platypleura badia* Distant, *Ann. Mus. Civ. Gen.*, xvii : 453.

1932. *Platypleura badia* Kato, *Monograph of Cicadidae*.

1963. *Platypleura badia* Metcalf, *General Catalogue Homop.*, viii, Part I : 71.

Material examined : 2 exs., India : Meghalaya : Sangsok, East Garo Hills, 6.v.1979, coll. J. K. Jonathan.

Diagnosis : Body brownish yellow. Head with black inner margins, a black fascia between eyes, pronotum with a black longitudinal central line, mesonotum with four black obconical spots, and two black small spots in front of cruciform elevation, tegmina palce hyaline; tegmina with opaque dark brownish yellow, wings with brownish yellow opaque coloration, abdomen fulvous brown.

Length : 16 mm (Female)

Distribution : India : Meghalaya (East Garo Hills). Elsewhere : Burma, Indo-China, Malay peninsula, Perak, Tenasserim, Tonkin.

13. *Platypleura nobilis* (Germar)

1830. *Platypleura nobilis* Germar, *Thon. Ent. Arch.* ii, 2 : 2.

1953. *Platypleura nobilis* Mathur, *Ind. Forest. Leaflet* (Ent.) *nobilis*, 121 (3) : 138 187.

1963. *Platypleura nobilis* Metcalf, *General Catalogue Homop.*, viii, Part 1 : 97.

Material examined : 3 exs., India : Meghalaya; 1 ex., Rongrengiri, East Garo Hills; 26.v.90. Coll. M. S. Shishodia; 1 ex., Songsok, East Garo Hills, 15.iv.73, coll. S. Biswas; 1 ex., Wageasi, East Garo Hills, 6.iv.73, coll. S. Biswas.

Diagnosis : Body greenish yellow. Head with blackish inner margin, a black fascia between eyes; pronotum with a central longitudinal black line; mesonotum with four obconical spots, and a central black oblong spot, and two small black spots in front of cruciform elevation; tegmina with basal half creamy yellowish, two spots on costal membrane, three spots in radial area, and a large spot on claval area, apical half pale hyaline with subapical oblique fascia and a series of small spots, wings dark smoky brown; abdomen greenish brown, the segmental margin black.

Length : 16 mm (Female).

Distribution : India : Meghalaya (East Garo Hills), Assam. Elsewhere : Burma, Borneo, Malayan Peninsula, Singapore.

Genus 9. *Purana* Distant

1905. *Purana* Distant, *A. M. N. H.* (7) xv : 60.

Head including eyes as wide as base of mesonotum and as long as space between eyes, face prominent and convex, its base almost at right angles to the anterior lateral angles of the vertex; pronotum narrowed anteriorly, its lateral margins angulated or toothed; mesonotum much longer than pronotum, abdomen moderately conical above, gradually attenuated posteriorly, in male consilonger than the space between the apex of head and base of cruciform elevation, tubercles on the second and third ventral segments large and prominent; opercula small; tympanal covering in male broader at base than long; tegmina and wings hyaline.

14. **Purana pryeri* (Distant)

1850. *Dundubia tigrina* Walker, *List of Homopterous insect, Brit. Mus.*, 1 : 69.
 1868. *Dundubia nebulilinea* Walker, *The naturalis in Vancouver Island and British Columbia* 2 : 8.
 1881. *Leptopsaltria pryeri* Distant, *Trans. Ent. Soc.*, : 633.
 1932. *Purana pryeri* Kato, *Monograph of Cicadidae* : 161.
 1963. *Purana pryeri* Metcalf, *General Catalogue Homop.*, viii, Part I : 468.

Material examined : 1 ex., India : Meghalaya : Mawphlong, Shillong; East Khasi Hills, 6.ix.75, Coll. N. Muraleedharan.

Diagnosis : Body brownish yellow; head with the frontal margin, area of ocelli and the posterior margin blackish; pronotum with a central longitudinal sulcation, its posterior and lateral margin brownish yellow; mesonotum with two obscure obconical spots on anterior margin, its edges blackish; tegmina and wings hyaline with pale brownish tinge, its venation, costal membrane brownish yellow, with a small dark spot at base, and a submarginal series of small blackish red colour spots near apices, legs brownish yellow, abdomen brownish yellow, its tubercles dark brown.

Length : 28 mm (Male).

Distribution : India : Meghalaya (Shillong). Elsewhere : Borneo.

Genus 10. *Rustia* Stål

1866. *Rustia* Stal, *Hem Afr.*, iv : 8.

Body moderately long and slender. Head broad, including eyes about as wide as the anterior margin of the mesonotum; the vertical angles globosely produced in front of the anterior margin of the eyes which are somewhat pedunculate; ocelli sinuate much further apart from eyes than from each other. Pronotum as long as mesonotum, lateral margins moderately convexly sinuate, the posterior angles somewhat lobately recurved. Anterior femora distinctly and prominently spined. Abdomen longer than space between apex of the head and base of cruciform elevation; Tympana almost totally uncovered and exposed. Opercula very small, not covering the cavities. Tegmina and wings hyaline; tegmina with the basal cell much longer than broad, apical area eight in number, interior ulnar area of irregular shape and much wider at apex than at base. Wings with five apical areas.

15. **Rustia dentivitta* (Walker)

1862. *Cicada dentivitta* Walker, *F. L. S. J. Ent.*, 1 : 304.
 1953. *Rustia dentivitta* Mathur, *Ind. Forst. Ind. Forst. Leaflet* (Ent.) 121 (3) : 138-187.
 1963. *Rustia dentivitta*, Metcalf, *General catalogue Homop.*, viii, Part I : 485.

Material examined : 1 ex., India : Meghalaya : Salbalgiri, West Garo Hills, 10.v.28, coll. R. Radhakrishnan.

Diagnosis : Body brownish yellow in colour, a fascia on each side of front of head, on vertex two black longitudinal central spots; anterior angle of vertex black; inner margin of eyes black; on

each side of pronotum with an oblique black fascia and two black central longitudinal, two obconical black spots, united centrally on mesonotum and a curved fascia on each lateral area of mesonotum; tegmina and wings hyaline, venation and costal membrane, with a series of marginal spots dark brown; abdomen black.

Length : 13 mm (Female).

Distribution : India : Meghalaya (West Garo Hills); Assam, Uttar Pradesh. Elsewhere : Burma, Cambodia, Rangoon, Siam.

Genus 11. *Scieroptera* Stål

1866. *Scieroptera* Stal, *Hem. Afr.*, iv, p. 4.

Body robust. Head including eyes a little broader than base of mesonotum; front subconically flatly produced, shorter than vertex, the lateral margin both discontinuous; pronotum longer than head, its lateral margins slightly convexly oblique, the posterior lateral angles distinctly produced, mesonotum (including cruciform elevation) not longer than pronotum; abdomen longer than pronotum; abdomen longer than space between apex of head and base of cruciform elevation; tympana entirely exposed, tympanal covering altogether absent; opercula in male small and transverse; anterior femora strongly spined beneath; face not longitudinally sulcate; tegmina more or less opaque, apical areas eight, basal cell longer than broad; wings hyaline, apical areas six.

16. *Sceiroptera splendidula* (Fabricius)

1775. *Tettigonia splendidula* Fabricius, *Sys. Ent.* p. 681.

1953. *Scieroptera spendidula* Mathur, *Ind. Forst. Leaflet* (Ent.) **121** (3), 146 p.

1963. *Scieroptera spendidula* Metcalf, *General Catalogue Homop.* vii, Part I, p. 51.

Material examined : 1 ex., India : Meghalaya; Motinagar; East Khasi Hills, 7.vii.72, coll. S. Biswas.

Diagnosis : Body black, front of head marked with purplish in colour, vertex brownish yellow, pronotum with brownish yellow central fascia, mesonotum brownish yellow, central area of cruciform elevation black, tegmina dark brown and wings hyaline, costal membrane of tegmina ochraceous femora reddish brown, tibiae and tarsi black, abdomen frequently with a central, dorsal longitudinal black macular fascia.

Length : 15 mm (Female)

Distribution : India : Meghalaya (East Khasi Hills); Assam, Bengal, Bihar, Sikkim, Uttar Pradesh. Elsewhere : Burma, Borneo, China, Indo-China, Java, Philippine, Sumatra.

Genus 12. *Tosena* Amyot and Serville

1843. *Tosena* Amyot and Serville, *Hem* : 462.

Body robust and long. Head broad, including eyes, about equal in width to that of mesonotum at base; ocelli twice the distance from eyes as from each other; face convex, slightly prominent above, pronotum as long as mesonotum; its lateral margins more or less amplified or laminately expanded, and more or less distinctly toothed; Anterior femora distinctly spined. Abdomen in male long very

much longer than space between apex of the head and base of cruciform elevation, somewhat convex above; tympana covered, opercula short and broad; tegmina and wings opaque; apical areas eight; interior ulnar area somewhat widened at apex.

17. *Tosena dives* (Westwood)

1842. *Cicada dives* Westwood, *Arc. Ent.*, i : 98.

1843. *Tosena fasciata* Amyot and Serville, *Hem.*, : 462.

1948. *Tosena dives* Fraser, *Nat. Hist. Soc. Jour.*, 22 : 103.

1963. *Tosena dives*, Metcalf, *General Catalogue Homp.*, VIII, Part I, : 565.

Material examined : 1 ex., India : Meghalaya; Shillong, East Khasi Hills, 15-30.vii.1911, coll. *H. Steven*.

Diagnosis : Body black in colour, apex of face reddish brown, and very globose; tegmina black, its venation, costal membrane, transverse fascia, apical area, reddish brown, wings red, its apex black; legs black, abdomen black.

Length : 25 mm (Male).

Distribution : India : Meghalaya (Shillong, East Khasi Hills); Assam, "Bengal" Sikkim.

18. *Tosena melonopteryx* (Kirkaldy)

1846. *Cicada melanoptera* White, *A. M. N. H.* xvii : 331.

1916. *Tosena melanoptera* Paiva, *Rec. India Mus.*, xvi : 373-377.

1953. *Tosena melanoptera*, Mathur, *Indian Forest Leaflet (Ent.)* 121(3) : 142.

1963. *Tosena melonopteryx*, Metcalf, *General Catalogue Homp.* viii, Part I : 562.

Material examined : 4 exs., India : Meghalaya; 2 exs., Shillong, East Khasi Hills, 15-30.vii.1911, coll. *S. Kemp*. 2 exs., Above Tura, West Garo Hills, 15.vii-31.viii.1917, coll. *S. Kemp*.

Diagnosis : Body black in colour; head, pronotum black, posterior margin and lateral margin of pronotum brownish yellow; posterior margin of mesonotum and lateral margin of metanotum ochraceous; tegmina more or less black; abdomen black, a double segmental series of spots in abdomen beneath.

Length : 60 mm (Male), 43 mm (Female).

Distribution : India : Meghalaya (Shillong, Tura); Assam, "Bengal" Sikkim. Elsewhere : Burma, Bhamo, Indochina, Tinkin.

19. *Tosena splendida* Distant

1878. *Tosena splendida* Distant, *Ent. Month. Mag.* xv : 76.

1953. *Tosena splendida*, Mathur, *Indian Forest Leaflet (Ent.)*, : 142.

1963. *Tosena splendida*, Matcalf, *General Catalogue Homp.* viii, Part-I : 572

Material examined : 2 exs., India : Meghalaya; Shillong, East Khasi Hills, 15.vii.1911, coll. *S. Kemp*.

Diagnosis : Body black in colour, head black, front of head with reddish spots at each basal angle, on vertex two small spots, pronotum with two large brownish yellow spots on disk and two brown spots, one each in posterior angle of pronotum, and two brownish yellow spots on the disk of mesonotum; tegmina and wings hyaline, tegmina exhibiting a changeable opaline lustre which in some lights is found to be ornamented with close and regular series of transverse darker striae; base of tegmina narrow, its costal membrane shining black and venation blackish red, a series of shining black marginal spots on apices, claval area pale greenish. Legs black, a wide central blood red annulation to femora; abdomen black.

Length : 46 mm (Male), 44 mm (Female).

Distribution : India : Meghalaya (Shillong), Assam. Elsewhere : Burma, Indo-China.

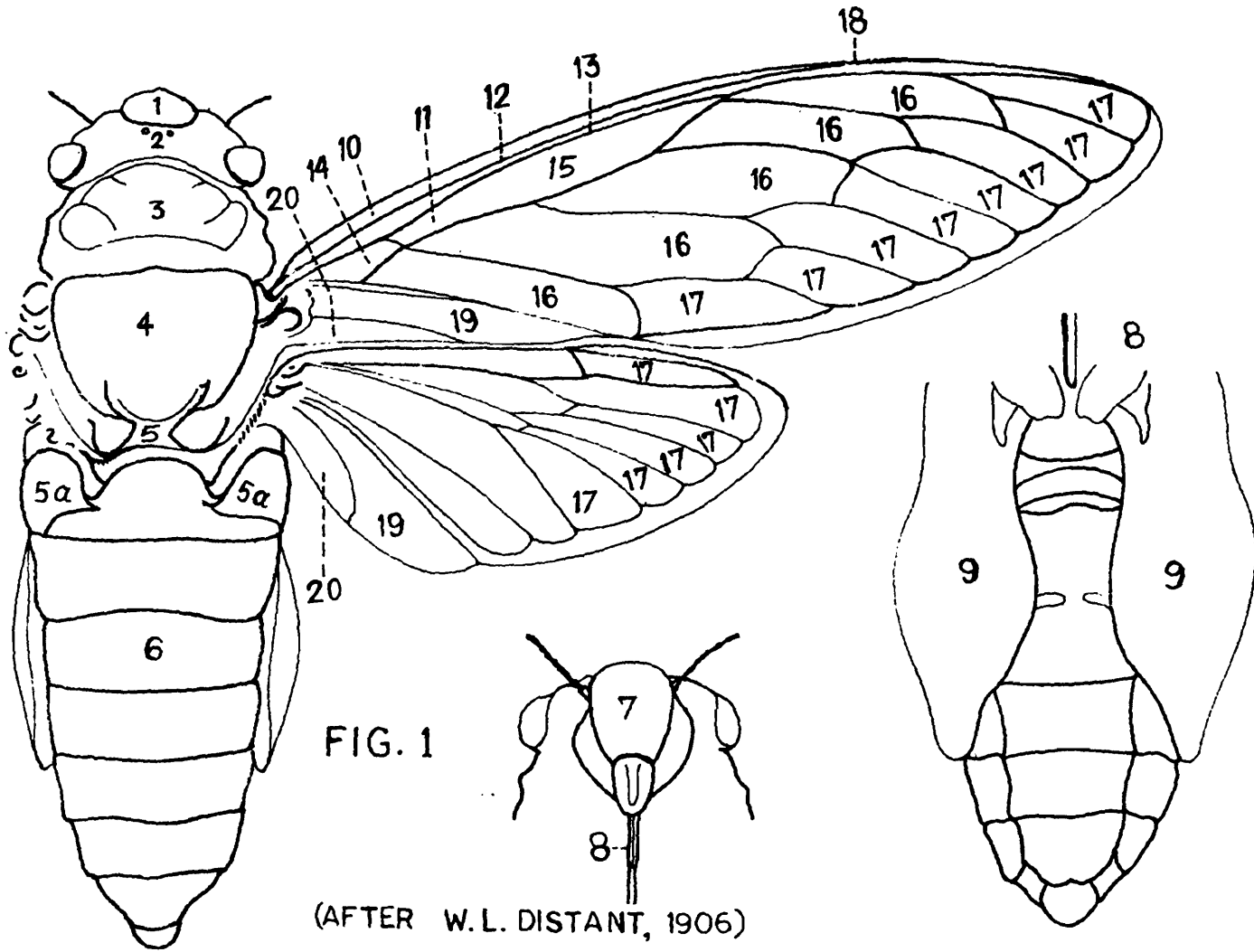


FIG. 1

(AFTER W.L. DISTANT, 1906)

Body

1. Front of head.
2. Vertex of head.
3. Pronotum.
4. Mesonotum.
5. Cruciform elevation.
- 5a. Tympanal coverings.

Body

6. Abdomen.
7. Face on head beneath.
8. Rostrum.
9. Opercula.

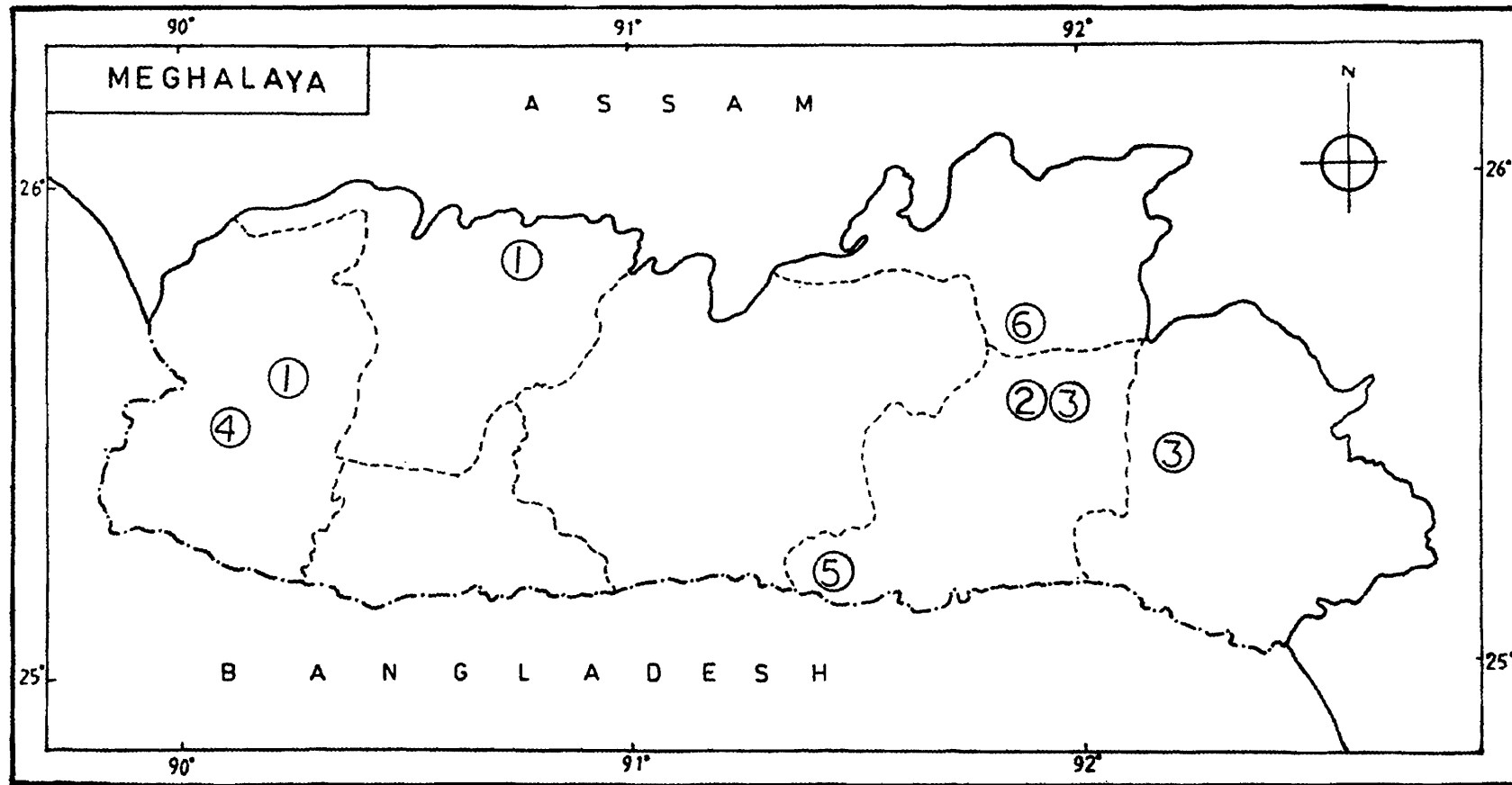
Tegmina and Wings.

16. Ulnar areas.
17. Apical areas.
18. Postcostal area.
19. Claval area.
20. Clavus.

Tegmina and Wings.

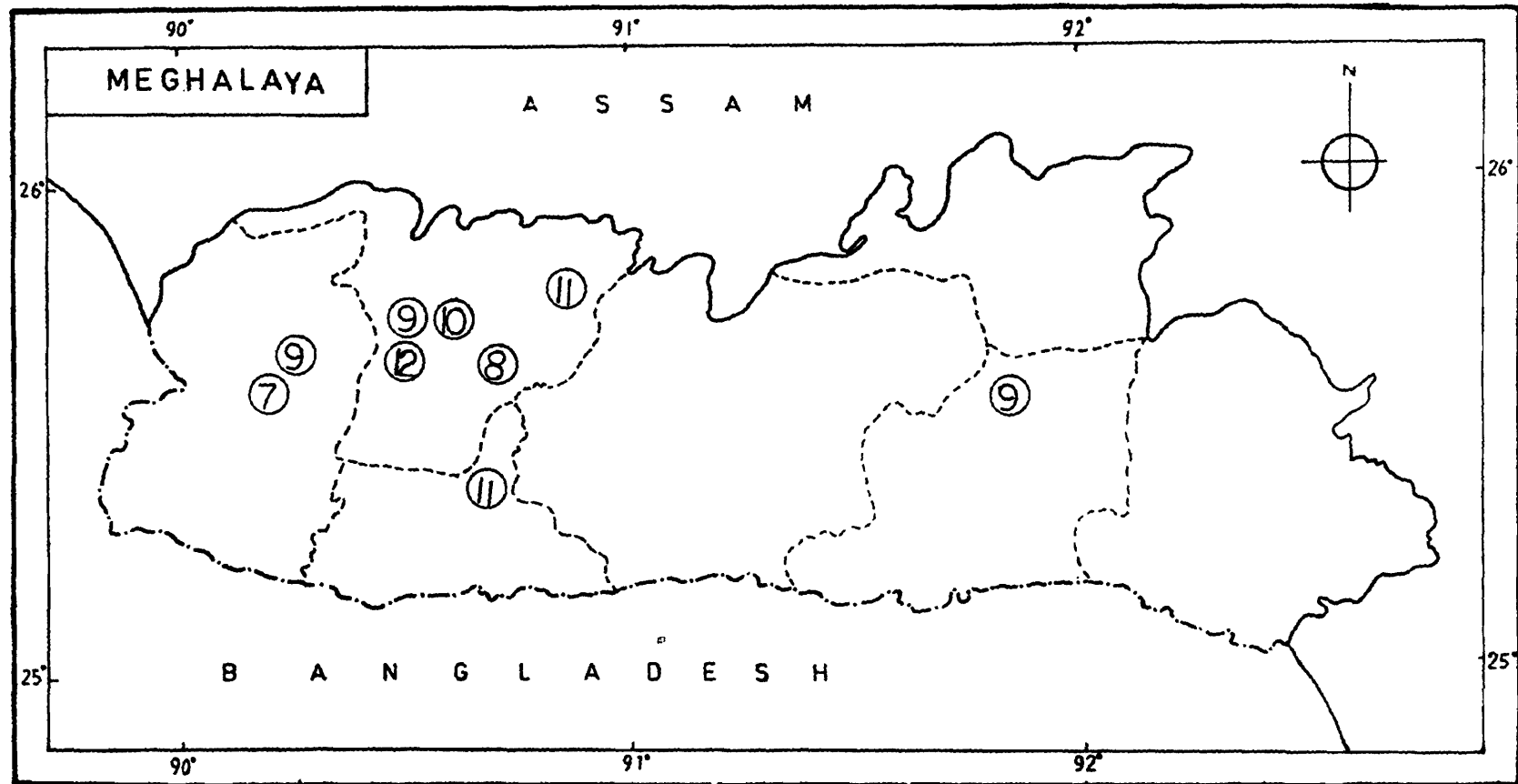
10. Costal membrane.
11. Costal area.
12. Costal vein.
13. Radial vein.
14. Basal cell.
15. Radial area.

MAP 1. SHOWING DISTRIBUTION OF THE SPECIES OF CICADIDAE OF MEGHALAYA



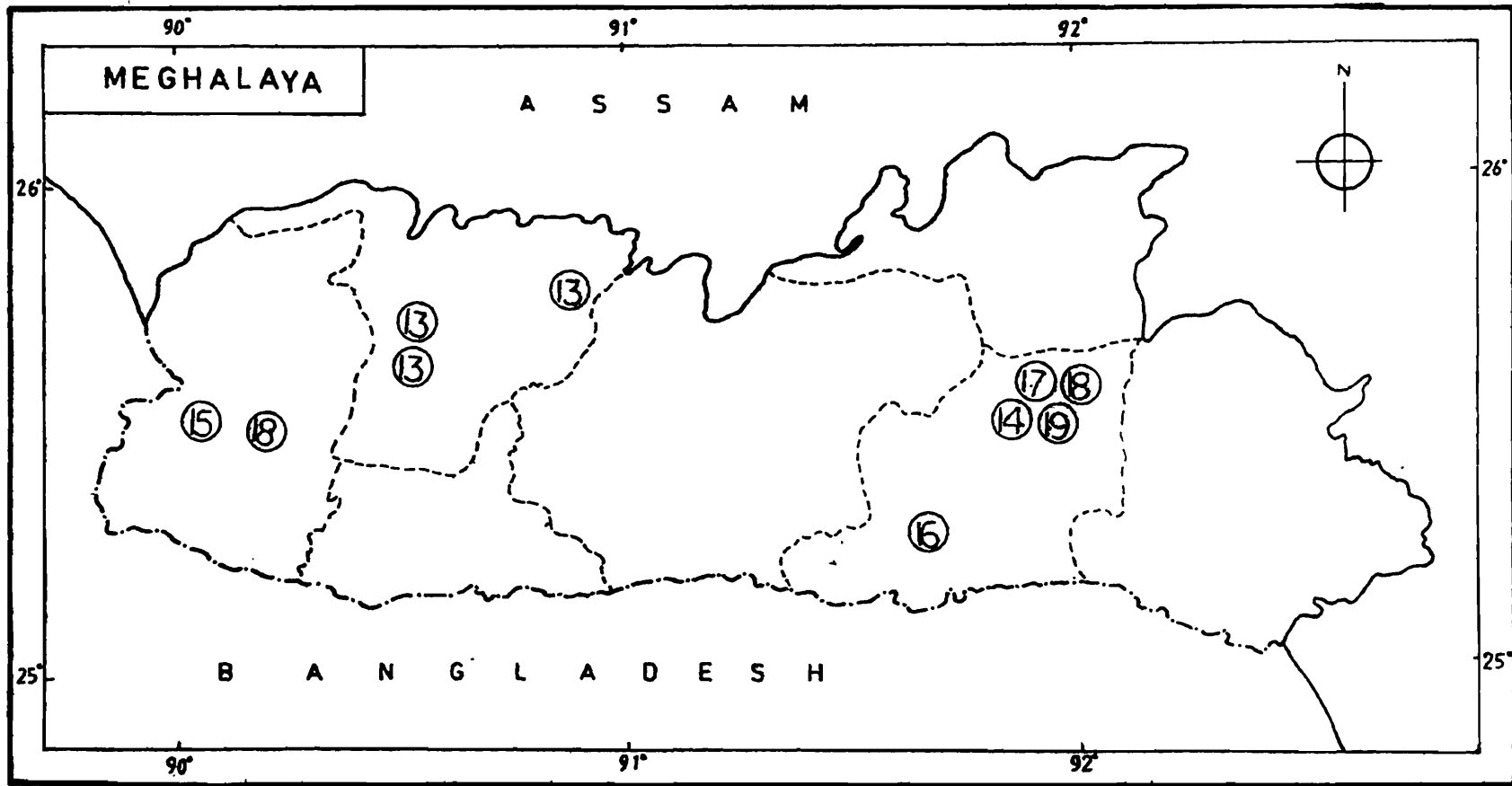
1. <u>Pomponia fusca</u> (Oliv.)	4. <u>Platylomia similis</u> (Distant)
2. <u>Gaeana maculata</u> Drury	5. <u>Platylomia umbrata</u> Distant
3. <u>Platylomia radha</u> Distant	6. <u>Cryptotympana corva</u> Walker

MAP 2. SHOWING DISTRIBUTION OF THE SPECIES OF CICADIDAE OF MEGHALAYA



7. <u>Cryptotympana varicolor</u> Distant	10. <u>Hapsia nicomache</u> Walker
8. <u>Dundubia intemerata</u> Walker	11. <u>Huechys sanguinea</u> De-Geer
9. <u>Dundubia mannifera</u> Linn.	12. <u>Platypleura latia</u> Distant

MAP - 3. SHOWING DISTRIBUTION OF THE SPECIES OF CICADIDAE OF MEGHALAYA

13. Platypleura nobilis Germar14. Purana preyeri Distant15. Rustia dentivitta Walker19. Tosena splendida Distant16. Scieroptera splendidula Fabricius17. Tosena dives Westwood18. Tosena melanopteryx Kirkaldy

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INSECTA : HEMIPTERA : HETEROPTERA : REDUVIIDAE

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Calcutta

The Reduviid fauna of Meghalaya in North-east India is meagre. A perusal of literature reveals that altogether 71 species belonging to 43 genera are so far known (Paiva 1919; Ambrose and Vennison 1989, Distant 1919; Kemp 1924; China 1924) from the state of Meghalaya as against a total Indian record of a little over 450 species in 129 genera distributed over 14 subfamilies (Miller 1959; Samuel and Joseph 1953; Wygadzinsky; Lent 1967, 1980; Muraleedharan 1976; Cook 1977; Ambrose and Livingstone 1986; Livingstone and Murugan 1987; Livingstone and Ravichandran 1988, 1990; Biswas *et al.* 1993).

The present work is an attempt to provide a comprehensive account of 48 species belonging to 37 genera of the family Reduviidae from Meghalaya. Of these, 20 species (marked *) in 18 genera are hitherto reported for the first time from the state. Thus, the total species of Reduviidae from Meghalaya stands at 91. The account deals with brief note on earlier investigation, keys to various taxa, diagnosis, geographical distribution of each species and literature references. The distribution of the species is indicated in Maps (1 - 8).

The classification of the family has been mainly adopted after Distant (1906, 1910) and for some of the subfamilies, Miller (1959) and Cook (1977) have been followed.

The work is based on the collections represented in Hemiptera Section, Zoological Survey of India, Calcutta.

GENERAL DIAGNOSIS

The characteristic features of the family Reduviidae is as follows :- Head narrow, longer than broad; jointed anteriorly; antennae filiform, apical segments often very fine, 4 or 5 segmented; eyes well developed; ocelli when present placed behind the eyes; rostrum short, curved, stout, usually 3 segmented, pointed and with the tip resting in a furrow between the fore coxae; prothorax prominent, smooth, ridged, spined or sharply angular; hemelytra with corium and clavus; membrane distinct, with areoles, wings well developed, rudimentary or absent; legs hairy or spiny, fore legs somewhat raptorial, tarsi 1-2 or 3-segmented with claws.

Subfamily	I. EMESINAE
Division	Stenololaemaria
Genus	1. <i>Myiophanes</i> Reut.
	1. <i>Myiophanes greeni</i> Distant
Division	Leistarcharia

Genus	2. <i>Bagauda</i> Bergr.
	2. <i>Bagauda cavernicola</i> Paiva
Subfamily	II. TRIBELOCEPHALINAE
Genus	3. <i>Apocaucus</i> Distant
	3. <i>Apocaucus laneus</i> Distant
Subfamily	III. STENOPODINAE
Genus	4. <i>Aulacogenia</i> Stål
	4. <i>Aulacogenia corniculata</i> Stål
Genus	5. <i>Canthesancus</i> Amy. & Serv.
	5. <i>Canthesancus gulo</i> Stål
Subfamily	IV. SALYAVATINAE
Genus	6. <i>Lisarda</i> annulosa Stål
	6. <i>Lisarda annulosa</i> Stål
Genus	7. <i>Valentia</i> Stål
	7. <i>Valentia apetala</i> (de Vuill)
Subfamily	V. ACANTHASPIDINAE
Division	Psopharia
Genus	8. <i>Psophis</i> Stål
	8. <i>Psophis erythraea</i> Stål
Division	Epiroderaria
Genus	9. <i>Centrocnemis</i> Sign.
	9. <i>Centrocnemis stali</i> Reuter
Genus	10. <i>Epirodera</i> Westwood
	10. <i>Epirodera bengalensis</i> Distant
	11. <i>E. impexa</i> Distant
Division	Acanthaspisaria
Genus	11. <i>Acanthaspis</i> Amy. & Serv.
	12. <i>Acanthaspis helluo</i> Stål
	13. <i>A. quinquespinosa</i> (Fabr.)
Division	Lenacaria
Genus	12. <i>Velitra</i> Stål

	14.	<i>Velitra rubropicta</i> (Amy. & Serv.)
Genus	13.	<i>Sminthocoris</i> Distant
	15.	<i>Sminthocoris fuscipennis</i> (Stål)
Subfamily	VI.	PIRATINAE
Genus	14.	<i>Pirates</i> Stål
	16.	<i>Pirates arcuatus</i> (Stål)
Subfamily	VII.	ECTRICHODIINAE
Genus	15.	<i>Scadra</i> Stål
	17.	<i>Scadra castanea</i> Paiva
	18.	<i>S. fuscicrus</i> Stål
Genus	16.	<i>Ectrychotes</i> Burm.
	19.	<i>Ectrychotes relatus</i> Paiva
Genus	17.	<i>Haematorrhophus</i> Stål
	20.	<i>Haematorrhophus marginatus</i> (Reuter)
Genus	18.	<i>Paralivavious</i> Paiva
	21.	<i>Paralivavious singularis</i> Paiva
Genus	19.	<i>Vilius</i> Stål
	22.	<i>Vilius melanopterus</i> (Stål)
Subfamily	VIII.	APIOMERINAE
Genus	20.	<i>Velocipeda</i> Bergr.
	23.	<i>Velocipeda aliena</i> (Distant)
Subfamily	IX.	HARPACTORINAE
Division		Harpactoraria
Genus	21.	<i>Lopocephala</i> Lap.
	24.	<i>Lopocephala guerini</i> Lap.
Genus	22.	<i>Rhynocoris</i> Hahn
	25.	<i>Rhynocoris costalis</i> (Stål)
	26.	<i>R. fuscipes</i> (Fabricius)
	27.	<i>R. marginellus</i> (Fabricius)
	28.	<i>R. nigricollis</i> (Dallas)
Genus	23.	<i>Sphedanolestes</i> Stål
	29.	<i>Sphedanolestes bowringi</i> Distant

	30.	<i>S. indicus</i> Reuter
	31.	<i>S. mendicus</i> (Stål)
	32.	<i>S. pubinotum</i> Reuter
	33.	<i>S. trichorus</i> (Stål)
Division		Vesbiaria
Genus	24.	<i>Vesbius</i> Stål
	34.	<i>Vesbius purpureus</i> (Thunb.)
Division		Velinaria
Genus	25.	<i>Cosmoslestes</i> Stål
	35.	<i>Cosmoslestes annulipes</i> Distant
Genus	26.	<i>Velinus</i> Stal
	36.	<i>Velinus annulatus</i> Distant
Division		Sycanaria
Genus	27.	<i>Sycanus</i> Amy. & Serv.
	37.	<i>Sycanus croceovittatus</i> Dohrn
Genus	28.	<i>Villanovanus</i> Distant
	38.	<i>Villanovanus dichrous</i> Distant
Division		Yolinaria
Genus	29.	<i>Agriosphodrus</i> Stål
	39.	<i>Agriosphodrus dohrni</i> Distant
Division		Euagorasaria
Genus	30.	<i>Epidaus</i> Stål
	40.	<i>Epidaus atrispinus</i> Distant
Genus	31.	<i>Rihirbus</i> Stal
	41.	<i>Rihirbus trochantericus</i> Stål
Division		Panthousaria
Genus	32.	<i>Panthous</i> Stål
	42.	<i>Panthous excellens</i> Stål
Division		Coranusaria
Genus	33.	<i>Coranus</i> Curtis
	43.	<i>Coranus fuscipennis</i> Reuter

	44. <i>C. spiniscutis</i> Reuter
Division	Polididusaria
Genus	34. <i>Forestus</i> Distant
	45. <i>Forestus typica</i> (Distant)
Genus	35. <i>Scipinia</i> Stål
	46. <i>Scipinia horrida</i> (Stål)
Subfamily	X. NABIDINAE
Division	Nabidinaria
Genus	36. <i>Gropis</i> Stål
	47. <i>Gropis annulatus</i> Paiva
Genus	37. <i>Nabis</i> Latr.
	48. <i>Nabis assamensis</i>

Key to the Subfamilies of the family Reduviidae

1(2)	Rostrum three jointed	3
2(1)	Rostrum four jointed.....	Nabidinae
3(4)	Anterior coxae not more than twice or three times longer than broad	5
4(3)	Anterior coxae much elongated, reaching or passing apex of head	Emesinae
5(6)	Ocelli absent, pronotum transverse, body tomentose; antenniferous tubercles laterally obliquely prominent, first joint of antennae increassate	Tribelocephalinae
6(5)	Ocelli present	7
7(8)	Hemelytra without a quadrangular areolet or cell at interior area of corium, near base of membrane	9
8(7)	Hemelytra with a quadrangular cell at interior area of corium near base of membrane.....	17
9(10)	Hemelytra with a discoidal cell somewhat sex angular and touching base of membrane or largely triangular.....	Stenopodinae
10(9)	Hemelytra without a discoidal cell	11
11(12)	Scutellum with its apex triangular or subtriangular.....	13
12(11)	Scutellum with its apex broad and two or three spined.....	Ectrichodiinae
13(14)	Pronotum constricted before or near middle.....	15
14(13)	Pronotum constricted behind middle.....	Piratinae
15(16)	Anterior tarsi two jointed.....	Salyavatinae
16(15)	Anterior tarsi three jointed.....	Acanthaspidinae

- 17(18) First joint of rostrum short, second joint long; space between eyes rarely transverse, generally as long as broad..... Apimerinae
- 18(17) First joint of rostrum rarely very short, generally elongate; space between eyes transverse ...
..... Harpactorinae

Key to the Division of the Subfamily Emesinae

- 1(2) Anterior tarsi short, not longer or little longer than the posterior tarsi; hemelytra absent or present, when present marked with fuscous Stenolaemaria
- 2(1) Anterior tarsi long, not or a very little shorter than the tibiae; hemelytra present, sometimes strongly marked with fuscous Leistarcharia

Subfamily I. EMESINAE

Division Stenolaemaria

Genus 1. *Myiophanes* Reut.

1881. *Myiophanes* Reut., *Act. Soc. Sc. Fenn.* 12 : 337.

1. *Myiophanes greeni* Distant

1902. *Myiophanes greeni* Dist., *Fauna Brit. India*, 2 : 205.
1966. *Myiophanes greeni* : Wygodzinsky, *Bull. Am. Mus. nat. Hist. New York*, 133 : 271.

Material examined : 1 ex., Tura, West Garo hills (1400), x.1917, Mrs. Kemp Coll.

Diagnostic characters : A creamy white species; a central oblique spot on each side of anterior pronotal lobe; three broad annulations to anterior femora; five broad transverse annulations to abdomen, dark fuscous; antennae slender, pilose, first and second joints subequal in length.

Length : 16.5 mm.

Distribution : India : Meghalaya (West Garo hills) : Elsewhere : Sri Lanka.

Division Leistarcharia

Genus 2. *Bagauda* Bergr. 1903

1903. *Bagauda* Bergr., *Rev. d'Ent.*, 22 : 12.

2. *Bagauda cavernicola* Paiva

1919. *Bagauda cavernicola* Paiva, *Rec. Ind. Mus.*, 16 : 366.
1966. *Bagauda cavernicola* : Wygodzinsky, *Bull. Am. Mus. nat. Hist. New York*, 133 : 95.

Material examined : 6 exs., Siju cave, West Garo hills, 2.xi.1917, R. Friel Coll.

Diagnostic characters : Castaneous brown; membrane fuliginous, a large rounded spot on coreium; apical halves of anterior femora, prosternum, a spot on the disk of meso and metasterna and posterior tibia creamy white; constricted area of pronotum extending to the anterior half of the posterior lobe.

Length : 16 mm (excluding membrane)

Distribution : India : Meghalaya (West Garo Hills).

Subfamily II. **TRIBELOCEPHALINÆ**

Genus 3. ***Apocaucus*** Dist., 1909

1909. *Apocaucus* Dist., *A.M.N.H.* (8) 3 : 506

3. ***Apocaucus laneus*** Distant

1909. *Apocaucus laneus* Dist., *A. M. N. H.* 8(3) : 507.

Material examined : 1 ex., Above Tura, West Garo hills, 15.vii.30.viii.17, *S. Kemp* Coll.

Diagnostic characters : Head castaneous brown covered with pale brownish fleecy clothing; elytra fuscous brown with the marginal area paler; abdomen beneath smooth and shining; legs finely pilose. pale castaneous brown.

Length : 5.5 mm.

Distribution : India : Meghalaya (West Garo hills), West Bengal.

Subfamily III. **STENOPODINÆ**

Key to the genera of Stenopodinae

- 1(2) Apical spine to scutellum laterally produced, nither erect nor suberect; rostrum with first joint about as long as two apical joints together ***Aulacogenia***
- 2(1) Apical spines to scutellum erect or suberect rostrum with first joint not or very little longer than second ***Canthesancus***

Genus 4. ***Aulacogenia*** Stål, 1870

1870. *Aulacogenia* Stål, *Ofv. vet. AK. Forh* : 700.

4. ***Aulacogenia corniculata*** Stal

1870. *Aulacogenia corniculata* Stål, *Ofv. Vet. AK. Forh* : 701.

Material examined : 1 ex., Rangram, West Garo Hills, 3.iii.1975, *S. Biswas* Coll.

Diagnostic characters : A gray species streaked with fuscous; head with a central piceous line on the postocular area; eyes black; corium with longitudinal fuscous streak, two small fuscous discal spots connected by a same coloured line; head tuberculously spinous, the apex of head is bispinously produced between antenniferous tubercles.

Length : 10 mm.

Distribution : India : Meghalaya (West Garo Hills). Elsewhere : Java; Philippines and Sri Lanka.

Genus 5. ***Canthesancus*** Amy & Serv. 1843

1843. *Canthesancus* Amy. & Serv., *Hem.* : 389.

5. ***Canthesancus gulo*** Stål

1863. *Canthesancus gulo* Stål, *Ann. Soc. Ent. Fr.* : 44.

1902. *Canthesancus gulo* Distant, *Fauna Brit. India*, 2 : 235.

Material examined : 2 exs., Above Tura, West Garo hills, (3500-3900), 15.vii.30, S. Kemp Coll.

Diagnostic characters : Head, pronotum and scutellum ochraceous; a central black line to head continued through pronotum, pronotal spine fuscous; hemelytra finely mottled with brown excepting at basal angle of corium and with three irregular spots; antennae black, first joint about as long as pronotum and scutellum together.

Length : 27-29 mm.

Distribution : India : Meghalaya (West Garo hills), Assam, Sikkim. Elsewhere : Burma; Malay Peninsula.

Subfamily IV. SALYAVATINAE

Key to the Genera of the Subfamily Salyavatinae

- 1(2) Head correctly produced between antenniferous tubercles; anterior tibiae simple *Lisarda*
- 2(1) Head not correctly produced between antenniferous tubercles; anterior tibiae apically compressed and amplified *Valentia*

Genus 6. *Lisarda* Stål, 1859

1859. *Lisarda* Stål, *Ofv. Vet. Ak. Forh.* : 192.

6. *Lisarda annulosa* Stål

1874. *Lisarda annulosa* Stål, *En. Hens.* 4 : 83.

1902. *Lisarda annulosa* : Distant, *Fauna Brit. India*, 2 : 237.

Material examined : 1 ex., Shangpung, Jaintia hills, 8.xii.1975, S. K. Chandra Coll.

Diagnostic characters : Apical spine to scutellum short, obtuse, robust; head with apical correct prolongation; mottlings to hemelytra and abdomen, a broad macular fascia on each side of abdominal disk joining a spot on apical segment; tibiae and femora annulated with fuscous, femora with an obscure spine near apex, the anterior femora also medially spined beneath.

Length : 11 mm.

Distribution : India : Meghalaya (Jaintia hills); Elsewhere : Burma; Sri Lanka.

Genus 7. *Valentia* Stål, 1865

1865. *Valentia* Stål, *Hem. Afr.* 3 : 144.

7. *Valentia apetala* (de Vuill)

1864. *Petalochirus apetala* de Vuill, *Ann. Soc. Ent. Fr.* : 142.

1874. *Valentia apetala* : Stål, *En. Hem.*, 4 : 82.

1902. *Valentia apetala* : Distant, *Fauna Brit. India*, 2 : 240.

Material examined : 1 ex., Tura, West Garo hills (1200-1500 ft), 15.vi.17, S. Kemp Coll.

Diagnostic characters : Anterior area of head and the pronotum centrally finely sulcate; lateral pronotal spines a little obliquely upwardly directed, a small rounded spot on inner margin of coreium; spots to connexium, basal area of femora and subbasal annulations to tibiae ochraceous or luteous.

Length : 17 to 18 mm.

Distribution : India : Meghalaya (West Garo hills); Elsewhere : Java Malay Peninsula; Siam.

Subfamily V. ACANTHASPIDINAE

Division Psopharia

Genus 8. *Psophis* Stål, 1863

1863. *Psophis* Stål, *Ann. Soc. Ent. Fr.* : 53.

8. *Psophis erythraea* Stål

1863. *Psophis erythraea* Stål, *Ann. Soc. Ent. Fr.* : 53.

1902. *Psophis erythraea* : Distant, *Fauna Brit. India*, 2 : 243.

Material examined : 1 ex., Garampani, Jaintia hills, 19.ix.1979, P. F. Cherian & C. Radhakrishnan Coll.

Diagnostic characters : Palely sanguineous; first antennal joint about as long as anteocular portion of head and fuscous; apex of the scutellum forming a recurved spinous tubercle, claval and subclaval area fused along the whole membranous area.

Length : 9 mm.

Distribution : India : Meghalaya (Jaintia hills), North India.

Division Epiroderaria

Key to the genera of the division Epiroderaria

- 1(2) Head with the postocular area long, cylindrical, longer than anteocular portion; eyes and anteocular portion of head strongly spined..... *Centrocnemis*
- 2(1) Head with the postocular area tumid, shorter than anteocular portion which is not spinous; first joint of antennae not passing apex of head *Epirodera*

Genus 9. *Centrocnemis* Sign., 1852

1852. *Centrocnemis* Sign., *Ann. Soc. Ent. Fr.* : 545.

9. *Centrocnemis stali* Reut

1881. *Centrocnemis stali* Reut., *Act. Soc. Sc.* 12 : 333.

1902. *Centrocnemis stali* : Distant, *Fauna Brit. India*, 2 : 246.

Material examined : 2 exs., Above Tura, West Garo hills (3500-3900) 15.vii. 3.viii.17, S. Kemp. Coll.

Diagnostic characters : Brownish ochraceous species mottled with fuscous; spines in front of eyes; posterior pronotal angles broad, with three short broad dentations, lateral abdominal margins spined at segmental angles; first joint of antennae a little thickened and granulate and about as long as anteocular portion of head.

Length : 22.5 mm.

Distribution : India : Meghalaya (West Garo hills), Assam. Sikkim, West Bengal.

Genus *Epirodera* Westw.

1847. *Epirodera* Westw., *Trans. Ent. Soc.* 4 : 247.

Key to the species of the genus *Epirodera*

- 1(2) Black, apex of the scutellum narrowly spatulate, connexivum ochraceous, spotted with piceous *bengalensis*
- 2(1) Chocolate brown, apex of the scutellum elongately lobate and sulcate, connexivum piceous, spotted with ochraceous *impexa*

Genus 10. *Epirodera* Westw. 1847

1847. *Epirodera* Westw., *Trans. Ent. Soc.* 4 : 247.

10. *Epirodera bengalensis* Distant

1909. *Epirodera bengalensis* Dist., *Ann. Soc. Ent. Belg.*, 13 : 364.

Material examined : 1 ex., Rangram, West Garo hills, 9.iii.1975, S. Biswas. Coll.

Diagnostic characters : Black species with anteocular portion of head ochraceous and longer than postocular which is globose behind eye; pronotum with the anterior lobe very strongly defined, the anterior angles conspicuous, two central longitudinal ridges curved inwardly near middle; abdomen beneath with a sublateral segmental series of black spots on each side.

Length : 9 mm.

Distribution : India : Meghalaya (West Garo hills), "Bengal", Bihar.

11. *Epirodera impexa* Distant

1903. *Epirodera impexa* Distant, *Ann. Soc. Ent. Belg.* : 56.

Material examined : 1 ex., Tura, West Garo hills, (1200-1500), 15.vi. 15.vii.1917, S. Kemp Coll.

Diagnostic characters : Generally an obscure chocolate brown species with the coreium except basal angle, membrane and connexivum piceous; antennae longly pilose with its apical joint luteous; pronotum with lateral margins of anterior lobe serrate, pronotum transversely constricted and trifoveate, anterior femora robust, prominently spined beneath.

Length : 9 mm.

Distribution : India : Meghalaya (West Garo hills) : Elsewhere : Burma.

Division Acanthaspisaria

Genus 11. *Acanthaspis* Amy. & Serv. 1843

1843. *Acanthaspis* Amy. & Serv., *Hem.* : 336.

Key to the species of the genus *Acanthaspis*

- 1(2) Posterior lobe of pronotum with four discal spines; basal joint of antennae about as long as head; anterior lobe of pronotum strongly sculptured, posterior lobe rugose... *quinquespinosa*
- 2(1) Posterior lobe of pronotum with two short but prominent discal tubercles; basal joint of antennae a little longer than head, anterior lobe of pronotum moderately sculptured, posterior lobe almost smooth..... *helluo*

12. *Acanthaspis helluo* Stål

1863. *Acanthaspis helluo* Stål, *Ann. Soc. Fr.* : 50.

1902. *Acanthaspis helluo* : Distant *Fauna Brit. India*, 2 : 263.

Material examined : 1 ex., Damaged, Above Tura, West Garo hills, (3500-3900), Sept., 17, Coll?

Diagnostic characters : A black species; first joint of antennae a little longer than head; pronotum with the anterior lobe moderately sculptured, posterior lobe almost smooth, the lateral angles ochraceous and subspicuously produced, their apices slightly recurved, posterior disk with two short, distinct tubercles.

Length : 20-22 mm.

Distribution : India : Meghalaya (West Garo hills), Assam, Nagaland.

13. *Acanthaspis quinquespinosa* (Fabricius)

1781. *Reduvius quinquespinosa* Fabr., *Spec. Ins.*, 2 : 382.

1874. *Acanthaspis quinquespinosa* : Stål, *En. Hem.* 4 : 72.

1902. *Acanthaspis quinquespinosa* : Distant, *Fauna Brit. India*, 2 : 257.

Material examined : 1 ex., Umthan, Ri Bhoi, 26.ix.1973, S. K. Chandra & party Coll. 1 ex., Shillong, East Khasi Hills, 6.vi.1979, M. S. Jyrwa Coll; 1 ex., Shillong, East Khasi Hills, 6.vi.1979, M. S. Jyrwa Coll; 1 ex., Umthan, Ri Bhoi, 26.ix.1975, S. K. Chandra and party Coll.; 1 ex., Rongram, West Garo hills, 26.ix.1975, Muraleedharan Coll.

Diagnostic characters : Generally black species with the four posterior spines of pronotum, a basal and a transverse discal spots to corium and spots to connexivum above and beneath luteous; basal joint of antennae about as long as head; scutellar spine long obliquely ascending.

Length : 15.5 to 19 mm.

Distribution : India : Meghalaya (Ri Bhoi, East Khasi hills, West Garo hills); Assam, "Bengal" Bihar, Maharashtra; Elsewhere : Burma; Sri Lanka.

Division Lenaearia

Key to the genera of the Division Lenaearia

- 1(2) Prosternal process acute, sulcate, posteriorly recurved; posterior tibiae and femora almost subequal in length..... *Velitra*
- 2(1) Prosternal process straight, not recurved; second joint of antennae four or five times as long as the first..... *Sminthocoris*

Genus 12. *Velitra* Stål 18651865. *Velitra* Stål, *Hem. Afr.*, 3 : 122.14. *Velitra rubropicta* (Amy. & Serv.)1843. *Opinus rubropicta* Amy. & Serv., *Hem.* : 339.1874. *Velitra rubropicta* : Stål, *En. Hem.*, 4 : 69.1902. *Velitra rubropicta* : Distant, *Fauna Brit. India*, 2 : 276.*Material examined* : 1 ex., Anogiri, West Garo hills, 7.xi.1973, S. Biswas Coll.*Diagnostic characters* : Piceous, pronotum with the anterior lobe sculptured, posterior lobe with three longitudinal series of punctures one central and others lateral, corium testaceous with an elongate piceous spot on each side of claval apex and a large irregular piceous spot not reaching apical angle; antennae except first joint finely pilose.*Length* : 18 to 20 mm.*Distribution* : India : Meghalaya (West Garo hills); Elsewhere : Burma; Java; Malay Peninsula.Genus 13. *Sminthocoris* Distant1902. *Sminthocoris* Distant, *Fauna Brit. India*, 2 : 279.15. *Sminthocoris fuscipennis* (Stål)1874. *Sminthus fuscipennis* Stål, *En. Hem.*, 4 : 68.1902. *Sminthocoris fuscipennis* : Distant, *Fauna Brit. India*, 2 : 280.*Material examined* : 1 ex., Anogiri forest, West Garo hills, 21.ii.1975, S. Biswas Coll.; 1 ex., Lailad, Ri Bhoi, 8.iv.1986, J. P. Sati Coll.*Diagnostic characters* : A sanguineous species; posterior lobe of pronotum with three longitudinal series of punctures; apex of the scutellum long, conical, straightly produced, first joint of antennae, base of the corium sanguineous.*Length* : 15 to 17 mm.*Distribution* : India : Meghalaya (West Garo hills, Ri Bhoi), Assam; Elsewhere : Burma.

Subfamily VI. PIRATINAE

Genus 14. *Pirates* Serv., 18311831. *Pirates* Serv. *Ann. Sc. Nat.*, 23 : 215.16. *Pirates arcuatus* (Stål)1870. *Spilodermus arcuatus* Stål, *Ofv. Vet. Ak. Forh.* : 692.1902. *Pirates arcuatus* Distant, *A.M.N.H.* (7)10 : 284.*Material examined* : 2 exs., S. W. of Barapani, East Khasi hills, 3.vi.1971, G. M. Yazdani Coll.; 1 ex., Dina Dubi, East Garo hills 16.ix.1975, N. Muraleedharan Coll.

Diagnostic characters : Generally a black species; pronotum longitudinally striate; pronotum, scutellum, clavus, basal half of corium dark brown; an arcuate transverse fascia near base of membrane, and an apical spot greyish flavacent.

Length : 9.5 to 11 mm.

Distribution : India : Meghalaya (East Khasi hills East Garo hills), Assam; Elsewhere : Burma; Philippines.

Key to the genera of the Subfamily Ectrichodiinae

- 1(2) Anterolateral angle of scutellum on each side with a prominent posteriorly curving tooth..... *Vilius*
- 2(1) Anterolateral angles of the scutellum rounded 3
- 3(4) Apical margin of scutellum with distinct posteriorly projecting median tubercles..... 5
- 4(3) Apical margin of scutellum without a distinct median tubercles, transverse sutures at or beyond the middle of the pronotum, interrupted by four short thickened longitudinal ridges; major ventral tubercles of fore femur at middle of segment usually accompanied by smaller tubercles..... *Haematorrohophus*
- 5(6) Abdomen with a strong acute spine at the posterior angle of each segment of the connexivum; median tubercles on apical margin of the scutellum two third as long as the lateral prongs..... *Paralivavious*
- 6(5) Abdomen without the spines at the posterior angle of each segment of the connexivum..... 7
- 7(8) Scutellum with three apical spinous angulations, the middle one minute..... *Ectrychotes*
- 8(7) Scutellum with two apical spinous angulations; rostrum with first joint about as long as remaining joints together *Scadra*

Genus 15. *Scadra* Stål 1859

1859. *Scadra* Stål, *Ofv. Vet. Ak. Forh.* 2 : 308.

Key to the species of the genus *Scadra*

- 1(2) Rufous testaceous, a large spot on the inner area of corium, three segmental spots to the ventral segment black *fuscicrus*
- 2(1) Castaneous, a small triangular patch on the apical margin of corium ochraceous, a greenish yellow patch on the basal lateral angles of the 2nd, 3rd, 4th & 5th segments..... *castanea*

17. *Scadra castanea* Paiva

1919. *Scadra castanea* Paiva, *Rec. Ind. Mus.*, 16 : 367.

Material examined : 1 ex., Above Tura, West Garo hills, (3500-3900), 15.viii.1917, S. Kemp Coll.

Diagnostic characters : Head pale brown, Pronotum constricted a little before middle, a deep central longitudinal furrow extending from the anterior margin to a little beyond the middle of the posterior lobe; scutellum strongly depressed on disk, the apical spines curved inwards; connexivum dilated, obliquely reflexed, marked alternately with orange yellow and black.

Length : 13.5 mm.

Distribution : India : Meghalaya (West Garo hills).

18. *Scadra fuscicrus* Stål

1859. *Scadra fuscicrus* Stal, *Ofv. Vet. Ak. Fosh.* : 183.

1902. *Scadra fuscicrus* : Distant, *Fauna Brit. India*, 2 : 308.

Material examined : 1 ex., Above Tura, West Garo hills, (3500-3900), 15.vii.1917, Coll. ?

Diagnostic characters : Posterior lobe of pronotum with two piceous spots; a large spot on interior area of corium, antennae; and three spots to the ventral segments black or piceous.

Length : 10.5 - 13.5 mm.

Distribution : India : Meghalaya (West Garo hills); Elsewhere : Burma; Sri Lanka.

Genus 16. *Ectrychotes* Burm., 1835

1835. *Ectrychotes* Burm., *Handls.* 2 : 237.

19. *Ectrychotes relatus* Paiva

1919. *Ectrychotes relatus* Paiva, *Rec. Ind. Mus.*, 16 : 368.

Material examined : 5 exs., Above Tura, West Garo hills (3500 - 3900) 15.vii.30.viii.1917, S. Kemp Coll.

Diagnostic characters : Reddish testaceous, pronotum excluding the posterior lateral margins, and base of scutellum cupreous, hemelytra black and a black patch on clavus and disk of the corium; connexivum with black patch on the third, fourth, fifth and sixth abdominal segments, posterior femora distinctly anaulated.

Length : 13 mm.

Distribution : India : Meghalaya (West Garo hills).

Genus 17. *Haematorrhophus* Stål 1874

1874. *Haematorrhophus* Stål, *K. Sverska Veteusk. Akad. Handl.*, 12 : 49.

20. *Haematorrhophus marginatus* (Reut.)

1881. *Physorhynchus marginatus* Reut., *Act. Soc. Sc. Fenn.*, 12 : 301.

Material examined : 1 ex. V, Burhalang, Nongpoh, Ri Bhoi, 26.vii.1965, M. Rynth Coll.; 1 ex. V, Lailad, Ri Bhoi, 23.vi.1972; G. M. Yazdani Coll.; 1 ex. V, Therria Ghat, North Khasi hills, 25.ii.1923, R. Hodgart Coll.

Diagnostic characters : Apterous, abdomen dorsally violaceous black irregularly rugose whereas lateral margin of connexivum sanguineous; pronotum with the anterior lobe longer than the posterior lobe which is broader than the anterior lobe.

Length : ♀ 30 to 40 mm.

Distribution : India : Meghalaya (Ri Bhoi, North Khasi Hills), Assam; Elsewhere : Burma.

Genus 18. ***Paralivavious* Paiva, 1919**

1919. *Paralivavious* Paiva, *Rec. Ind. Mus.*, **16** : 368.

21. ***Paralivavious singularis* Paiva**

1919. *Paralivavious singularis* Paiva, *Rec. Ind. Mus.*, **16** : 368.

Material examined : 1 ex., above Tura, West Garo hills, 15.vi. 15.vii.1917, C. A. Paiva Coll.

Diagnostic characters : Pale reddish ochraceous; antennae black, extreme base of first joint ochraceous; disk of the posterior lobe of pronotum, scutellum, legs castaneous; membrane dull black.

Length : 8 mm.

Distribution : India : Meghalaya (West Garo hills)

Genus 19. ***Vilius* Stål, 1863**

1863. *Vilius* Stål, *Ann. Soc. Ent. Fr.* : 45.

22. ***Vilius melanopterus* Stål**

1863. *Vilius melanopterus* Stal, *Ann. Soc. Ent. Fr.* : 45.

1902. *Vilius melanopterus*; Distant, *Fauna Brit. India*, **2** : 325.

Material examined : 1 ex., Rongzeng. East Garo hills, 26.v.1990, M. S. Shishodia Coll.; 3 exs., Garampani, Jaintia hills, 19.v.1990, M. S. Shishodia Coll.; 4 exs., Nongal, East Garo hills, 28.v.1990; M. S. Shishodia Coll.; 1 ex., Cherrapunjee, East Garo hills, 19.v.1973, S. Biswas Coll.

Diagnostic characters : Generally a coral red species, with base and lateral margin of corium testaceous; posterior lobe of pronotum with three longitudinal impressions; antennae with first and second joints longly ochraceously pilose in male but in female not pilose.

Length : 17 22 mm.

Distribution : India : Meghalaya (East Garo hills, Jaintia hills), Assam; Elsewhere : Bangladesh; Burma; Malay Peninsula.

Subfamily VIII. **PIOMERINAE**

Genus 20. ***Velocipeda* Bergr. 1891**

1891. *Velocipeda* Bergr., *Wlen. ent. Zeit.*, **10** : 263.

23. ***Velocipeda aliena* (Dist.)**

1902. *Godefridus alienus* Dist., *Fauna Brit. India*, **8** : 329.

1919. *Velocipeda aliena*; Paiva, *Rec. Ind. Mus.*, **16** : 371.

Material examined : 4 exs., above Tura, West Garo hills, 15.vi-15.vii.1917, C. A. Paiva Coll.

Diagnostic characters : Generally a piceous species, with three transverse ochraceous spots on lateral areas of hemelytra; pronotum with the anterior lobe glabrous and shining, the posterior lobe granulous and speckled with greyish; abdomen beneath castaneous and piceous on lateral area.

Length : 9-10 mm.

Distribution : India : Meghalaya (West Garo hills).

Subfamily IX. HARPACTORINAE

Division Harpactoraria

Key to the division on the Subfamily Harpactorinae

- 1(2) Head armed with a spine or tubercle behind the base of each antennae..... Euagrasaria
- 2(1) Head without any spine or tubercle..... 3
- 3(4) The lateral margins of the abdomen are strongly dilated the lateral segmental areas more or less globosely elevated..... Yolinaria
- 4(3) The lateral segmental areas of abdomen not globosely elevated..... 5
- 5(6) Pronotum posteriorly dilated and covers the scutellum and base of corium..... Panthousaria
- 6(5) Pronotum not dilated to cover the scutellum and base of corium..... 7
- 7(8) The scutellum has longitudinal carination which is some cases produced in a suberect process or spine..... Coranusaria
- 8(7) Scutellum not longitudinally carinate..... 9
- 9(10) Anterior femora nodulose or spinous 11
- 10(9) Anterior femora not nodulose or spinous; postocular area much longer than the anteocular area..... 13
- 11(12) Legs and body spinous..... Polididusaria
- 12(11) Legs and body not spinous Velinaria
- 13(14) Postocular and anteocular area almost subequal in length; abdominal segments lsbately dilated; head almost as long as pronotum; body oblong & subelongate..... Harpactoraria
- 14(13) Postocular area longer than anteocular area 15
- 15(16) Head long slender, abdomen on each side much dilated..... Sycanaria
- 16(15) Head thicker with the eyes inserted near apex; abdomen not dilated..... Vesbiaria

Key to the genera of the Division Harpactoraria

- 1(2) First joint of antennae as long as head..... **Lophocephala**
- 2(1) First joint of antennae much longer than head..... 3
- 3(4) Posterior lobe of pronotum nither longitudinally impressed nor elevated **Rhynocoris**
- 4(3) Posterior lobe of pronotum longitudinally impressed..... **Sphedanolestes**

Genus 21. *Lopocephala* Lap. 18321832. *Lopocephala* Lap. *Ess. Hem.* : 12.24. *Lopocephala guerini* Lap.1832. *Lopocephala guerini* Lap., *Ess. Hem.* : 12.1902. *Lopocephala guerini* : Distant, *Fauna Brit. India*, 2 : 331.*Material examined* : 1 ex., Tura, West Garo hills (1400), x.1917, Mrs. Kemp Coll.

Diagnostic characters : Generally a sanguineous species, with, antennae, scutellum, membrane, inner area of corium, body beneath, posterior and intermediate femora violaceous black; head thickly pilose and transversely impressed behind eyes; posterior pronotal angle rounded; antennae finely pilose with the basal joint a little longer than the second.

Length : 16 - 17 mm.*Distribution* : India : Meghalaya (West Garo hills), West Bengal; Elsewhere : Sri Lanka.Genus 22. *Rhynocoris* Hahn. 18341834. *Rhynocoris* Hahn, *Wanz. Ins.* 2 : 20Key to the species of the genus *Rhynocoris*

- 1(2) First joint of rostrum not or scarcely longer than anteocular area of head..... 3
- 2(1) First joint of rostrum distinctly longer than anteocular area of head..... 5
- 3(4) Coral red, pronotum with anterior lobe distinctly sculptured..... *fuscipes*
- 4(3) Black, pronotum with anterior lobe very obscurely sculptured..... *costalis*
- 5(6) Pronotal lobe concolorous; first joint of antennae about equal in length to anterior femora, anterior lobe of pronotum posteriorly centrally impressed..... *marginellus*
- 6(5) Pronotal lobe not concolorous; posterior lobe luteous; first joint of rostrum reaching posterior margin of eyes *nigricollis*

25. *Rhynocoris costalis* (Stål)1866. *Reduvius costalis* Stål, *Ofv. Vet. Ak. Forh.* : 285.1986. *Rhynocoris costalis* : Ambrose and Livingstone, *J. Bombay nat. Hist. Soc.* 83(1) : 176.

Material examined : 1 ex., Umling, East Khasi hills, 29.ix.1988, B. N. Das Coll.; 1 ex., Dinadubi, East Garo hills.

Diagnostic characters : Generally black species with lateral margins and basal area of posterior pronotal lobe, apex of scutellum, lateral areas of corium, coxae, trochanters and abdomen beneath, a spot between and a lateral spot behind eyes, and anterior lobe of pronotum coral red, basal joint of rostrum not passing eyes; first joint of antennae a little shorter than anterior femora.

Length : 12 to 14 mm.

Distribution : India : Meghalaya (East Khasi hills, East Garo hills), Assam, Bengal; Elsewhere : Malay Peninsula.

26. *Rhynocoris fuscipes* (Fabricius)

1787. *Reduvius fuscipes* Fabr., *Mant. Ins.* 2 : 312.

1986. *Rhynocoris fuscipes* : Ambrose and Livingstone, *J. Bombay nat. Hist. Soc.* 83(1) : 176.

Material examined : 3 exs., Dinadubi, East Garo hills, 8.v.1979, J. K. Jonathan Coll; 1 ex., Garampani, Jaintia hills, 29.ii.1975, A. K. Ghosh Coll; 1 ex., Darugiri, East Garo hills, 16.v.1979, S. B. Roy & Party Coll.; 1 ex., Umsang, Ri Bhoi, 25.vii.72 A. K. Ghosh Coll.

Diagnostic characters : Generally coral red in colour, upper surface of the postocular area, and a lateral fascia behind eyes, disk of scutellum, anterior area of the posterior lobe of pronotum, segmental fasciae of abdomen beneath and legs black; clavus, interior area of corium and membrane fuscous; violaceous; first joint of antennae a little shorter than anterior femora; pronotum with the anterior lobe distinctly sculptured.

Length : 14 to 16 mm.

Distribution : India : Meghalaya (East Garo hills, Jaintia hills) Maharashtra; Elsewhere : Sri Lanka.

27. *Rhynocoris marginellus* (Fabr.)

1803. *Reduvius marginellus* Fabricius, *Syst. Rhyng.* : 271.

1986. *Rhynocoris marginellus* : Ambrose and Livingstone, *J. Bombay nat. Hist. Soc.* 83(1) : 176.

Material examined : 2 exs., Umtru forest, East Khasi hills, 6.vii.1979, P. F. Cherian Coll.; 1 ex., Sangsok, East Garo hills, 21.ix.1975, N. Muraleedharan Coll.

Diagnostic characters : Black, pronotum with the anterior lobe obscurely sculptured, posteriorly centrally impressed, posterior lobe sericeous; lateral margins of abdomen ochraceous or reddish ochraceous first joint of antennae about equal in length to anterior femora; head as long as pronotum; basal joint of rostrum just passing eyes.

Length : 12 to 15 mm.

Distribution : India : Meghalaya (East Garo hills, East Khasi hills), Assam, Sikkim; Elsewhere : Burma.

28. *Rhynocoris nigricollis* (Dall.)

1850. *Arilus nigricollis* Dall., Jr. *E. S.* : 8.

1986. *Rhynocoris nigricollis* : Ambrose and Livingstone, *J. Bombay nat. Hist. Soc.* 83(1) : 176.

Material examined : 1 ex., Above Tura, West Garo hills, (3500 - 3900), 15.vii.30.viii.1917, S. Kemp Coll.

Diagnostic characters : Black, head beneath, corium, posterior lobe of pronotum, and posterior area of prosternum luteous; membrane pale brownish, connexivum and abdomen beneath sanguineous; first joint of antennae shorter than anterior femora, anterior lobe of femora not sculptured; first joint of rostrum reaching posterior margins of eyes.

Length : 13-14 mm

Distribution : India : Meghalaya (West Garo hills), Sikkim, West Bengal; Elsewhere : Bhutan; Burma; Sumatra.

Genus 23. *Sphedanolestes* Stål, 1866

1866. *Sphedanolestes* Stål. *Ofv. Vet. AK-Forh.* : 284 & 288.

Key to the species of the Genus *Sphedanolestes*

- 1(2) Pronotum unicolorous, or palely pubescent..... 3
- 2(1) Pronotum black, anterior lobe and posterior margin sanguineous, head with a large spot behind eyes black..... *mendicus*
- 3(4) Pronotum black..... 7
- 4(3) Pronotum sanguineous..... 5
- 5(6) Rostrum black, a small lateral spot to head near eyes coral red, membrane fuscous violaceous *trichrous*
- 6(5) Rostrum with its first joint, a large spot on each side of head in front of eyes and a small spot on each side of head behind eyes, pale luteous; black tessellate markings on each lateral area of abdomen beneath *bowringi*
- 7(8) Coreium greyishly pubescent, abdomen sanguineous..... *pubinotum*
- 8(7) Coreium piceous, connexivum spotted and a large spot before apex of abdomen beneath sanguineous..... *indicus*

29. *Sphedanolestes bowringi* Distant

1909. *Sphedanolestes bowringi* Dist., *Ann. Soc. Ent. Belg.* III : 369.

Material examined : 1 ex., Sangsak, East Garo hills, 22.ix.1975, N. Muraleedharan Coll.

Diagnostic characters : Black species with pronotum, scutellum and sternum coral red; two spots on posterior area of connexivum; anterior femora about as long as the first joint of antennae; pronotum with anterior lobe centrally longitudinally sulcate, posterior lobe centrally broadly impressed; membrane considerably passing the abdominal apex with its apical area brownish ochraceous.

Length : 9 mm.

Distribution : India : Meghalaya (East Garo hills).

30. *Sphedanolestes indicus* Reuter

1881. *Sphedanolestes indicus* Reuter, *Act. Soc. Sc. Fenn.*, 12 : 289.

1902. *Sphedanolestes indicus* : Distant, *Fauna Brit. India*, 2 : 340.

Material examined : 2 exs., Botanical garden Shillong, East Khasi hills, 18.v.1974, M.S. Jyrwa Coll.; 1 ex., Mawphlang, East Khasi hills, 16.v.1979, P.T. Cherian Coll., 1 ex., Shillong Fruit garden, East Khasi hills, 9.v.1971, M.S. Jyrwa Coll.

Diagnostic characters : Black species with bases of femore and corium piceous, antennae with the first joint about as long as anterior femora; lateral pronotal angle rounded; anterior pronotal lobe centrally sulcated, posterior lobe discally broadly impressed.

Length : 12.5 mm.

Distribution : India : Meghalaya (East Khasi hills).

31. *Sphedanolestes mendicus* (Stål)

1866. *Reduvius mendicus* Stål, *Ofv. Vet. AK. Forh.* : 286.

1902. *Sphedanolestes mendicus* : Distant *Fauna Brit. India*, 2 : 341.

Material examined : 1 ex., Tura, West Garo hills (1200-1500), 15.vi.15.vii.1917, S. Kemp. Coll.

Diagnostic characters : Black species with head anterior lobe and posterior margin of pronotum, sanguineous, head about as long as pronotum, first joint of rostrum slightly longer than anteocular portion of head; membrane longly passing abdominal apex.

Length : 11-14 mm.

Distribution : India : Meghalaya (West Garo hills), Assam; Elsewhere : Burma; Malay Peninsula.

32. *Sphedanolestes pubinotum* Reut.

1881. *Sphedanolestes pubinotum* Reut., *Act. Soc. Sc. Fenn.* : 12 : 289.

1902. *Sphedanolestes pubinotum* : Distant, *Fauna Brit. India*, 2 : 339.

Material examined : 1 ex., Old barapani Road, Shillong East Khasi hills, 6.iv.1973, A. K. Ghosh Coll.; 1 ex., Motinagar, Shillong, 14.ix.1961, S. N. Prasad Coll.; 1 ex., Shillong, East Khasi hills, 30.ii.1964, S. Biswas Coll.

Diagnostic characters : Shiningly black species with abdomen sanguineous beneath, head with postocular area a little longer than anteocular area; pronotum with its central impression continued to about middle of the posterior lobe, first joint of rostrum a little longer than anteocular portion of head and much shorter than second joint, membrane longly passing the abdominal apex.

Length : 15 to 16.5 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Sikkim, West Bengal. Elsewhere : Burma.

33. *Sphedanolestes trichorus* (Stål)

1874. *Haemactus trichorus* Stal, *En. Hem.* 4 : 34.

1902. *Sphedanolestes trichorus* Distant, *Fauna Brit. India*, 2 : 343.

Material examined : 1 ex., Darugiri, West Khasi hills, 11.v.1991, R. S. Pilli Coll.

Diagnostic characters : Coral red species with antennae rostrum, head and legs black but base of the head and base of femora coral red, small lateral spot to head near eyes, membrane fuscous violaceous.

Length : 11 mm.

Distribution : India : Meghalaya (West Khasi hills).

Division Vesbiaria

Genus 24. **Vesbius** Stål, 1865

1865. *Vesubius* Stål, *Hem. Afr.* 3 : 50.

34. **Vesbius purpureus** (Thunb.)

1784. *Cimex purpureus* Thumb., *Nov. Ins. Sp.* 3 : 57.

1902. *Vesbius purpureus* Distant, *Fauna Brit. India*, 2 : 344.

Material examined : 1 ex., Darugiri, West Khasi hills, 11.iv.1971, R. S. Pillai Coll.

Diagnostic characters : Generally a sanguineous species with, antennae, head, rostrum, legs and membrane black; first joint of antennae subequal in length to anterior femoral femora nodulose; apical third of membrane hyaline, legs largely pilose.

Length : 7-8 mm.

Distribution : India : Meghalaya (West Khasi hills), Assam. Elsewhere : Burma; Java; Phillipines, Sri Lanka.

Division Velinaria

Key to the genera of the Division Velinaria

- 1(2) First joint of antennae about as long as anterior femora; scutellum with the apex spatulately dilated..... **Cosmoslestes**
- 2(1) First joint of antennae very much longer than anterior femora..... **Velinus**

Genus 25. **Cosmoslestes** Stål 1866

1866. *Cosmoslestes* Stål, *Ofv. Vet. AK. Forth.* : 285.

35. **Cosmoslestes annulipes** Distant

1879. *Cosmoslestes annulipes* Distant, *A. M. N. H.* 5(3) : 132.

1902. *Cosmoslestes annulipes* : Distant *Fauna Brit. India*, 2 : 346.

Material examined : 2 exs., Garampani, Jaintia hills, 19.ix.1979, P. T. Cherian & C. Radhakrishnan Coll.

Diagnostic characters : General colouration of the species luteous; annulations to femora and basal annulations to tibiae black; head with an oblique fascia in front of eyes; scutellum with a central discal line and spatulate apex luteous.

Length : 10 mm.

Distribution : India : Meghalaya (Jaintia hills), Assam. Elsewhere : Burma.

Genus 26. **Velinus** Stål 1865

1865. *Velinus* Stål, *Hem. Afr.*, 3 : 52.

36. **Velinus annulatus** Distant

1879. *Velinus annulatus* Distant, *A. M. N. H.* 5(3) : 131.

1902. *Velinus annulatus* : Distant, *Fauna Brit. India*, 2 : 346.

Material examined : 1 ex., Garampani, Jaintia hills, 19.ix.1979, P. T. Cherian & C. Radhakrishnan Coll.; 1 ex., Nongkhylllem Res. forest, East Khasi hills, 28.x.1983, R. Mathew Coll.

Diagnostic characters : Generally a luteous species; corium purplish red, membrane brownish black, its apical area pale fuliginous; anterior lobe of pronotum medially impressed; first joint of antennae about twice the length of the head; annulations to the femora black and annulations to the basal joint of antennae and apex of scutellum luteous.

Length : 15 to 16 mm.

Distribution : India : Meghalaya (Jaintia hills, East Khasi hills) Assam. Elsewhere : Burma.

Divison Sycanaria
Genus 27. *Sycanus* Amy. & Serv., 1843

1843. *Sycanus* Amy. & Serv., *Hem.*; 360.

37. *Sycanus croceovittatus* Dohrn

1859. *Sycanus croceovittatus* Dohrn, *Stett. ent. Zeit.*, **20** : 97.

1902. *Sycanus croceovittatus* : Distant, *Fauna Brit. India*, **2** : 352.

Material examined : 1 ex., Nonakhyllem Reserve forest, East Khasi hills, 28.v.1983, R. Mathew Coll.

Diagnostic characters : General coloration of the species black, apical half of corium and basal margin of membrane golden yellow; antennae unicolourous first joint subequal in length to anterior femora; scutellar spine long a little obliquely curved backward its apex bifid, abdominal margins amplified and upwardly reflexed.

Length : 22 to 25 mm.

Distribution : India : Meghalaya (East Khasi hills).

Genus 28. *Villanovanus* Dist., 1902

1902. *Villanovanus* Dist., *Fauna Brit. India* **2** : 364.

38. *Villanovanus dichrous* Distant

1902. *Villanovanus dichrous* Distant, *Fauna Brit. India*, **2** : 364.

1919. *Villanovanus dichrous* : Paiva, *Rec. Ind. Mus.*, **16** : 371.

Material examined : 2 exs., above Tura, West Garo hills, 15.vi.vii.1917, C. A. Paiva Coll.

Diagnostic characters : Generally a sanguineous species with eyes, antennae, rostrum black; abdomen, lateral margins of sternum, sanguineous; pronotum longer than head and its posterior lateral spines short.

Length : 25 mm.

Distribution : India : Meghalaya (West Garo hills), Assam, Nagaland.

Division Yolinaria

Genus 29. *Agriosphodrus* Stål 18681868. *Agriosphodrus* Stål, *Ofv. AK. Forh.* : 279.39. *Agriosphodrus dohrni* (Sing.)1862. *Eulyes dohrni* Sign., *Ann. Soc. Ent. Fr.* : 126.1902. *Agriosphodrus dohrni* Distant, *Fauna Brit. India*, 2 : 359.*Material examined* : 1 ex., Khasi hills, Date ? Coll. ? material badly damaged.*Diagnostic character* : A shiningly black species, lateral margin of the abdomen dilated, dull ivory white with large black segmental spots, apex of last abdominal segment more prominent in female than male, pronotum medially longitudinally impressed.*Length* : 19 - 22 mm.*Distribution* : India : Meghalaya (Khasi hills), Deccan. Elsewhere : China.

Key to the genera of the Division Evagorasaria

1(2) Anterior tibiae simple, not inwardly spined before apex..... *Epidaus*2(1) Anterior tibiae incurved and spined before apex..... *Rihirbus*Genus 30. *Epidaus* Stål 1859.1859. *Epidaus* Stål, *Ofv. Vet. AK. Forh.* : 193.40. *Epidaus atrispinus* Distant1902. *Epidaus atrispinus* Distant, *Fauna Brit. India*, 2 : 372.*Material examined* : 3 exs., Mawphlang, East Khasi hills, 5.x.1963, S. Biswas Coll.; 1 ex., Lamparing, East Khasi hills, 16.iv.1960, S. N. Prasad Coll.; 1 ex., Umtru forest, East Khasi hills, 6.vii.1979, P. T. Cherian Coll.*Diagnostic characters* : A tawny brown species with legs and abdomen beneath pale luteous, discal and lateral spines to the posterior lobe of pronotum, scutellum black; head with a short erect tubercles behind base of each antenna, first joint of which as long as anterior femora and trochanters together, membrane shiningly brown.*Length* : 21 mm.*Distribution* : Meghalaya (East Khasi hills), Sikkim.

Genus 31. ***Rihirbus*** Stål 18611861. *Rihirbus* Stål, *Stett. ent. Zeit.*, **22** : 129.41. ***Rihirbus trochantericus*** Stål1861. *Rihirbus trochantericus* Stål, *Stett. ent. Zeit.* **22** : 132.1902. *Rihirbus trochantericus* : Distant, *Fauna Brit. India*, **2** : 378.*Material examined* : 1 ex., Tura, West Garo hills, ?, Coll. ?*Diagnostic characters* : A black greyishly sericeous species, sternum and abdomen pale reddish testaceous.*Length* : 18-24 mm.*Distribution* : India : Meghalaya (West Garo hills). Elsewhere : Burma; Philippine islands; Sri Lanka.

Division Panthousaria

Genus 32. ***Panthous*** Stål, 18631863. *Panthous* Stål, *Ann. Soc. Ent. Fr.* : 42.42. ***Panthous excellens*** Stål1863. *Panthous excellens* Stål, *Ann. Soc. Ent. Fr.* : 42.1902. *Panthous excellens* : Distant, *Fauna Brit. India*, **2** : 379.*Material examined* : 5 exs., Above Tura, West Garo hills (3500-3900), 15.vii.30.viii.1917, Coll. ?*Diagnostic characters* : Generally an ochraceous species, anterior lobe of pronotum, transeverse spots to lateral areas of abdomen beneath and legs black, membrane olivaceously black, femora and tibiae nodulose; rostrum, coxae, trochanters, and bases of femora reddish ochraceous.*Length* : 24-29 mm.*Distribution* : India : Meghalaya (West Garo hills); Assam, Nagaland.

Division Coranusaria

Genus 33. ***Coranus*** Curtis, 18331833. *Coranus* Curtis, *Brit. Ent.*, **10** : 453.Key to the species of the genera *Coranus*

- 1(2) Membrane bronzy fuscous; corium fuscous; antennae brownish ochraceous, abdomen beneath ochraceous; first joint of antennae distinctly shorter than head *spiniscutis*
- 2(1) Membrane brassy black, corium very pale ochraceous; abdomen beneath black; first joint of antennae almost as long as head *fuscipennis*

43. *Coranus fuscipennis* Reut.1881. *Coranus fuscipennis* Reut, *Act. Soc. Sc. Fenn.* **12** : 275.1902. *Coranus fuscipennis* : Distant, *Fauna Brit. India*, **2** : 381.

Material examined : 1 ex., Shillong peak, East Khasi hills, 12.vi.1989, J. R. Dange Coll., 2 exs., Mawphlang, East Khasi hills, 6.ix.1975, S. K. Chandra Coll.

Diagnostic character : Black, postocular area with a central pale longitudinal line; corium pale ochraceous, clavus and membrane brassy black; connexivum above and beneath pale testaceous with transverse piceous spots; femora black, nodulose, scutellum with an erect conical spine, posterior lobe of pronotum densely granulate, first joint of rostrum shorter than second.

Length : 9 to 10 mm.

Distribution : India : Meghalaya (East Khasi hills); Elsewhere : Sumatra.

44. *Coranus spiniscutis* Reuter1881. *Coranus spiniscutis* Reuter, *Act. Soc. Sc. Fenn.*, **12** : 275.1902. *Coranus spiniscutis* : Distant, *Fauna Brit. India*, **2** : 381.

Material examined : 1 ex., Songsok, East Garo hills, 22.ix.1975, N. Muraleedharan Coll.

Diagnostic character : A testaceous fuscous species, head black, antennae brownish ochraceous with first joint and base of second joint luteous; abdomen beneath ochraceous; legs ochraceous with annulations to femora; first joint of antennae distinctly shorter than head; scutellum with an erect conical tuberculous spine.

Length : 9 - 10 mm.

Distribution : India : Meghalaya (East Garo hills), Assam, Bihar. Elsewhere : Burma.

Division Polididusaria

Genus 34. *Forestus* Dist., 1903

1903. *Forestus* Dist., A. M. N. H. (7) II : 251.45. *Forestus typica* (Distant)1902. *Henricohahnia typica* Distant, *Fauna Brit. India*, **2** : 307.1903. *Forestus typica* : Distant, A. M. N. H. **7** (11) : 251.

Material examined : 1 ex., Nongkhyllam Reserve forest, East Khasi hills, 28.x.1983, R. Mathew Coll.

Diagnostic characters : Ochraceous species; membrane, basal and apical joints of antennae, a large spot on fourth and fifth segments on connexivum brownish ochraceous.

Length : 12.5 - 14 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Sikkim.

Genus 35. *Scipinia* Stål

1861. *Scipinia* Stål, *Stett. ent. Zeit.*, **22** : 137 & 138.

46. *Scipinia horrida* (Stål)

1859. *Sinea horrida* Stål, *Freg. eng. Resa. Ins.*, : 262.

1902. *Scipinia horrida* : Distant, *Fauna Brit. India*, **2** : 384.

Material examined : 1 ex., Rongram, East Garo hills, 27.xii.1975, N. Muraleedharan Coll.

Diagnostic characters : An ochraceous species, membrane bronzy; black spots to the connexivum, largest being on fourth and fifth segment; posterior lobe of pronotum granulate, its lateral angle acute; posterior and intermediate femora subnodulose near apex.

Length : 10 mm.

Distribution : India : Meghalaya (East Garo hills), Sikkim; Elsewhere : Burma; Philippines; Sri Lanka.

Division Nabidinaria

Genus 36. *Gropis* Stål 1859

1859. *Gropis* Stål, *Ofv. Vet. AK. Forh* : 377.

47. *Gropis annulatus* Paiva.

1919. *Gropis annulatus* Paiva, *Rec. Ind. Mus.*, **16** : 370.

Material examined : 1 ex., above Tura, West Garo hills, 15.Vi.15.vii.1917, C. A. Paiva Coll.

Diagnostic characters : Head, pronotum, scutellum and legs pale luteous; scutellum with a black spot at centre of basal margin, some light brown linear markings on vertex of head; hemelytra fuscous brown; disk of the anterior lobe of pronotum variegated with brown, legs with two large black patches on the outer side of the anterior femora.

Length : 10 mm.

Distribution : India : Meghalaya (West Garo hills).

Genus 37. *Nabis* Latr. 1807

1807. *Nabis* Latr. *Gen.*, **3** : 127.

48. *Nabis assamensis* Paiva

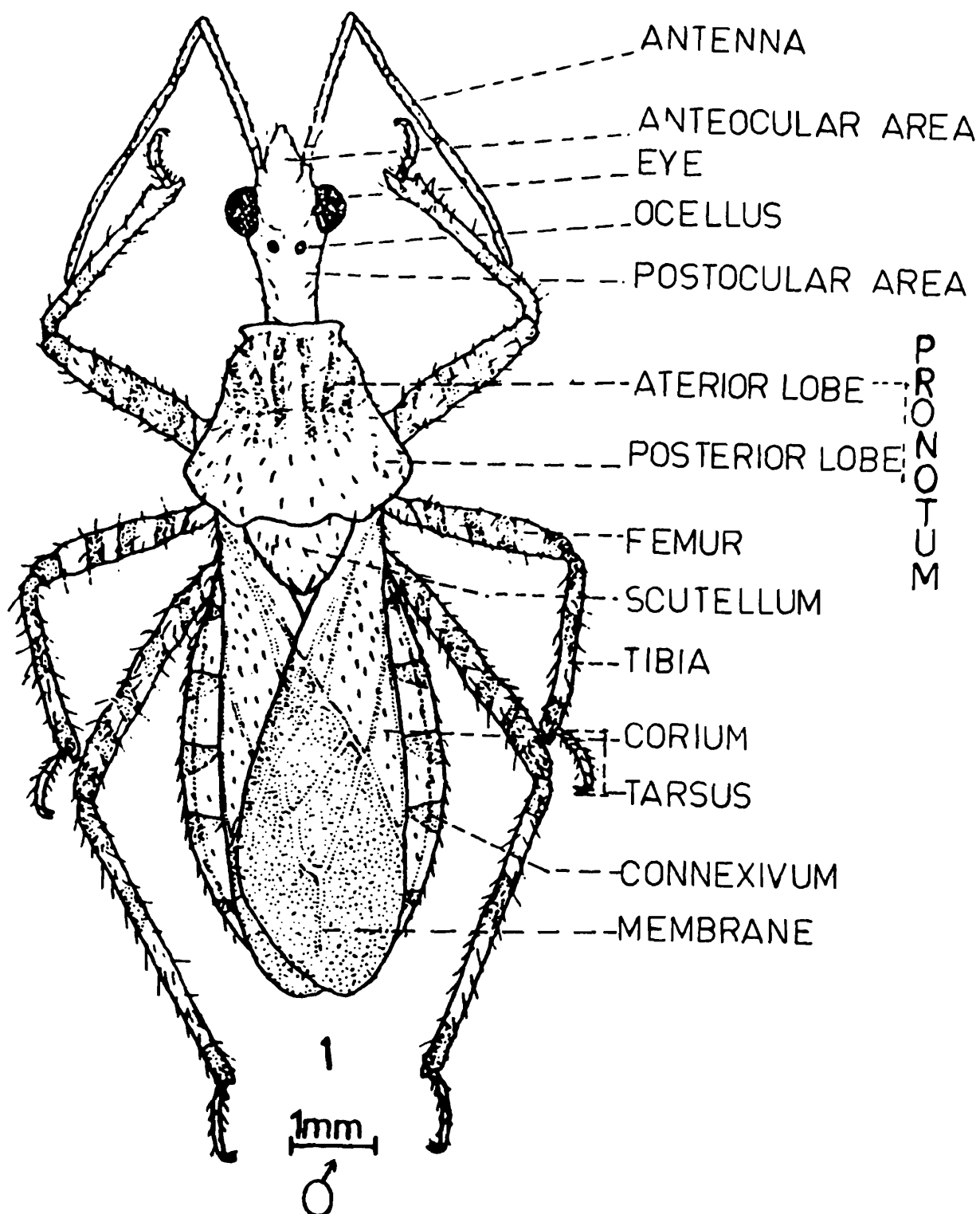
1919. *Nabis assamensis* Paiva, *Rec. Ind. Mus.* **16** : 371.

Material examined : 1 ex., above Tura, West Garo hills, 15.vi. 15.vii.1917, C. A. Paiva Coll.

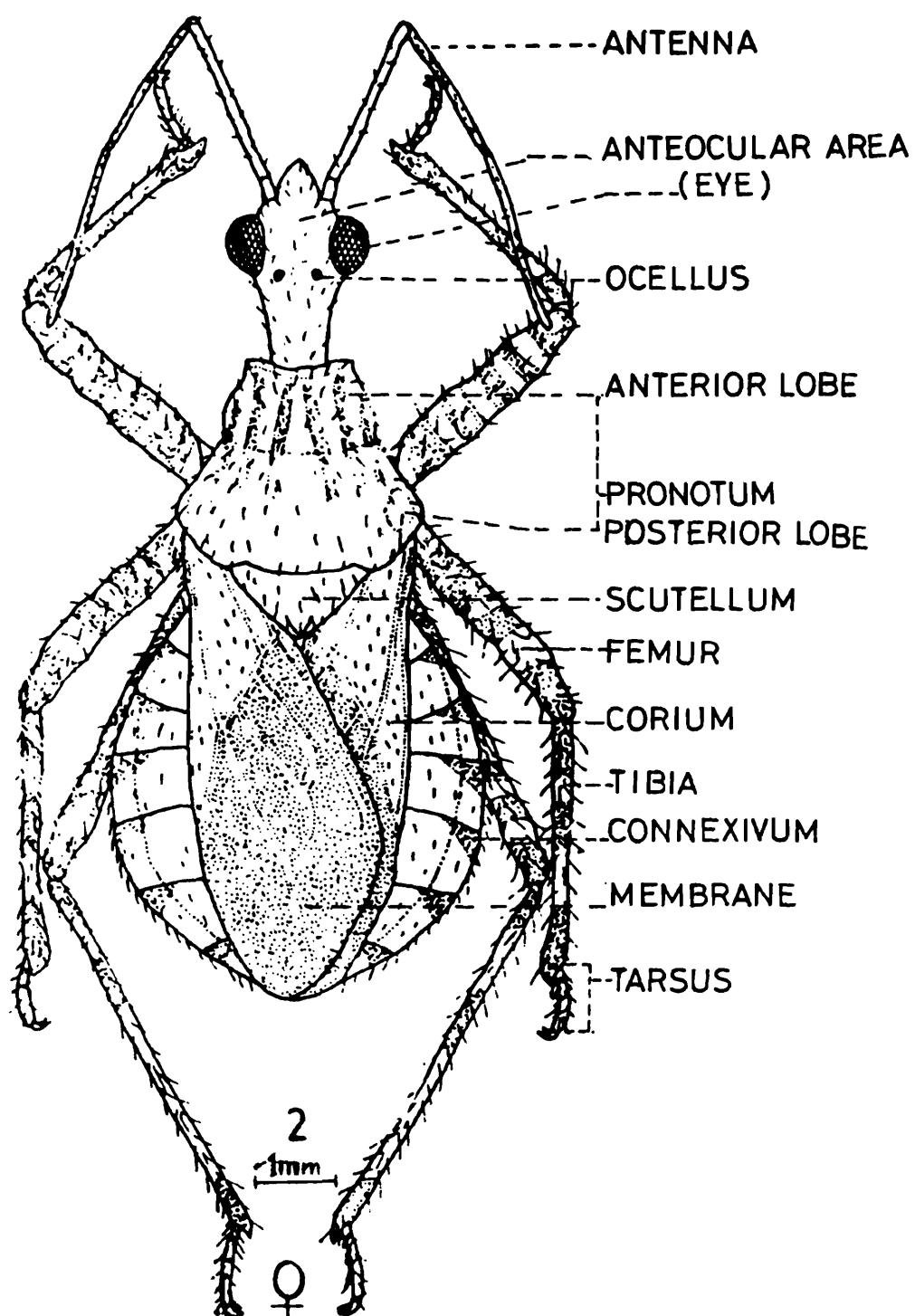
Diagnostic characters : Head fuscous brown, a black 'V' shaped mark on disk extending from anterior margin of eyes to base of head, pronotum with a greyish sericeous patch on disk of the anterior lobe and black elongated spot on the central area of the anterior lobe, connexivum black with transverse ochraceous spots, a small black spot on the disk of corium and another small ochraceous spot on apical margin of membrane.

Length : 9-25 mm.

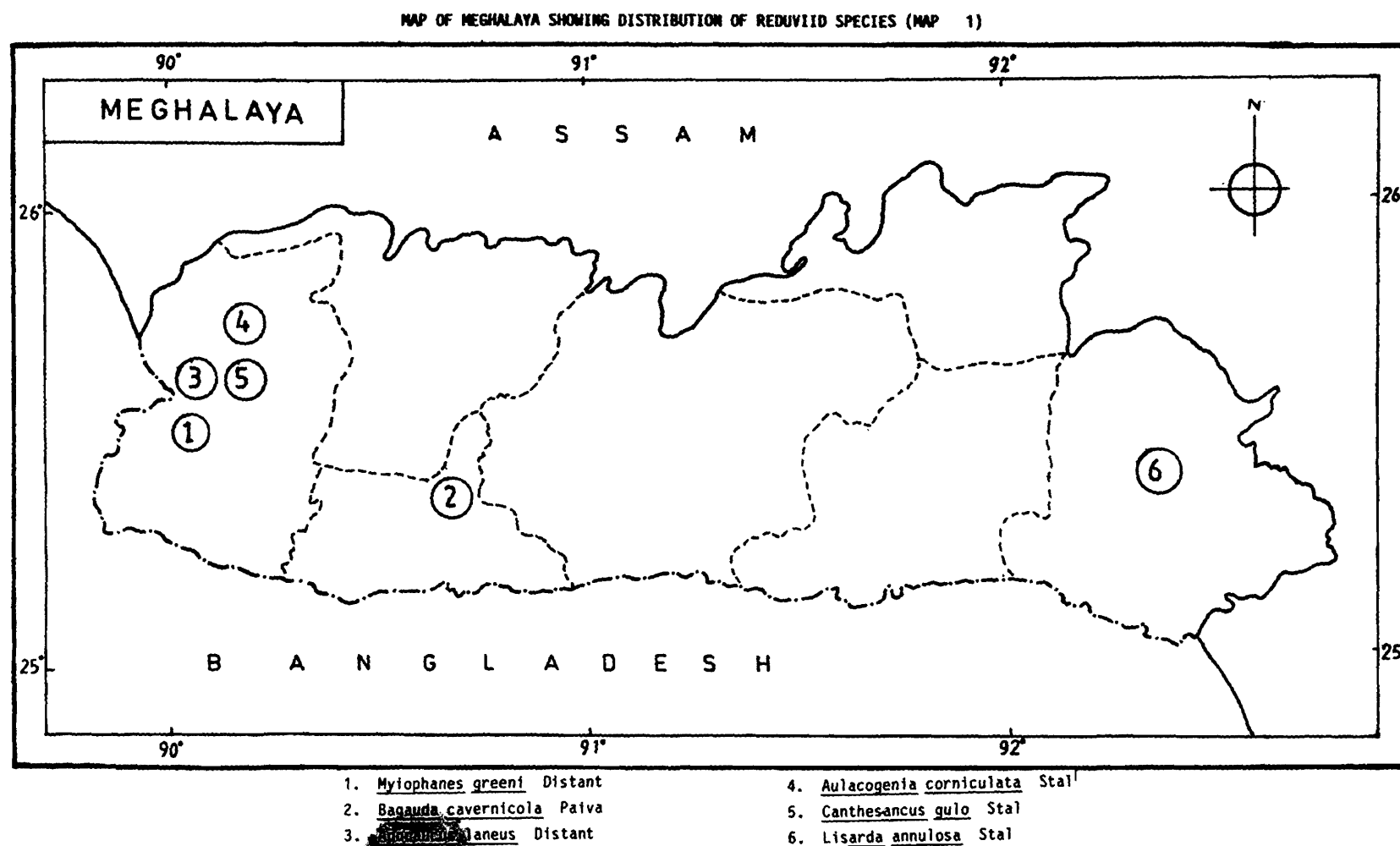
Distribution : India : Meghalaya (West Garo hills).



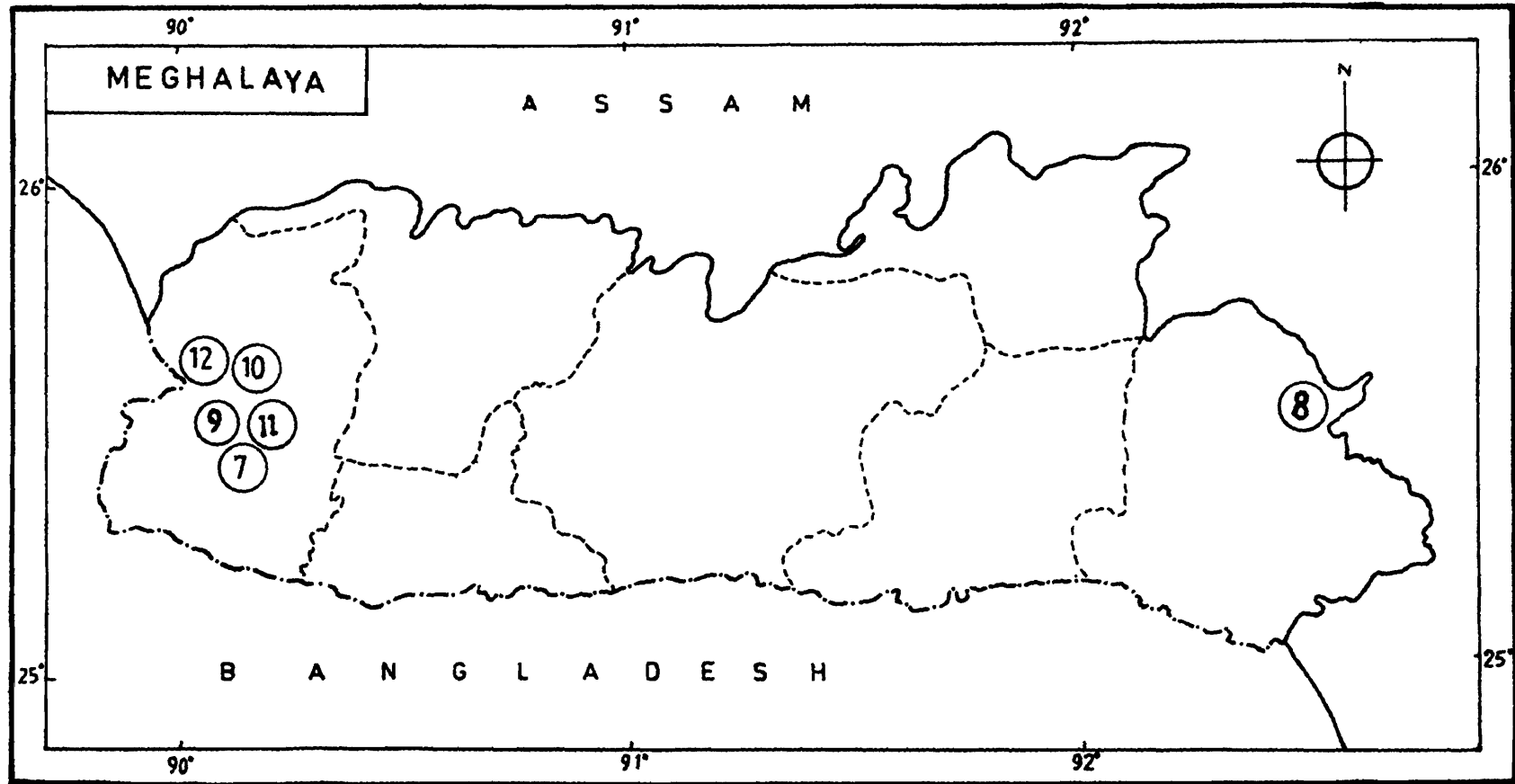
SCHEMATIC DIAGRAM OF A REDUVIID BUG SHOWING
MORPHOLOGICAL TERMINOLOGY USED IN THE TEXT



SCHEMATIC DIAGRAM OF A REDUVIID BUG SHOWING
MORPHOLOGICAL TERMINOLOGY USED IN THE TEXT

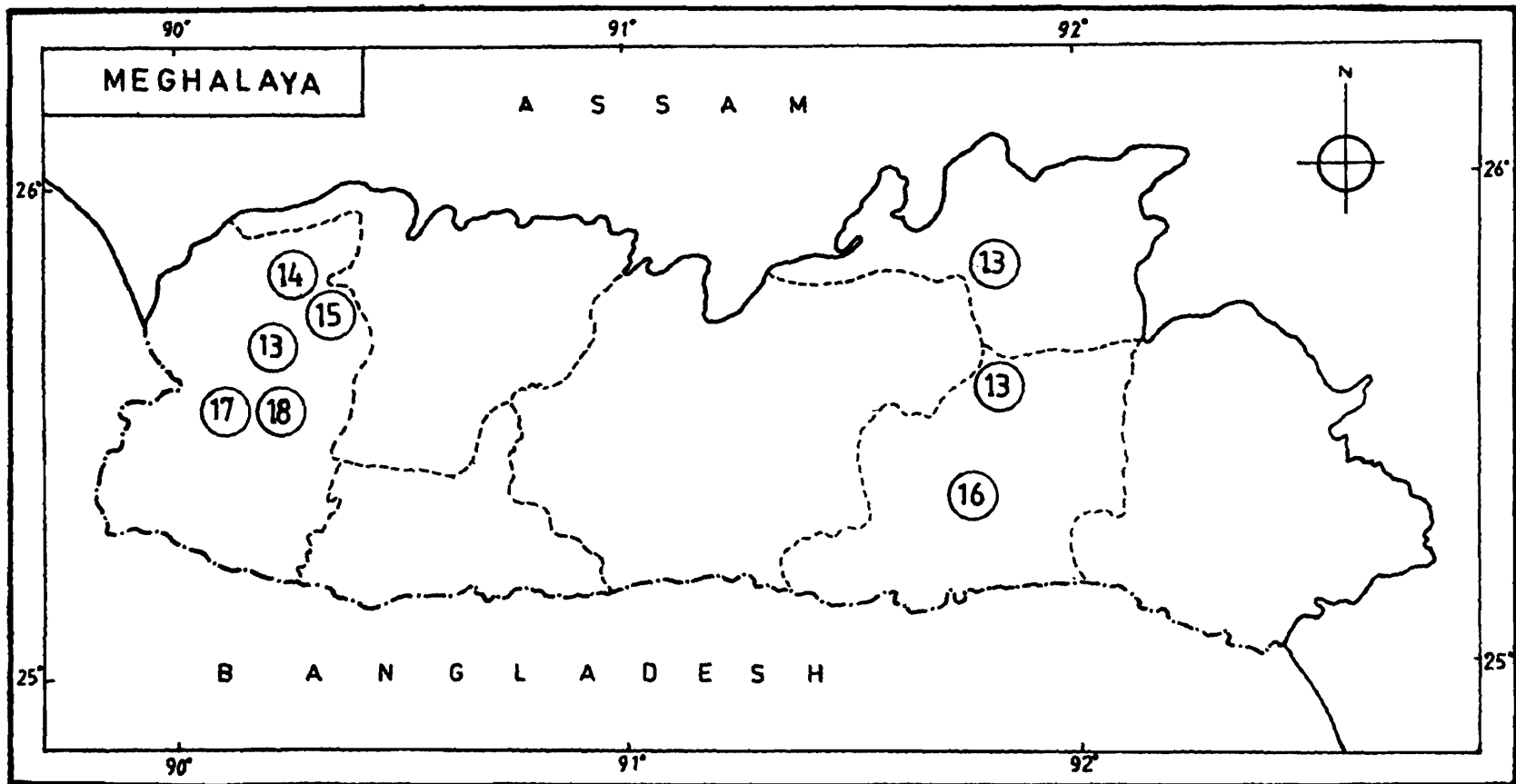


MAP OF MEGHALAYA SHOWING DISTRIBUTION OF REDUVIID SPECIES (MAP 2)



7. <u>Valentia apetala</u> (de Vuill)	10. <u>Epirodera bengalensis</u> Distant
8. <u>Psophis erythraea</u> Stal	11. <u>Epirodera impexa</u> Distant
9. <u>Centrocnemis stali</u> Reuter	12. <u>Acanthaspis helluo</u> Stal

MAP OF MEGHALAYA SHOWING DISTRIBUTION OF REDUVIID SPECIES (MAP 3)



13. Acanthaspis quinquispinosa (Fabricius)

14. Velitra rubropicta (Amy. & Serv.)

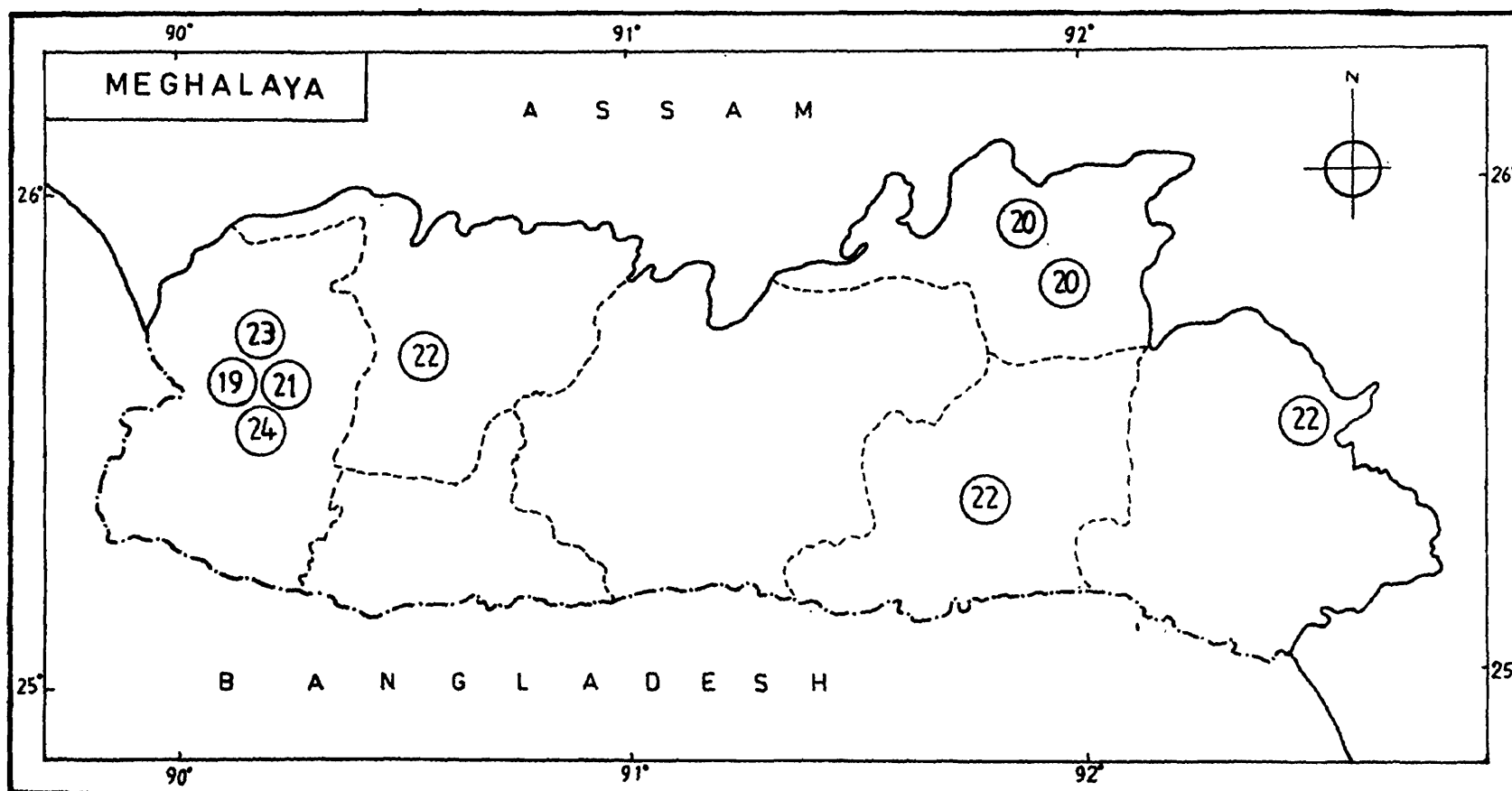
15. Sminthocoris fuscipennis (Stal)

16. Pirates arcuatus Stal

17. Scadra castanea Paiva

18. Scadra fuscicrus Stal

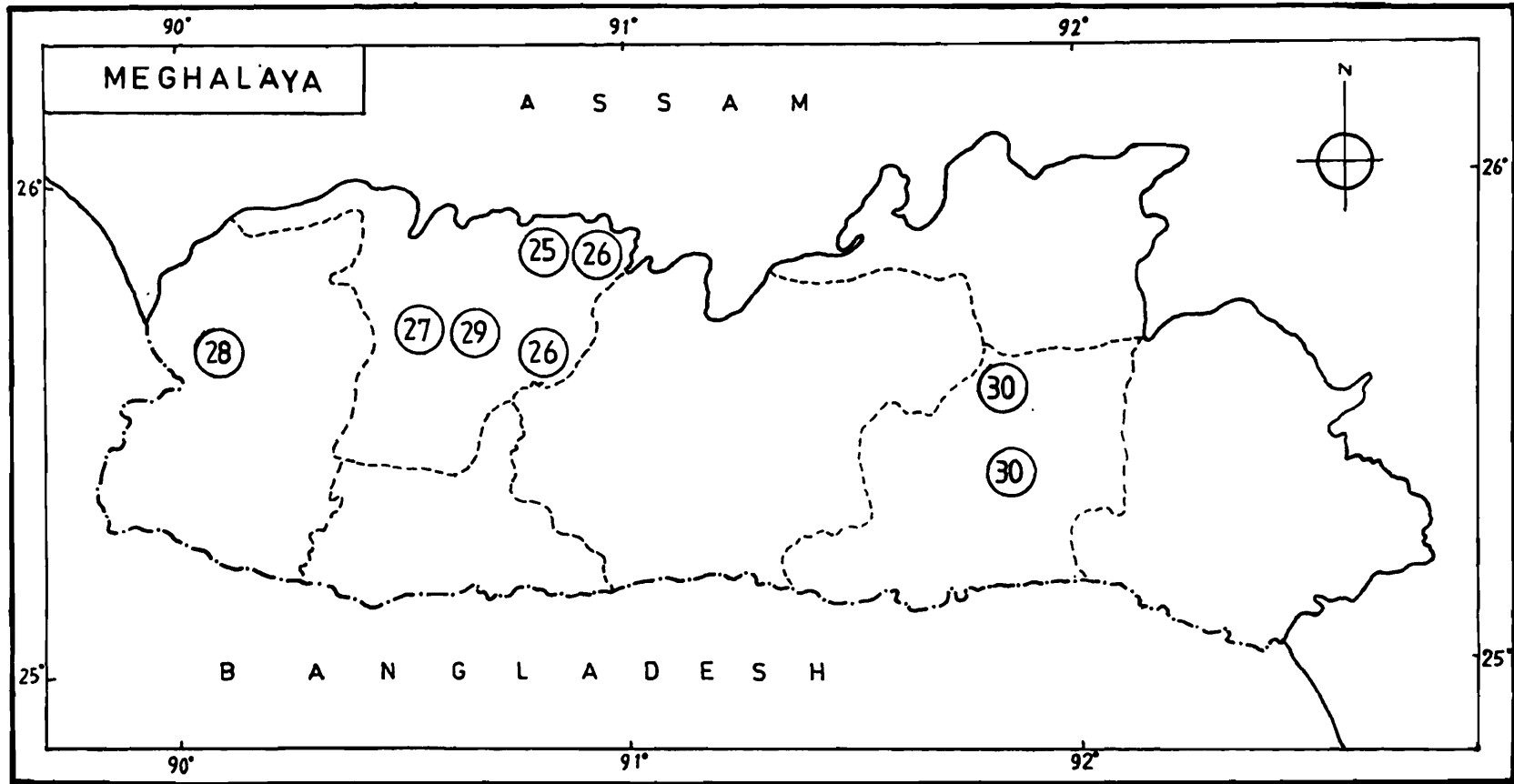
MAP OF MEGHALAYA SHOWING DISTRIBUTION OF REDUVIID SPECIES (MAP 4)



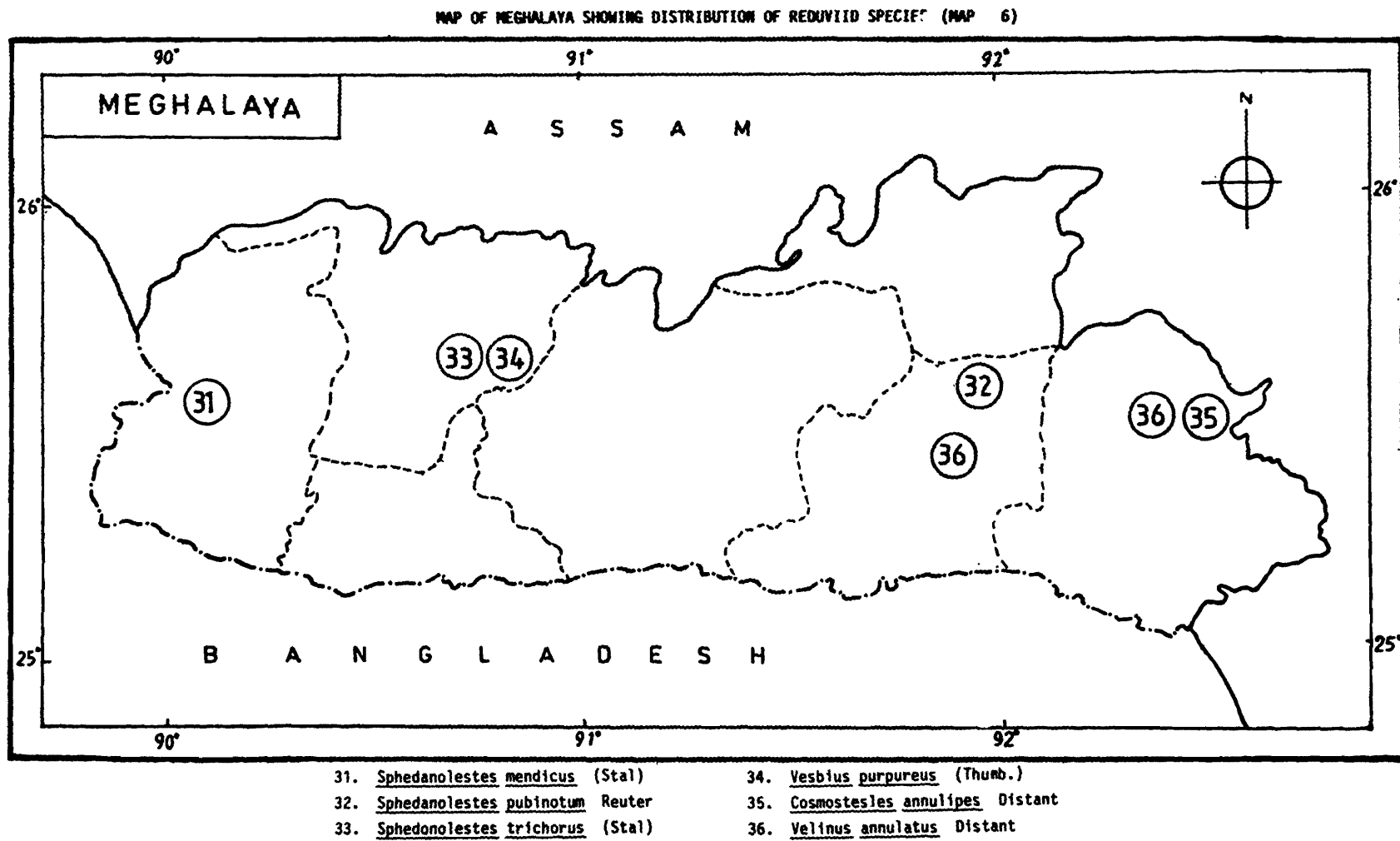
19. *Ectrychotes relatus* Paiva
 20. *Haematorrhophus marginatus* (Reuter)
 21. *Paralivavious singularis* Paiva

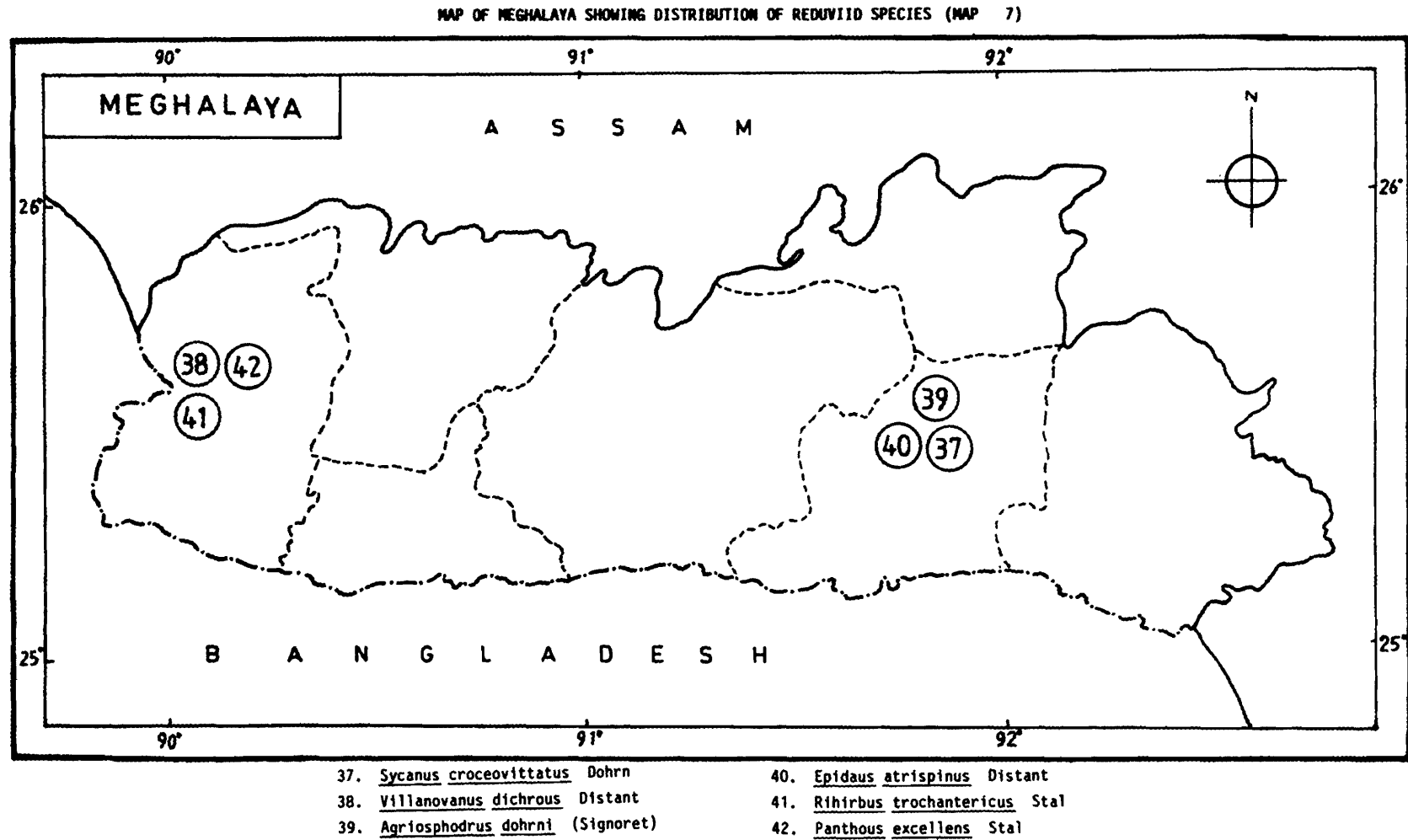
22. *Vilius melamopterus* Stal
 23. *Velocipeda aliena* (Distant)
 24. *Lopocephala guerini* Lap.

MAP OF MEGHALAYA SHOWING DISTRIBUTION OF REDUVIID SPECIES (MAP 5)



25. <u>Rhynocoris costalis</u> (Stal)	28. <u>Rhynocoris nigricollis</u> (Dallas)
26. <u>Rhynocoris fuscipes</u> (Fabricius)	29. <u>Spedanolestes bowringi</u> Distant
27. <u>Rhynocoris marginellus</u> (Fabricius)	30. <u>Spedanolestes indicus</u> Reuter





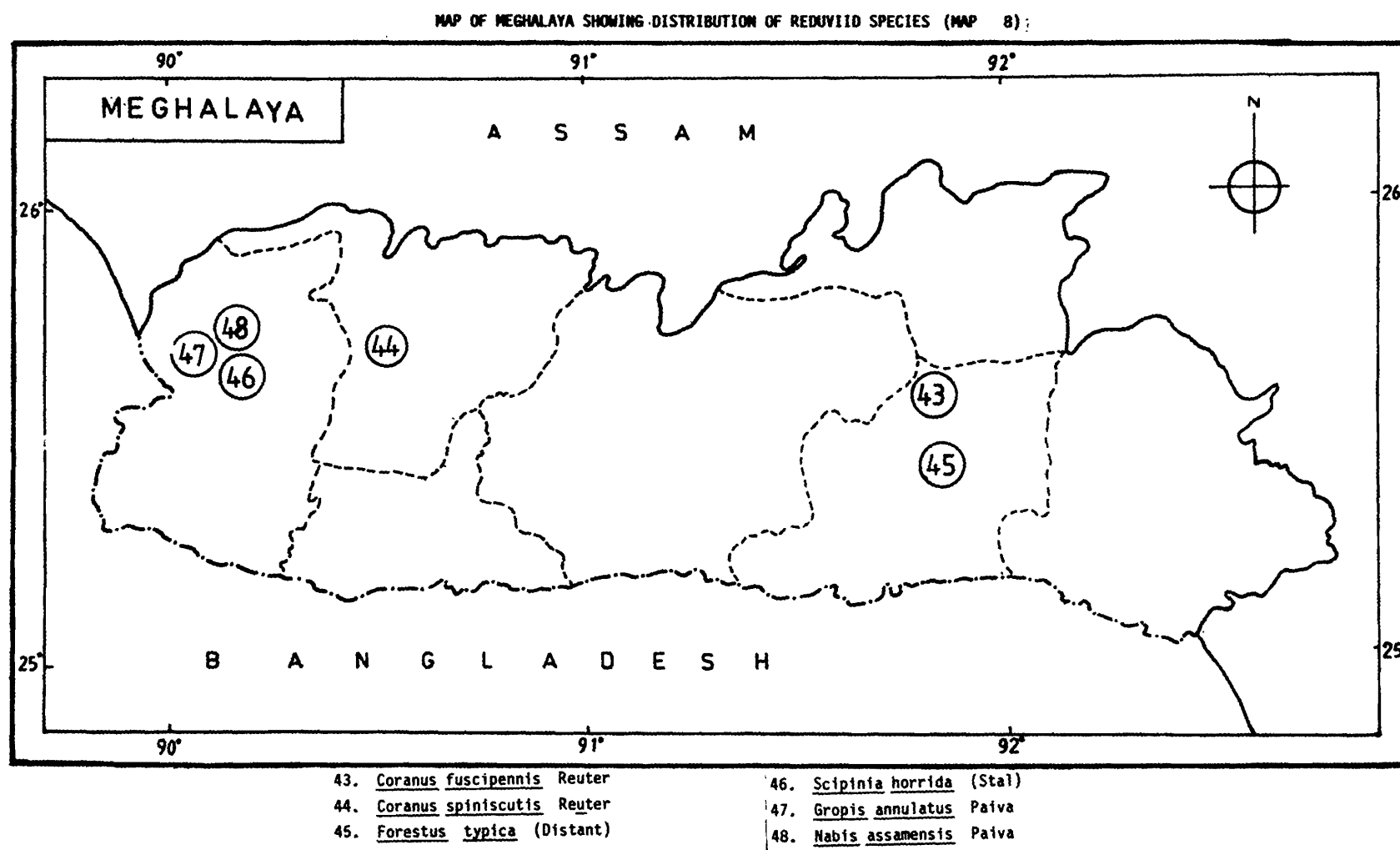


Table - 1. Distribution of the Reduviid species in different districts of Meghalaya.

Name of the species	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	JAINTIA HILLS
1. <i>Myiophanes greeni</i> Distant		+					
2. <i>Bagauda cavernicola</i> Paiva		+					
3. <i>Apocaucus laneus</i> Distant		+					
4. <i>Aulacogenia corniculata</i> Stal		+					
5. <i>Canthesancus gulo</i> Stal		+					
6. <i>Lisarda annulosa</i> Stal							+
7. <i>Valentia apetala</i> (deVeill)		+					
8. <i>Psophis erythraea</i> Stal							+
9. <i>Centrocnemis stali</i> Reuter		+					
10. <i>Epirodera bengalensis</i> Distant		+					
11. <i>Epirodera impexa</i> Distant		+			-		
12. <i>Acanthaspis helluo</i> Stal		+					
13. <i>Acanthaspis quinquespinosa</i> (Fabr.)		+		+	-	+	
14. <i>Velitra rubropicta</i> (Amy. & Serv.)		+					
15. <i>Sminthocoris fuscipennis</i> (Stal)		+				+	
16. <i>Pirates arcautus</i> (Stal)	+			+			
17. <i>Scadra castanea</i> Paiva		+					
18. <i>Scadra fuscicrus</i> Stal		+					
19. <i>Ectrychotes relatus</i> Paiva		+					
20. <i>Haematorrhopus marginatus</i> (Reuter)						+	
21. <i>Paralivavious singularis</i> Paiva		+					
22. <i>Vilius melanopterus</i> (Stal)	+						+
23. <i>Velocipeda aliena</i> (Distant)		+					
24. <i>Lopocephala guerini</i> Lap.		+					
25. <i>Rhynocoris costalis</i> (Stal)	+			+			

Table - 1. Distribution of the Reduviid species in different districts of Meghalaya.

Name of the species	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	JAINTIA HILLS
26. <i>Rhynocoris fuscipes</i> (Fabr.)	+			-	-	-	+
27. <i>Rhynocoris marginellus</i> (Fabr.)	+	-	-	+			-
28. <i>Rhynocoris nigricollis</i> (Dall.)		+	-	-	-	-	-
29. <i>Sphedanolestes bowringi</i> Distant	+		-	-	-	-	-
30. <i>Sphedanolestes indicus</i> Reuter	-	-	-	+	-	-	-
31. <i>Sphedanolestes mendicus</i> (Stal)	-	+	-	-	-	-	-
32. <i>Sphedanolestes pubinotum</i> Reut.	-	-	-	+	-	-	-
33. <i>Sphedanolestes trichorus</i> (Stal)	-	-	-	+	-	-	-
34. <i>Vesbius purpureus</i> (Thumb.)	-	-	-	-	+	-	-
35. <i>Cosmoslestes annulipes</i> Distant	-	-	-	-	-	-	+
36. <i>Velinus annulatus</i> Distant	-	-	-	+	-	-	+
37. <i>Sycanus croceovittatus</i> Dohrn.	-	-	-	+	-	-	-
38. <i>Villanovanus dichrous</i> Distant	-	+	-	-	-	-	-
39. <i>Agriosphodrus dohrni</i> (Sign.)		-	-	-	-	-	-
40. <i>Epidaus atrispinus</i> Distant	-	-	-	+	-	-	-
41. <i>Rihirbus trochantericus</i> Stal	-	+	-	-	-	-	-
42. <i>Panthous excellens</i> Stal	-	+	-	-	-	-	-
43. <i>Coranus fuscipennis</i> Reuter	-	-	-	+	-	-	-
44. <i>Coranus spiniscutis</i> Reuter	+	-	-	-	-	-	-
45. <i>Forestus typica</i> (Distant)	-	-	-	+	-	-	-
46. <i>Scipinia horrida</i> (Stal)	+	-	-	-	-	-	-
47. <i>Gropis annulatus</i> Paiva	-	+	-	-	-	-	-
48. <i>Nabis assamensis</i> Paiva	-	+	-	-	-	-	-

SUMMARY

The paper deals with a consolidated account of 48 species belonging to 37 genera under 10 subfamilies of the family Reduviidae from Meghalaya. Of these, 20 species (marked*) belonging to 18 genera were hitherto unknown from the state. Running keys to the various taxa are incorporated for easy recognition of the group. In addition, general diagnostic characters of each species is provided. The original and recent references and distributional record of each species from India and abroad are also furnished. The study is based on the existing collections as well as mopping survey materials of different survey parties in recent years. The distribution of all 48 species is shown in maps.

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INSECTA : HEMIPTERA : HETEROPTERA : PYRRHOCORIDAE

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INTRODUCTION

Pyrrhocorid bugs are commonly known as 'Cotton Stainers' which is derived from ~~their~~ habit of piercing the bolls and staining the fibre. They are mostly phytophagous in nature and usually inhabit the agricultural fields, bushes, vegetable gardens, crop fields etc.

The species belonging to the genus *Dysdercus* Amyot and Serville are serious pest of cotton and mostly occur in cotton fields.

The family Pyrrhocoridae is primarily tropical and sub-tropical in distribution. The world record of Pyrrhocoridae represents about 360 species belonging to 43 genera. In India, the family is represented by 45 species under 15 genera (Distant 1902, 1910; Mitra *et al.* 1977; Sen *et al.* 1993).

The Pyrrhocorid fauna of Meghalaya is poorly explored. So far, only 14 species belonging to 8 genera are known from the State.

The paper provides a consolidated account of these 14 species under 8 genera. Of these, two species (marked *) constitute new distributional record from the State.

The classification of the family has been mainly adopted after Distant (1904, 1910).

The work is chiefly based on the collections represented in Hemiptera Section, Zoological Survey of India, Calcutta.

SYSTEMATIC ACCOUNT

Family PYRRHOCORIDAE

1. Subfamily Euryopthalminae

1. Genus *Iphita* Stål

1. *Iphita limbata* Stål

2. Genus *Macrocerea* Spinola

***2. *Macrocerea grandis* (Gray)**

3. Genus *Physopelta* Amyot & Serville

3. *Physopelta gutta* Burm.

4. *Physopelta schlanbuschi* Fabricius

2. Subfamily *Pyrrhocorinae*
 4. Genus *Antilochus* Stål
 5. *Antilochus coqueberti* Fabricius
 - *6. *Antilochus russus* Stål
 5. Genus *Dindymus* Stål
 7. *Dindymus lanius* Stål
 8. *Dindymus rubigenosus* Fabricius
 6. Genus *Dysdercus* Amyot & Serville
 9. *Dysdercus evanescens* Distant
 10. *Dysdercus koenigii* (Fabricius)
 7. Genus *Euscophus* Stål
 11. *Euscophus indecorus* (Walker)
 12. *Euscophus rufipes* Stål
 8. Genus *Melamphaus* Stål
 13. *Melamphaus feber* Fabricius
 14. *Melamphaus rubrocinctus* Stål

Family PHRRHOCORIDAE

Diagnosis : Large and robust insects; usually bright in colour, red and black with predominant tints. Ocelli absent; antennae inserted below a line drawn from the centre of the eye to the apex of the face; corium broader, without appendix; membrane generally with four but not with more than five veins; in a few genera hemelytra incomplete, membrane fully developed; This family shows much affinity with Lygaeidae but can be distinguished in the absence of ocelli which is present in Lygaeidae.

Key to the Subfamilies

Sixth ventral segment of female divided on the median line *Euryopthalminae* (= *Larginae*)

Sixth ventral segment of female entire *Pyrrhocorinae*

1. Subfamily Euryopthalminae

Key to Genera of the Subfamily Euryopthalminae

1. Antennae in male long; first joint about twice as long as head and pronotum together *Macroceroea*
 Antennae normal in male, first joint longer than head but shorter than head and pronotum together 2
2. Anterior area of the pronotal disk convex, this convexity not reaching at the anterior margin; lateral margin reflexed *Iphita*

Anterior area of the pronotal disk convex, this convexity reaching at the anterior margin; lateral margin not reflexed ***Physopelta***

1. Genus ***Iphita*** Stål

1870. *Iphita* Stal, *Enum. Hem.* 1 : 91 and 99. Type by subsequent designation *Iphita limbata* Stal

1870. *Iphita limbata* Stal, *Enum. Hem.*, 1 : 99.

1. ***Iphita limbata*** Stål

1870. *Iphita limbata* Stål, *Enum. Hem.*, 1 : 99.

1903. *Iphita limbata* Distant, *Rhynch. Brit. Ind.*, 11 : 96.

1909. *Iphita limbata* Lefroy, *Rec. Indian Mus.* 111 : 325.

1929. *Iphita limbata* Roland F. Hussev. *General Catalogue of Hem.*, 1 : 34.

Material examined : 1 ex., Meghalaya : North Khasi Hills, 27.iii.1957, Coll. B.K. Tikadar.

Diagnosis : Body blackish red, lateral margin of pronotum, corium and base of antennae brownish yellow; pronotum at centre transversely impressed, not well defined; legs reddish.

Length : 18 mm. (Female)

Distribution : India : Meghalaya (North Khasi Hills); West Bengal. Elsewhere : Sri Lanka.

2. Genus ***Macroceres***

1837. *Macroceres* Spinola, *Essai. Ins. Hem.* : 177. Type by original designation.

1832. *Lygaeus grandis* Gray, In. *Griffith Ins. Anim. Kingd XV Ins* : 242.

2. ***Macroceres grandis*** (Gray)

1832. *Lohita grandis* Gray, In. *Griffith Ins. Anim. Kingd XV* : 242.

1913. *Macroceres grandis* Bergroth, *Mem. Soc. Ent. Belg.*, XXII : 166.

Material examined : 1 ex., India : Meghalaya, Shella, Khasi Hills, 22.ix.1972, Coll. A.K. Ghosh.

Diagnostic character : Body red. Pronotum and scutellum reddish in colour. Central to clavus area with elongate spots and large rounded spots different in size at inner angle of corium. Leg black.

Length : 30 mm. (Female)

Distribution : India : Meghalaya (Khasi Hills); Assam; West Bengal. Elsewhere : Philippines.

3. Genus ***Physopelta*** Amyot and Serville

1843. *Physopelta* Amyot and Serville, *Hemip.* : 271. Type by original designation, *Physopelta albofasciata* (De Geer)

1773. *Cimex albofasciatus* De Geer, *Mem. Hist. Ins.*, 111 : 335.

Key to the species of the genus ***Physopelta***

Body reddish ochraceous, a discal rounded black spot at the middle of the corium, paramere weakly bifid with inner arm narrower than outer ***gutta***

Body sanguineous, a dot like black spot at the middle of the corium, paramere deeply bifid, with dissimilar arms ***schlanbuschi***

3. *Physopelta gutta* (Burmeister)

1843. *Lygaeus gutta* Burmeister, *Nova. Acta Acad. Leop. Carot.*, XVI, Suppl : 425.

1903. *Physopelta gutta* Distant, *Fauna Brit. India*, II : 97.

1927. *Physopelta gutta* Taeuber, *Konowia.*, VI : 174.

Material examined : 4 exs., India, Meghalaya, Garam pani, Jaintia Hills, 22.v.1990, M. S. Shisodia 1 ex, Cherrapunji 3.iv.1991, Coll. S.K. Ghosh; 1 ex., Shillong, 28.x.1972, Coll. R.S. Giri.

Diagnostic characters : Body pale reddish brown in colour; head with a spot at base; pronotum, scutellum and base of corium reddish in colour and with a discal round black spot; antennae reddish in colour; body pilose.

Length : 16 mm. (Female)

Distribution : India : Meghalaya (Jaintia Hills, Cherrapunji, Shillong); Assam; West Bengal. Elsewhere : Australia, Burma, China, Ceylon, Java, Japan, Philippines, Sumatra.

4. *Physopelta schlanbuschi* (Fabricius)

1789. *Cimex slanbuschi* Fabricius, *Mant. Ins.*, 11; 299.

1903. *Physopelta schlanbuschii* : Distant, *Fauna Brit. India*, 11 : 99.

1909. *Physopelta schlanbuschii* : Lefroy, *Rec. Indian Mus.*, 111 : 325.

Material examined : 4 exs., Meghalaya, Garo Hills, Resa, 19.ii.1975, Coll. S. Biswas; 2 exs., Meghalaya, Garo Hills, Phulbari, 11.iii.1991, Coll. H.C. Ghosh.

Diagnostic characters : Body blood red in colour, at posterior lobe of pronotum with two large transverse spots and at posterior a rounded area punctate; spot on scutellum to corium sternal with a lateral series of transverse linear spots; antennae pilose.

Length : 15 mm. (Female)

Distribution : India : Meghalaya (Garo Hills); Assam; West Bengal. Elsewhere : Burma, China, Hong Kong, Formosa, Penang, Tenasserim.

Remarks : This species damages rice crops.

2. Subfamily Pyrrhocorinae

Keys to genera of Pyrrhocorinae

1. Apical angle of corium elongately acute..... ***Dysdercus***
- Apical angle of corium more or less rounded, not elongately acute 2
2. Head transversely constricted or impressed beneath near base ***Antilochus***
- Head not transversely constricted or impressed beneath 3
3. Anterior area of pronotum completely circumscribed by continuous impression or punctures ***Euscopus***
- Anterior area of pronotum not or incompletely circumscribed by continuous impression or punctures.....4
4. Lateral margins of pronotum acute, strongly reflexed..... ***Dindymus***
- Lateral margins of pronotum rarely reflexed ***Melamphaus***

4. Genus *Antilochus* Stål1863. *Antilochus*, Stål Berlin. Ent. Zritsch., VII : 394. Type by original designation.1784. *Cimex augur* Fabricius Thunberg. Nova, Ins. Spec., III : 58.

Key to species

Pronotum with two transverse series of punctures and at base of scutellum with transverse series of punctures *russus*Pronotum without transverse series of puncture; at base scutellum without transverse series puncture *coqueberti*5. *Antilochus coqueberti* (Fabricius)1784. *Cimex augur* Fabricius, Thunberg. Nova, Ins. Spec., III : 58.1903. *Antilochus coqueberti* : Distant, Fauna Brit. India, II : 101.1926. *Antilochus coqueberti* : Esaki, Ann. Mus. Nat. Hung. XXIV : 158.*Material examined* : 2 exs., Meghalaya, Rongrois, Phedbon, Garo Hills, 12.ii.71, Coll K.P. Singh.*Diagnostic characters* : Head blood red in colour; antennae, membrane black; apical margin of membrane pale brownish; pronotum at anterior margin black, obscurely punctate; corium thickly punctate; anterior femoral spine present.*Length* : 15 mm. (Female)*Distribution* : India : Meghalaya (Garo Hills), Andaman Islands, Assam, Jammu & Kashmir, Nagaland, West Bengal. Elsewhere : Burma, Sri Lanka.6. *Antilochus russus* Stål1863. *Antilochus russus* Stål, Berlin. Ent. Zritsch., VII : 394.1903. *Antilochus russus* : Distant, Fauna Brit. India, II : 101.*Material examined* : 1 ex., Meghalaya, Khasi Hills, Date and Coll. ?*Diagnostic characters* : Body reddish brown, membrane yellowish brown, pronotum transversely punctate and strongly angulated; scutellum at base of membrane, corium thickly punctured, apices of anterior femora spined.*Length* : 18 mm. (Female)*Distribution* : India : Meghalaya, (North Khasi Hills), Assam, Sikkim. Elsewhere : Bhutan, Tenasserim.5. Genus *Dindymus* Stål1861. *Dindymus* Stål Qfv. Vet. AK. Forh., : 196. Type by original designation *Dindymus bicolor* (Herre-Sch.).1842. *Dindymus bicolor*, (Herre-Sch.), Wanz., VI : 27.

Key to species

Hemelytra broadly subovate; pronotum at anterior area defined by coarse black punctures *lanius*

Hemelytra elongated; pronotum at anterior area without punctures *rubiginosus*

7. *Dindymus lanius* Stål

1863. *Dindymus lanius* Stål, *Berlin. Ent. Zeitschr.*, VII : 401.

1903. *Dindymus lanius* : Distant, *Fauna Brit. India*, II : 110.

Material examined : 1 ex., Meghalaya, North Khasi Hills, Date and Coll. ?

Diagnostic characters : Body blackish red; a large discal black spot at membrane, basal margin of scutellum, base of abdomen and legs black; lateral margin of pronotum reddish, anterior area of pronotum coarse black puncture and posterior part of pronotum sparingly punctate, corium finely and thickly punctate. abdomen blackish red.

Length : 17 mm. (Female)

Distribution : India : Meghalaya (Khasi Hills), Assam. Elsewhere : Burma, Karennee.

8. *Dindymus rubiginosus* Fabricius

1787. *Cimex rubiginosus* Fabricius, *Mant. Ins.*, II : 301.

1903. *Dindymus rubiginosus* : Distant, *Fauna Brit. India*, II : 111.

1962. *Dindymus rubiginosus* : Esaki, *Ann. Mus. Nat. Hung.*, XXIV : 158.

Material examined : 1 ex., Meghalaya : Khasi Hills (North).

Diagnostic characters : Body reddish with brownish tinge, membrane with a large black spot; abdomen, legs black; Posterior parts of three sternal segments creamy white; basal margin of pronotum and membrane pale blackish red; basal area of abdomen black.

Length : 14 mm. (Female)

Distribution : India : Meghalaya (Khasi Hills), Assam. Elsewhere : Burma, Karnnee, Malewoon, Malabar, Margherita, Palon, Sadiya, Tenasserim, Thagata.

6. Genus *Dysdercus* Amy. & Serv.

1843. *Dysdercus* Amy. & Serv. *Hem.* : 272. Type by original designation *Dysdercus cingulatus* Fabricius.

1775. *Cimex cingulatus* Fabricius, *Sys. Ent.*, : 19.

Key to species

Present a transverse line which connect the area of each eye. Pronotum and corium punctate *koenigii*

Absent a transverse line which connect area of each eyes. Pronotum and corium thickly punctate *evanescens*

9. *Dysdercus evanescens* Distant

1902. *Dysdercus evanescens* Distant, *Ann. Mag. Nat. Hist.*, 7 : 43.

1909. *Dysdercus evanescens* : Lefroy, *Rec. Indian Mus.*, III : 326.

Material examined : 1 ex., Meghalaya, Rongrongir, Garo Hills, 11.xi.1978, Coll. K.P. Singh; 1 ex., Phedbon, Garo Hills, 12.ii.1971, Coll. M. Yazdani.

Diagnostic characters : Body pale brownish; head, pronotum and scutellum reddish brown; a transverse line present between eyes; pronotum thickly punctate; abdominal segment reddish brown and abdominal margin black; membrane pale brownish.

Length : 19 mm. (Female)

Distribution : India : Meghalaya (Garo Hills). Assam, 'Bengal', Bor ghat, Sikkim. Elsewhere : Burma, Karennee.

10. *Dysdercus koenigii* (Fabricius)

1775. *Cimex koenigii* Fabricius, *Sys. Ent.*: 720.

1914. *Dysdercus koenigii* Bergroth, *Ent. Mitt.*, III : 335.

Material examined : 11 exs., Meghalaya : Garo Hills; 4 exs., Donura; 2 exs., Wagease; 2 exs., Rongrongiri, 1 ex., I.B. Rongran; 1 ex., Resu; 1 ex., Sunsak R.F., 23.IX.73 to 17.XI.73, Coll. S. Biswas; 3 exs., Fruit garden; Shillong, 3.iii.59 to 10.iii.59, Coll. A.P. Kapur.

Diagnostic characters : Body ochraceous; anterior pronotal callosity and lateral margin of pronotum reddish; scutellum, membrane and legs black in colour; abdominal segments, spot of coxae creamy white.

Length : 14 mm. (Female)

Distribution : India : Meghalaya (Garo Hills, Shillong); Assam, Karnataka,, Nicobar Islands, West Bengal. Elsewhere : Bhamo, Burma, Ceylon, Hougndaran, Kamorta, Minhla, Metaja.

7. Genus *Euscopus* Stal

1870. *Euscopus* Stal, *En. Hem.*, 1 : 102 & 106. Type by original designation *Euscopus rufipes* Stal

1870. *Euscopus rufipes* Stal, *Enum. Hem.*, 1 : 106.

Key to species

- Anterior femora with two distinct spines beneath near apex *indecorus*
- Anterior femora without distinct spines beneath near apex *rufipes*

11. *Euscopus indecorus* (Walker)

1872. *Pyrrhocoris indecorus* Walker, *Cat. Heter.*, V : 172.

1902. *Euscopus indecorus* Distant, *Ann. Mag. Nat. Hist.*, IX : 37.

1909. *Euscopus indecorus* : Lefroy, *Rec. Indian Mus.*, III : 326.

Material examined : 1 ex., Meghalaya : North Khasi Hills. Date and Coll. ?

Diagnostic characters : Body reddish black; lateral and posterior margin of pronotum brownish yellow; a small spot present at apical margin of corium; membrane dark reddish paler at its apical margin; a round black spot present at lateral margin of abdomen; coarse of series punctures present transversely at pronotum; two distinct spines present at apex of femora.

Length : 8.5 mm. (Female)

Distribution : India : Meghalaya (North Khasi Hills), Assam. Elsewhere : Bhamo, Ceylon, Teinzo.

12. *Euscopus rufipes* Stål

1870. *Euscopus rufipes* Stål, *Enum. Hem.*, 1 : 106.

1903. *Euscopus rufipes* : Distant, *Fauna Brit. India*, II : 106.

1925. *Euscopus rufipes* : China, *Ann. Mag. Nat. Hist.*, (9) XVI : 463.

Material examined : 1 ex., Meghalaya : North Khasi Hills.

Diagnosis characters : Body black; apex of scutellum blackish red, valvus area with a black round spot; apical margin of membrane with reddish disk of pronotum; scutellum and corium thickly punctate; posterior part of pronotum more coarsely punctate; legs blackish red.

Length : 10 mm. (Female)

Distribution : India : Meghalaya (North Khasi Hills), Assam. Elsewhere : Burma, Java, Karennee, Pulo Laut, Yunnan.

8. Genus *Melamphaus* Stål

1868. *Melamphaus* Stål, *Hem. Fabr.*, 1 : 83. Type by original designation *Melamphaus feber* (Fabricius)

1787. *Cimex faber* Fabricius, *Mant. Ins.* : 297.

Key to species

Lateral margin of pronotum acute. Rostrum extending to near middle of abdomen *faber*

Lateral margin of pronotum reflexed. Rostrum not extending to near middle of abdomen
..... *rubrocinctus*

13. *Melamphaus feber* (Fabricius)

1903. *Melamphaus feber* : Distant, *Fauna Brit. India*, II : 107.

1905. *Melamphaus feber* : Breddin, *Mitt. Naturhist. Mus. Hamburg*.

Material examined : 2 exs., Meghalaya, Nongal, East Garo Hills, 28.v.1990, Coll. M.S. Shisodia and party.

Diagnostic characters : Head blood reddish in colour; posterior area of pronotum, scutellum and membrane black; two black spots at base of sternal sutures and four black spots present at lateral segment of abdomen; apical margin of corium with brownish spot; antennae black.

Length : 26 mm. (Female)

Distribution : India : Meghalaya (East Garo Hills), Assam, West Bengal. Elsewhere : Burma, Borneo, Ligo, Malacca, Palawan, Pulo Candor, Philippines.

14. *Melamphaus rubrocinctus* Stål

1870. *Melamphaus rubrocinctus* Stål, *Enum. Hem.*, 1 : 108.

1903. *Melamphaus rubrocinctus* Distant, *Fauna Brit. India*, II : 108.

Material examined : 1 ex., Meghalaya : Garampani, Jaintia Hills, 22.v.90, Coll. M.S. Shisodia.

Diagnostic characters : Head brownish red, with small spot at base; pronotum, scutellum, corium, membrane pitchy black; two oblique reddish fasciae present at lateral and posterior margin of pronotum; apical margin of membrane smoky brown.

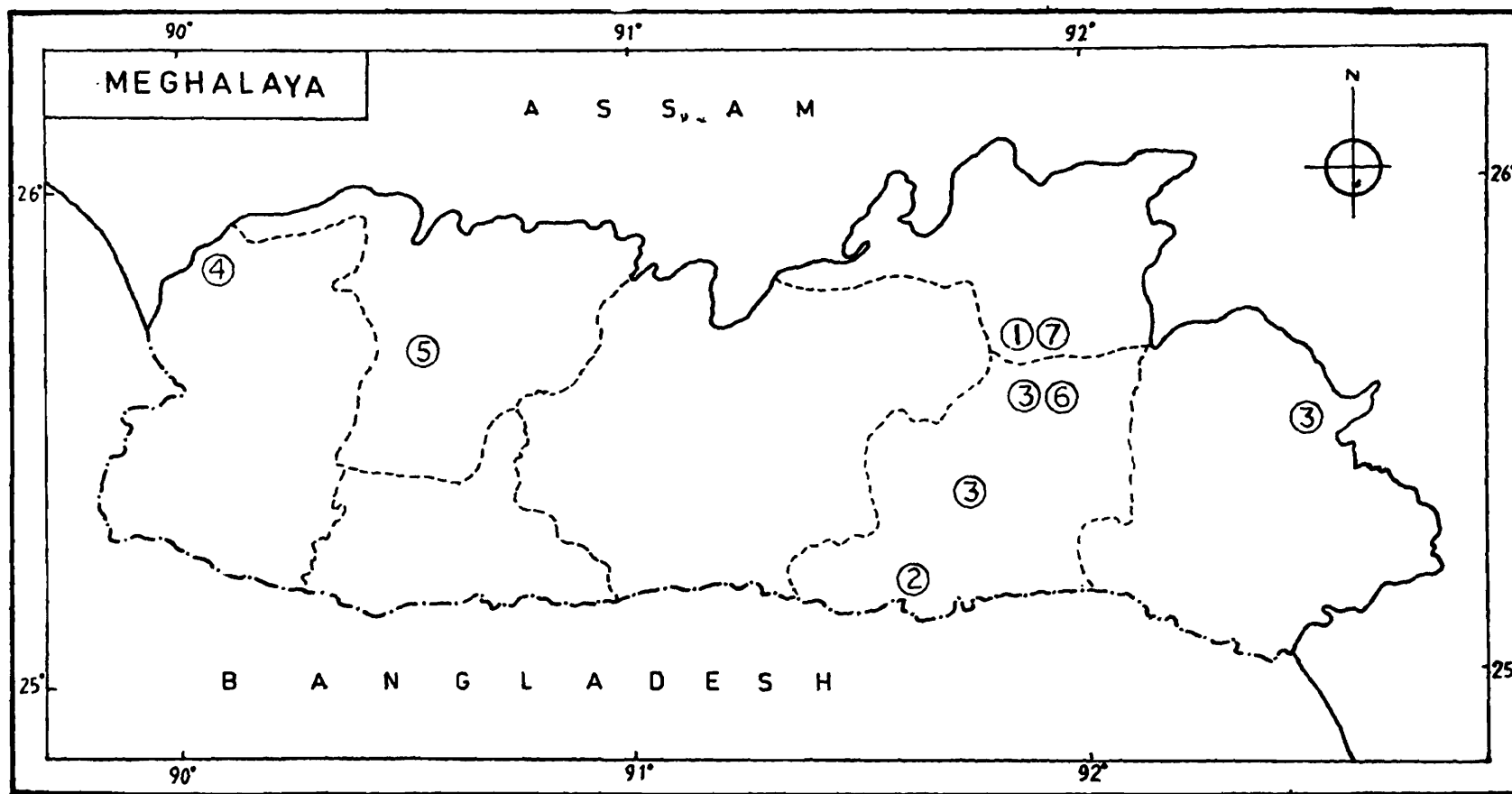
Length : 22 mm. (Female)

Distribution : India : Meghalaya (Khasi Hills, Jaintia Hills), Assam. Elsewhere : Burma, Karennee, Margherita.

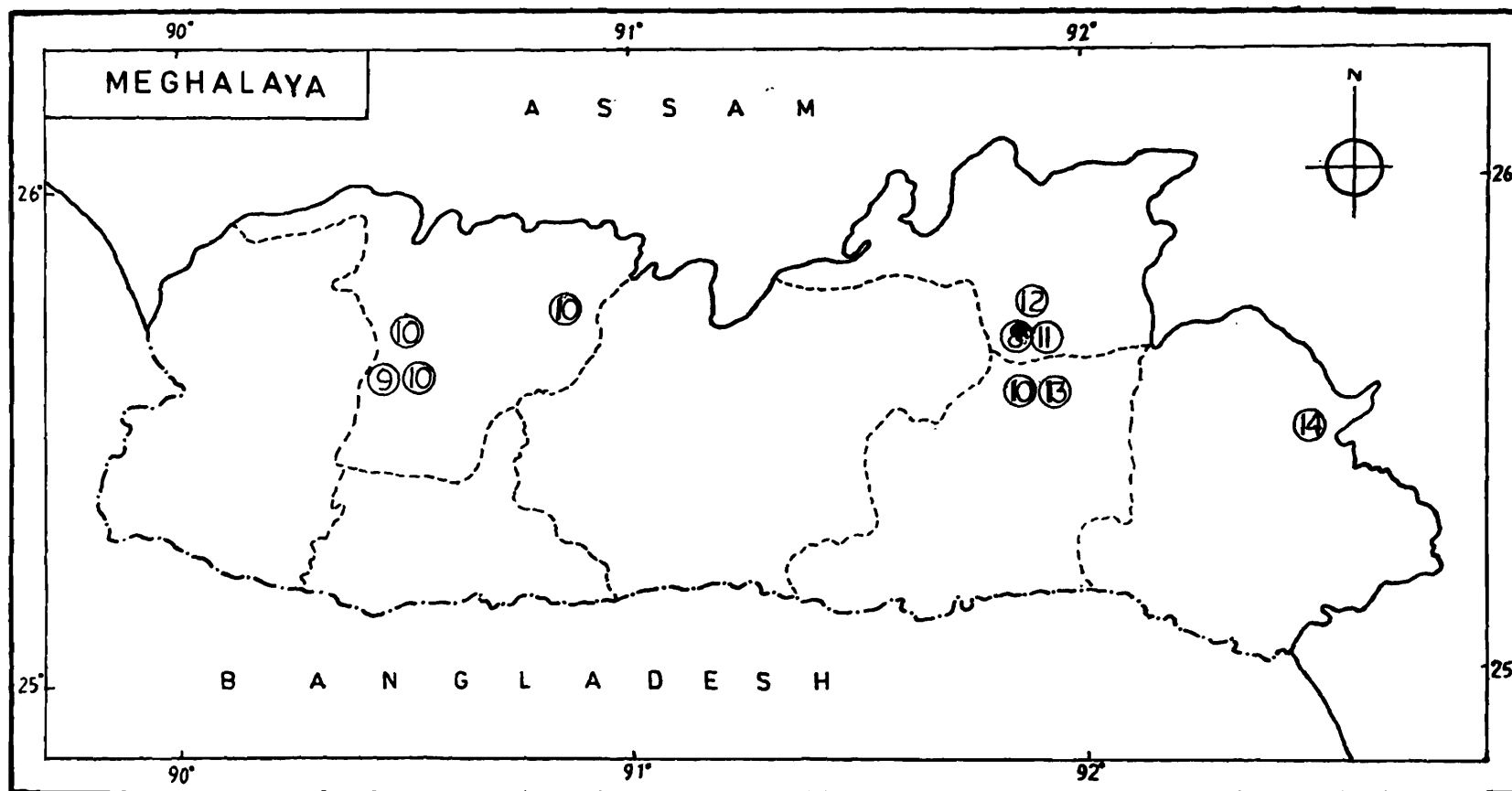
Table - 1. Distribution of Pyrrhocoridae in different districts of Meghalaya.

Name of the species	West Garo hills	East Garo hills	South Garo hills	West Khasi hills	East Khasi hills	Jayantia hills	Rivoi
	1	2	3	4	5	6	7
1. <i>Iphita limbata</i> Stal	-	-	-	-	+	-	
2. <i>Macrocerea grandis</i> (Gray)	-	-	-	-	+	-	-
3. <i>Physopelta gutta</i> Burm.	-	-	-	-	+	-	
4. <i>Pysopelta schlanbuschi</i> Fabricius	+	-	-	-	-	-	
5. <i>Antilochus cogueberti</i> Fabricius		+	-	-	-	-	-
6. <i>Antilochus russus</i> Stal	-	-	-	-	+		
7. <i>Dindymus lanius</i> Stal	-	-	-	-	+	-	-
8. <i>Dindymus rubigenosus</i> Fabricius	-	-	-		+	-	-
9. <i>Dysdercus evanescens</i> Distant	-	+	-	-	-	-	
10. <i>Dysdercus koenigii</i> (Fabricius)	-	+	-	-	-	-	-
11. <i>Euscophus indecorus</i> (Walker)	-	-	-	-	+	-	-
12. <i>Euscophus rufipes</i> Stal	-	-	-	-	+	-	-
13. <i>Melamphaus feber</i> Fabricius	-	-	-	-	+	-	
14. <i>Melamphaus rubrocinctus</i> Stal	-	-	-	-	-	+	-

MAP-1. SHOWING DISTRIBUTION OF THE SPECIES OF PYRRHOCORIDAE

1. Iphita limbata Stål2. Macroceres grandis (Gray)3. Physopelta gutta Burm.7. Dindymus lanius Stål4. Physopelta schlanbuschi Fabricius5. Antilochus coqueberti Fabricius6. Antilochus rufus Stål

MAP-2. SHOWING DISTRIBUTION OF THE SPECIES OF PYRRHOCORIDAE



8. Dindymus rubigenosus Fabricius

9. Dysdercus evanescens Distant

10. Dysdercus koenigi (Fabricius)

11. Euscophus indecorus (Walker)

12. Euscophus rufipes Stal

13. Melamphaus feber Fabricius

14. Melamphaus rubrocinctus Stal

SUMMARY

The paper presents an accounts of 14 species belonging to 8 genera under 2 subfamilies of the family Pyrrhocoridae from Meghalaya. Of these, 2 species (marked *) constitute new locality records from the state. Running keys to various taxa are incorporated for easy identification of the group. General diagnosis of the species (not included in the key) is given. Also, distribution of each species in India and elsewhere is provided. The study is based on the existing collections as well as mopping survey material of Zoological Survey of India parties in the recent years.

ACKNOWLEDGEMENTS

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INSECTA : HEMIPTERA : FULGOROIDEA

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Fulgorids, usually known as 'Lantern flies', are principally characterised by reticulated anal area of the wing. The group is abundant in tropical regions and also found in temperate zones.

A perusal of literature reveals that about 430 species of Fulgoroidea are known from India as against world fauna of nearly 6521 species. In India, earlier contributions are made by Distant (1908, 1916), Paiva (1918), Menon and Prasad (1962), Chopra (1976), Dutta and Pramanick (1977), Dutta and Ghosh (1979).

Our knowledge of Fulgorid fauna of Meghalaya is at present inadequate. So far, only 20 species belonging to 16 genera under 5 subfamilies are known from the State.

In this paper, an attempt has been made to provide a consolidated account of the superfamily Fulgoroidea from Meghalaya.

It deals with all the 20 species mentioned above. Of these, 5 species (marked *) belonging to 5 genera constitute new distributional record from Meghalaya.

The paper provides keys to various taxa where more than one taxon is involved. General diagnosis has been given only in case of single species which is not included in the key. Distributional record for each species in India and elsewhere has been included.

The paper is based on the material collected during Mopping Surveys of Meghalaya. It is also supplemented by the materials deposited in the National Zoological Collections made by the earlier survey parties of Zoological Survey of India. A classified list of species so far known from Meghalaya is given.

The classification is basically followed by Distant (1908, 1916) and Metcalf (1936, 1945).

The material is in the Zoological Survey of India, Calcutta.

CLASSIFIED LIST OF FULGOROIDEA

1. Family CIXIIDAE
1. Genus *Andes* Stål
 1. *Andes plagosa* Distant
2. Genus *Oliarus* Stål
 - * 2. *Oliarus caudatus* Walker
2. Family FULGORIDAE

3. Genus ***Laternaria*** Linne
 3. *Laternaria candelaria* (Linne)
 4. *Laternaria viridirostris* Westwood
4. Genus ***Lycorma*** Stål
 - * 5. *Lycorma jole* Stål
5. Genus ***Penthicodes*** Blanchard
 6. *Penthicodes (Atomaria) nigropunctata* Guerin-Meneville
6. Genus ***Zanna*** Kirkaldy
 7. *Zanna chennelli* Distant
 8. *Zanna chinensis* Distant
 - * 9. *Zanna dohrni* Stål
3. Family **NOGODINIDAE**
7. Genus ***Indogaetulia*** Schmidt.
 10. *Indogaetulia nigrovenosa* Melichar
4. Family **RICANIIDAE**
8. Genus ***Pochazia***
 11. *Pochazia atkinsoni* Distant
9. Genus ***Ricania*** Germar
 12. *Ricania speculum* Walker
 13. *Ricania pulverosa* Stål
5. Family **TROPIDUCHIDAE**
10. Genus ***Sogana*** Matsumura
 14. *Sogana extrema* Melichar
1. Subfamily **Dictyopharinae**
11. Genus ***Centromeria*** Stål
 15. *Centromeria simulata* Distant
12. Genus ***Chanithus*** Kolenati
 - * 16. *Chanithus pallidus* Donovan
2. Subfamily **Achilinae**
13. Genus ***Faventia*** Stål
 - * 17. *Faventia pustulata* Walker
14. Genus ***Kinnara*** Distant
 18. *Kinnara spectra* Distant

- 3. Subfamily Eurybrachinae
- 15. Genus *Messena* Stål
 - 19. *Messena radiata* Distant
- 4. Subfamily Flatinae
- 16. Genus *Farona* Melichar
 - 20. *Farona fuscipennis* Melichar

* New record from Meghalaya

SYSTEMATIC ACCOUNT

Superfamily FULGOROIDEA

Diagnostic Characters : Genae very often separated from frons by a ridge; tegmina at base with a tegula which is concealed, wings reticulated at anal area; anterior coxae inserted near the sides of the body, very often elongate, posterior pair transverse, contiguous, extending to the lateral margin of the body.

Key to the families

- 1. The anal and jugal areas of hind wings strongly reticulate..... Fulgoridae
 - The anal and jugal areas of hind wings not as above 2
- 2. Head usually with distinct cephalic process Dictyophoridae
 - Head without such process 3
- 3. Hind tibiae long, either without or with only a few lateral spines..... Cixiidae
 - Hind tibiae always with many lateral spines..... 4
- 4. Second segment of antennae usually subglobular pronotum short with a median carina
 - Ricaniidae
 - Second segment of antennae usually distinctly longer than broad; pronotum without median carina..... Nogodinidae

1. Family Cixiidae

The head not elaborately developed, relatively simple; antennae two-jointed, each with a terminal flagellum; tegulae present; wings are usually macropterous, sub-costa, radius and media usually united, radius and media have a few branches forming a small number of antiapical cell; claval suture distinct, the claval vein united; Legs usually simple; the hind tibiae long, either without or with only a few lateral spines; apex of hind tibia with a circle of apical spines.

Key to genera of Cixiidae

- 1. Mesonotum with three longitudinal ridges..... *Andes*
 - Mesonotum with five longitudinal ridges *Oliarus*

1. Genus *Andes* Stål

1866. *Andes* Stål, *Hemip. Africana*, 4 : 166
 Type by original designation. *Andes undulatus* Stål.
 1870. *Abdes undulatus* Stål, *Ofv. Sevenska Vet. Akad. Forh. Philippines*, 27 : 47.

1. *Andes plagosa* Distant

1911. *Brixia plagosa* Distant, *Ann. Mag. Nat. Hist.*, 8(8) : 745.
 1925. *Andes plagosa* Muir, *Philippine Jour. Sci.*, 27 : 223.
 1936. *Andes plagosa* Metcalf, *General Catalogue of the Hemiptera*, 2 : 18.

Material examined : 1 ex., India : Meghalaya : above Tura, Garo Hill, 15.vii.1917, Coll. S. Kemp.

Diagnosis : Body above pitchy black and beneath brownish; tegmina pale brownish; three transverse pale silvery spots at margin with castaneous; the first short and strongly oblique at base, the second long and slightly oblique at middle, the third one short and discal before apical area; greyish fascia present and a large spots beyond stigma; wings pale smoky brown

Length : 4 mm(♀)

Distribution : India : Meghalaya (Garo Hill), Sikkim.

2. Genus *Oliarus* Stål

1862. *Oliarus* Stål, *Berliner Ent. Zeit.*, 6 : 306.
 Type by original designation *Oliarus walkeri* Stål.
 1862. *Oliarus walkeri* Stål, *Berliner Ent. Zeit.*, 6 : 306.

2. *Oliarus caudatus* Walker

1858. *Cixius caudatus* Walker, *Insecta Saunder.*, : 43.
 1906. *Oliarus caudatus* Distant, *Fauna Brit. India*, 3 : 258.
 1936. *Oliarus caudatus* MetCalf, *General Catalogue of the Hemiptera*, 2 : 54.

Material examined : 1 ex., Meghalaya : Garampani; Jaintia Hills, 4.x.1988, Coll. V.D. Srivastava & party.

Diagnosis : Body reddish brown; two ridges on the head; pronotum and mesonotum have five carinae; abdomen brownish; a central ridge present on frontal area of face; tegmina hyaline; venation dark brown and at apical areas two or three dark brown spots.

Length : 5-5 mm(♀)

Distribution : India : Meghalaya (Jaintia Hill), North India.

2. Family Fulgoridae

Head large and usually with a large cephalic process; frons large, usually quadrangular, with strongly elevated lateral margin; compound eyes large, projecting, semiglobose with ventral sinus ill-developed paired ocelli conspicuous. Antennae usually relatively indistinct. Thorax typically large, pronotum about as large as mesonotum. Median carina strongly elevated Mesonotum typically triangular. Tegulae large, the anal and jugal areas of hind wings are strongly reticulate, Abdomen large and broadly depressed.

Key to genera of Fulgoridae

1. Head with strong porect cephalic process..... 2
Head without such process 3
2. Cephalic process straight; Genae before eyes rounded; apex of face profoundly sinuate; mesonotum not centrally carinate..... **Zanna**
Cephalic process more or less curved; genae before eyes truncate; apex of face slightly sinuate; mesonotum centrally carinate..... **Laternaria**
3. Face with two parallel discal carination sometimes obliterated behind middle **Lycorma**
Face having disc with two anteriorly divergent carination and with a central, sometimes obsolete longitudinal sulcation **Penthicodes**

3. Genus **Laternaria** Linne1964. *Laternaria* Linne, *Museum Uricae* : 152Type by original designation *Fulgora candelaria* Linne.1767. *Fulgora candelaria* Linne, *Systema Nature Editor Duodecima* 1(2) : 703.Key to species of **Laternaria**

Head and cephalic process ochraceous; measured from apex to eyes as long as from anterior margin of mesonotum to abdominal apex; Length of cephalic process 16 to 20 mm..... *candalaria*

Head and cephalic process green; measured from apex to eyes as long as from posterior angle of mesonotum to abdominal apex; Length of cephalic process 12 to 15 mm.....

..... *viridirostris*

3. **Laternaria candelaria** (Linne)1746. *Cicada candelaria* Linne, *Actattolm* : 631942. *Laternaria candelaria* de costa, *Insects do Brasil*, 3 : 44 39.1947. *Laternaria candelaria* MetCalf, *General Catalogue of the Hemiptera*, 9 : 187.**Material examined** : 1 ex., Meghalaya : Umran, Ri-bhoi Dist. 16.ix.1971, Coll. S. Biswas.

Diagnosis : Cephalic process of the head brownish; with minute white spots; pronotum and mesonotum brownish, with two discal four obconical and two oblique black spots, abdomen brownish, tegmina pitchy black; with deeply reticulate, pale olicaceus venation; a transverse fascia present at base of tegmina and medially two same fascia centrally fused; a series of black spots present.

Length : 23 mm. (♀)

Distribution : India : Meghalaya (Ri-bhoi); Sikkim. Elsewhere : Asia, Cambodia, China. East Indies, Fukien, Hainan Island, Hong Kong, Indochina, Kwangtung, Siam, South China, Thailand, Tonkin.

4. *Laternaria viridirostris* (Westwood)

1848. *Fulgora viridirostris* Westwood, *The Cabinet of Oriental Entomology*, 4 : 8.

1919. *Fulgora viridirostris* Paiva, *Rec. Indian Mus.*, 16 : 373.

1932. *Fulgora viridirostris* Sherborn, *Index Animalium*, 28 : 69-40.

1947. *Laternaria viridirostris* MetCalf, *General Catalogue of Hem.*, 9 : 207.

Material examined : 1 ex., Meghalaya; above Tura, Garo Hills; 19.ix.75, Coll. S.W. Kemp.

Diagnosis : Head green; with minute white spots cephalic process also green and spotted; two discal dark spots on pronotum and four spots on mesonotum; tegmina pitchy-black with pale olivacum venation, with brown fascia at base and two same fasciae often medially fused at centre; and present a series of spots; wings yellowish brown, its apical area broadly black.

Length : 20 mm. (♀)

Distribution : India : Meghalaya (Garo Hills); Assam; Sikkim. Elsewhere : Burma, Indo-China, Penang Island, Tonkin.

4. Genus *Lycorma* Stal

1863. *Lycorma* Stal, *Stett. Ent. Zeit.*, 24 : 232.

Type by original designation *Lycorma imperialis* White

1846. *Aphana imperialis* White. *Ann. Mag. Nat. Hist.*, 17 : 330.

5. *Lycorma jole* Stål

1863. *Lycorma jole* Stal, *Stett. Ent. Zeit.*, 24 : 234.

1935. *Lycorma jole* Kato, *Rept. First Sci. Manchoukuo*, 9(36) : 3.

1946. *Lycorma jole* MatCalf, *General Catalogue of Hem.*, 9 : 166.

Material examined : 1 ex., Meghalaya : Sericulture station; Shillong, East Khasi Hills; 21.iv.79, Coll. J.K. Jonathan.

Diagnosis : Head and thorax green-olivaceous, mesonotum and tegmina also green-olivaceous; with large black spots and its apical area blackish; and green veined; wings with black spots and with short green fascia.

Length : 17.5 mm.

Distribution : India : Meghalaya (Shillong). Elsewhere : Oriental.

5. Genus *Penthicodes* Blanchard

1845. *Penthicodes* Blanchard, *Histoire des Insects.*, 2 : 424.

Type by original designation *Aphaena farinosa* Fabricius.

6. *Penthicodes nigropunctata* (Guerin-Meneville)

1801. *Cicada atomaria* Weber. *Observations Entomological* : 113.

1935. *Aphaena nigropunctata* Guerin-Meneville, *Catalogue Insectorum Sinensium* 2 : 97.

1947. *Penthicodes nigropunctata* MetCalf, *General Catalogue of Hem.*, 9 : 125.

Material examined : 1 ex., Meghalaya : Sorynkhan, Shillong, East Khasi Hills, 21.iv.79, Coll. J.K. Jonathan.

Diagnosis : Head and pronotum brownish, mesonotum pitchy black; abdomen reddish; tegmina brownish yellow; its basal area purplish; on costal area two black spots; at base an elongated spot and a few minute pale spots on apical area; wings purplish red; black spot on its basal area; posterior area dark brown.

Length : 17 mm. (♀)

Distribution : India : Meghalaya (Khasi Hills); Punjab. Elsewhere : China, Java, Malay Peninsula, Sumatra.

6. Genus *Zanna* Kirkaldy

1902. *Zanna* Kirkaldy, *J.nat. Hist. Soc. Bombay*, 14 : 46.

Type by original designation *Fulgora tenebrosa* Fabricius

1775. *Fulgora tenebrosa* Fabricius, *Systema Entomologiae* : 674.

Key to species of *Zanna*

1. Abdomen above fulvous or ochraceous.....*dohrni*
Abdomen above black..... 2
2. Tegmina thickly spotted with black, the spots slightly more prominent on anterior portion, body larger in size..... *chinensis*
Tegmina finely spotted with black, the spots a little longer on upper half, smaller and denser on the posterior half; body smaller in size.....*chennelli*

7. *Zanna chennelli* (Distant)

1906. *Pyrops chennelli* Distant, *Fauna Brit. India*, 3 : 182.

1938. *Zanna chennelli* Metcalf, *Bull. Mus. Comp. Zool. Harvard Coll.*, 82 : 361.

Material examined : 1 ex., Meghalaya : Williamnagar; East Garo Hills, 21.i.91, Coll. B. Nandy & party.

Diagnosis : Head and pronotum brownish with yellowish tinge; head with thickly black punctures; cephalic process of head with a central carina; tegmina brownish with finely black spots; wing milky white with brownish venation; abdomen black.

Length : 24.5 mm. (♀)

Distribution : India : Meghalaya (East Garo Hills) ; Assam; Naga Hills.

8. *Zanna chinensis* (Distant)

1893. *Pyrops chinensis* Distant, *Trans. Ent. Soc. London*, 448.

1906. *Pyrops chinensis* Distant, *Fauna Brit. India*, 3 : 181.

1938. *Zanna chinensis* Metcalf, *Bull. Mus. Comp. Zool. Harvard Coll.*, 82 : 361.

Material examined : 1 ex., Meghalaya : Old Burapani Rd., Shillong; East Garo Hills, 18.ix.91, Coll. R.K. Varshney & party.

Diagnosis : Head dull greyish; cephalic process with a few black spots; thorax dull greyish with ochreous tinge have thickly black spots; tegmina with thick black spots; more prominent on apical area; venation brownish; wings milky white; abdomen black.

Length : 34.5 mm. (♀)

Distribution : India : Meghalaya (Jaintia Hill); Assam. Elsewhere : China, Indo-China, Japan.

9. *Zanna dohrni* Stål

1858. *Pyrops dohrni* Stål, *Ofv. Svenska Vet. Akad. Forth.*, **15** : 449.

1906. *Pyrops dohrni* Distant, *Fauna Brit. India*, **3** : 180.

1938. *Zanna dohrni* Metcalf, *Bull. Mus. Comp. Zool. Harvard Coll.* **82** : 361.

Material examined : 1 ex., Meghalaya : Songsak; East Garo Hills, 21.iv.75, Coll. N. Muraleedharan.

Diagnosis : Head pale brownish spotted black, pronotum black spotted, tegmina pale brownish, spotted black its venation ochraceous; wing light creamy-white; vein darker in colour, abdomen chalky-white, pilose.

Length : 33 mm. (♀)

Distribution : India : Meghalaya (Garo Hills); Tamil Nadu. Elsewhere : Ceylon, Indo-China, Java.

3. Family Nogodinidae

Head about as wide as pronotum; crown short and broad; frons longer than wide; lateral carinae strongly elevated, clypeus less than half as long as the frons; antennae small, the 1st segment short, collar-like, 2nd segment usually distinctly longer than broad. Pronotum short and broad, posterior margin of pronotum deeply in size; Laterally the pronotum narrows behind the compound eyes. Mesonotum large, tri-carinate, usually longer than its maximum diameter. Tegmina large; coriaceous, sub-hyaline or hyaline, usually broader towards the apex, and with numerous veins and cross veins, basal cell usually large; clavus not punctulate, with claval vein united at middle or beyond. Hind tibia with lateral spines, 2nd segment of hind tarsus small, with a pair of spine at apex.

7. Genus *Indogaetulia* Schmidt

1919. *Indogaetulia* Schmidt, *Sett. Ent. Zeit.*, **80** : 171.

Type by original designation *Indogaetulia nigrovenosa* Melichar.

10. *Indogaetulia nigrovenosa* Melichar

1898. *Gaetulia nigrovenosa* Melichar, *Verh. Zool. Bot. Ges. Wein*, **48** : 399.

1923. *Indogaetulia nigrovenosa* Melichar, *Gen. Insect.*, **182** : 170.

1954. *Indogaetulia nigrovenosa* Metcalf, *General Catalogue of Hem.*, **12** : 65.

Material examined : 1 ex., Meghalaya : Shillong, East Khasi Hill, 5.ix.15, Coll. S.W. Kemp.

Length : 5 mm. (♀)

Diagnosis : Body ochraceous; vertex with two piceous lines; pronotum and mesonotum with pale brownish yellow central carinate fascia, later three longitudinal fasciae brownish; tegmina and wings transparent, the venation fuscous; and present a subtriangular costal fuscous spot.

Distribution : India : Meghalaya (Khasi Hill); Assam, Eastern India. Elsewhere : Burma, Java, Sumatra, Tenasserim.

4. Family *Ricaniidae*

Head about as wide as pronotum; vertex short and broad, nearly rectangular, usually carinate. Frons rather large with lateral carinae strongly elevated. Clypeus much narrower than frons, triangular, usually with a median carina. Antennae short, basal segment short, collar-like, 2nd segment usually sub-globular, flagellum elongated, shorter than body. Pronotum short with a median carina. Mesonotum large, tricarinate, convex; tegulae usually large. Tegmina large nearly triangular, costal margin rather straight, apical margin long, nearly straight; costal membrane broad with numerous cross vein; corium with many cross veins; claval veins usually united beyond. Tegmina vary greatly in texture; venations of tegmina also vary greatly; typically radius, media and cubitus with supernumerary veins. Costa arises from the base of basal cell. The wings smaller than the tegmina, cross veins relatively few. Legs simple with the front and middle legs small; hind femora large; hind tibiae elongate with one or more spines on the lateral margin; 1st segment of hind tarsi usually shorter than 2nd and 3rd together, without spine at the apex.

Key to genera of family Ricaniidae

Apical Margin of tegmina longer than inner margin..... *Pochazia*

Apical margin of tegmina about as long as inner margin..... *Ricania*

8. Genus *Pochazia* Amyot and Serville

1843. *Pochazia* Amyot and Serville, *Histoire Naturelle des Insects, Hemipteres* : 528.

Type by original designation *Pochazia fasciata* Fabricius.

1803. *Flata fasciata* Fabricius. *Systema Rhyn.*, 47.

11. *Pochazia atkinsoni* Distant

1906. *Pochazia atkinsoni* Distant, *Fauna of British India*, 3 : 374.

1923. *Pochazia atkinsoni* Melichar, *Gen. Insect*, 182 : 125.

1955. *Pochazia atkinsoni* Metcalf, *General Catalogue of the Hemp.*, 16 : 21.

Material examined : 1 ex., Meghalaya; above Tura, Garo hills, 7.vii.1916, Coll. F.H. Gravely.

Length : 10.5 mm. (♀)

Diagnosis : Body pitchy black; face centrally with a strong carina; tegmina pale reddish brown with two large yellowish spots, one elongated at costal margin, other on rounded disk; wings pale reddish brown.

Distribution : India : Meghalaya (Garo Hills); Sikkim.

9. Genus *Ricania* Germar

1818. *Ricania* Germar, *Mag.Ent.*, 3 : 221.

Type by original designation *Ricania fenestrata* Fabricius.

1775. *Cercopis fenestrata* Fabricius, *Sys. Ent.*, 688.

12. *Ricania speculum* Walker

1851. *Flatoides speculum* Walker, *List of Homopteran Insects* : 406.

1951. *Ricania speculum* Wade, *Mem. Int. soc. sugar cane Tech.*, 1 : 50.

1955. *Ricania speculum* Metcalf, *General Catalogue of Hemp.*, 16 : 79.

Material examined : 1 ex., Meghalaya; Sangsak; East Garo Hills; 27.ix.1975, Coll. N. Muraleedharan.

Diagnosis : Head, pronotum, mesonotum, pitchy black in colour, Face with fine central carina; tegmina pitchy black, beyond middle three greyish white spots two upper and one costal margin and two elongate spots on costal margin, wing smoky brown in colour, abdomen pitchy brown in colour.

Length : 6.5 mm. (♀)

Distribution : India : Meghalaya (East Garo Hills); Assam; 'Bengal'; Madras; Sikkim. Elsewhere : Borneo, British Malaya, Burma, China, Ceylon, Duth, East Indies, Fukein, Java, Japan, Luzon, Malay, Mindanao, Singapore, Sumatra, Sunda, Tenasserim, Tonkin.

13. *Ricania pulverosa* (Stål)

1865. *Ricania pulverosa* Stål, *Ofv. Sevenska Vet. Akad. Forh.*, **22** : 162.

1923. *Ricania pulverosa* Melichar, *Gen. Insect.*, **182** : 130.

1955. *Ricania pulverosa* Metcalf, *General Catalogue of Hemp.* **16** : 97.

Material examined : 1 ex., Meghalaya; Sangsak, East Garo Hills, 27.ix.1975, Coll. N. Muraleedharan.

Diagnosis : Head, face, pronotum, mesonotum carina with pitchy black in colour; face with central and lateral tegmina dark brown with yellowish tinge in colour; the costal with two transverse black spots; and two greyish white large spots divided by a central black line, and two small black spots and minute black spots present at costal margin; wings redish brown.

Length : 6 mm (♀)

Distribution : India : Meghalaya (East Garo Hills); Assam; 'Bengal' Elsewhere : Burma, Formosa, France, Japan, Java, Lower Burma, Sumatra, Siam, Tonkin.

5. Family Tropiduchidae

10. Genus *Sogana* Matsumura

1914. *Sogana* Matsumura, *Ann. Mus. Nat. Hungaria*, **12** : 268.

Type by original designation *Sogana hopponis* Matsumura

1914. *Sogana hopponis* Matsumura, *Ann. Mus. Nat. Hungarici*, **12** : 266.

14. *Sogana extrema* Melichar

1914. *Sogana extrema* Melichar, *Monographie der Tropiduchnen* : 115.

1942. *Logana* (Sic.) *extrema* Lallemant, *Notes Ent. Chinoise*, **9** : 70.

1915. *Sogana extrema* Metcalf, *General Catalogue of Hemp.*, **11** : 131.

Material examined : 1 ex., Meghalaya; Tura, Garo Hills, x.1917, Coll. Mrs. S.W. Kemp.

Distribution : India : Meghalaya (Garo Hill). Elsewhere : Tenasserim.

Note : Diagnosis and measurement could not be given due to damage condition of the specimen.

Key to Subfamilies

1. Face broad, transverse or almost equally broad as long; anterior legs compressed, more or less dilated; anal area of wings sometime reticulated.....Eurybrachidina
- Face not laterally angulate; legs very often simple; anal area of wings never reticulated 2.

2. Claval vein not reaching apex; face without apical ocellus; lateral margin of clypeus always carinate or acute..... Dictyopharina
Claval vein reaching apex or united with the claval suture near apex..... 3
3. Head narrower than thorax; sides of clypeus carinate; last joint of rostrum elongate; thorax notched at base..... Achilinae
- Sides of clypeus without a ridge or with an obtuse ridge; clavus granulate, apex sometime subacute and closed; costa dilated, costal membrane with transverse veins, claval suture prominent..... Flatinae

1. Subfamily Dictyopharinae

Key to genera of Dictyopharinae

Anterior femora without a spine; head with a well developed porrect or curved cephalic process..... *Chanithus*

Anterior femora with a minute acute spine near apex; head with a short anterior recurved process..... *Centromeria*

11. Genus *Centromeria* Stål

1870. *Centromeria* Stål, *Svenska Vet. Akad. Fösh.*, **27** : 745.
Type by original designation *Dictyophora longipennis*, Walker.
1851. *Dictyophora longipennis* Walker, *List of Homopterous Insects* **2** : 316.

15. *Centromeria simulata* Distant

1906. *Centromeria simulata* Distant, *Fauna Brit. India* **3** : 252.
1919. *Centromeria simulate* Paiva, *Rec. Indian Mus.*, **16** : 374.
1946. *Centromeria simulate* Metcalf, *General Catalogue of the Hem.*, **8** : 36.

Material examined : 1 ex., Meghalaya; Jowai Shungphung; Jaintia Hills; 22.ix.1988, Coll. V.D. Srivastava & party.

Diagnosis : Head brownish with yellowtinger; central place of vertex with two small spots and a longitudinal ridge pronotum reddish-brown with a broad central fascia, tegmina transparent, its claval area dark brown; wings transparent with elongate dark brown spots; abdomen ochraceous.

Length : 10 mm. (♀)

Distribution : India : Meghalaya (Jaintia Hills); Assam;

12. Genus *Chanithus* Kolenati.

1857. *Chanithus* Kolenati, *Bull. Soc. Nat. Moscou*, **30** : 427.
Type by original designation *Chanithus pannonicus* Kolenati
1857. *Chanithus pannonicus* Kolenati, *Bull. Soc. Nat. Moscou*, **30** : 427.

16. *Chanithus pallidus* (Donovan)

1800. *Fulgora pallida* Donovan, *Insects of India* **8**.
1929. *Chanithus pallidus* Kusnezov. *Zool. Anz.*, **79** : 325.
1946. *Chanithus pallidus* MetCalf, *General Catalogue of Hem.*, **8** : 54.

Material examined : 1 ex., Meghalaya : West Garo Hills, 15.i.91; Coll. *B. Nandi and party*.

Diagnosis : Head yellowish brown, pronotum and mesonotum with three yellowish carinae; mesonotum with pitchy black spots at its basal angle; tegmina and wings transparent, the venation dark brown abdomen pitchy black.

Length : 22.5 mm. (♀)

Distribution : India : Meghalaya (West Garo Hills); Maharashtra, Sikkim; Tamil Nadu; West Bengal. Elsewhere : Borneo, Burma, Sri Lanka.

2. Subfamily Achilinae

Key to genera of the Subfamily Achilinae

1. Face not or very slightly projecting before eyes; clypeus about or nearly as long as face; face anteriorly emarginate..... *Kinnara*
- face prominently produced before eyes, clypeus small, less than half length of face not emarginate as above..... *Faventia*

13. Genus *Faventia* Metcalf

1946. *Faventilla* Metcalf, *General Catalogue of the Hem.* part 10 : 60 *Faventilla* nom. nov. for *Faventia* Stål, 1866.
Type *Cixius pustulatus* Walker.
1837. *Cixius pustulatus* Walker, *Jour. Proc. Linn. Soc.*, 1 : 87.

17. *Faventia pustulatus* (Walker)

1916. *Faventia pustulatus* Distant, *Fauna Brit. India*, 6 : 56.
1946. *Faventia pustulatus* Metcalf, *General Catalogue of Hem.* Part 10 : 61.

Material examined : 1 ex., Meghalaya : Jowai Badarpali, Jaintia Hills, 20.vii.88, Coll. *V.D. Srivastava*.

Diagnosis : Body dark brown with yellowish tinge; vertex black and two black spots on mesonotum, tegmina greyish; apical area darker; its vein brownish-yellow and small reddish spots on apical marginal area; on its claval area one large prominent spot and one spot on disk and one at base. Wing smoky-brown and venation brownish, face with central and lateral ridge.

Length : 8 mm. (♀)

Distribution: India : Meghalaya (Jaintia Hills); Assam; Sikkim. Elsewhere : Borneo, Palawan Island, Singapore, Tenasserim.

14. Genus *Kinnara* Distant

1906. *Kinnara* Distant, *Entomologist.*, 39 : 8.
Type by original designation *Pleroma ceylonica* Melichar.
1903. *Pleroma ceylonica* Melichar, *Homopteren Fauna von Ceylon*, 42 : 26.

18. *Kinnara spectra* Distant1922. *Kinnara spectra* Muir, *Rec. Indian Mus.*, **24** : 349.1945. *Kinnara spectra* Metcalf, *General Catalogue of Hem.*, **7** : 244.*Material examined* : 1 ex., Meghalaya : above Tura, Garo Hills, 19.iv., Coll. S.W. Kemp.*Diagnosis* : Body brownish; head short and broad and much narrower than pronotum, at its margin present strong carinae; tegmina and wings pale transparent with greyish white tinge.*Length* : 3 mm. (♀)*Distribution* : India : Meghalaya, (Garo Hills); West Bengal. Elsewhere : Malay.

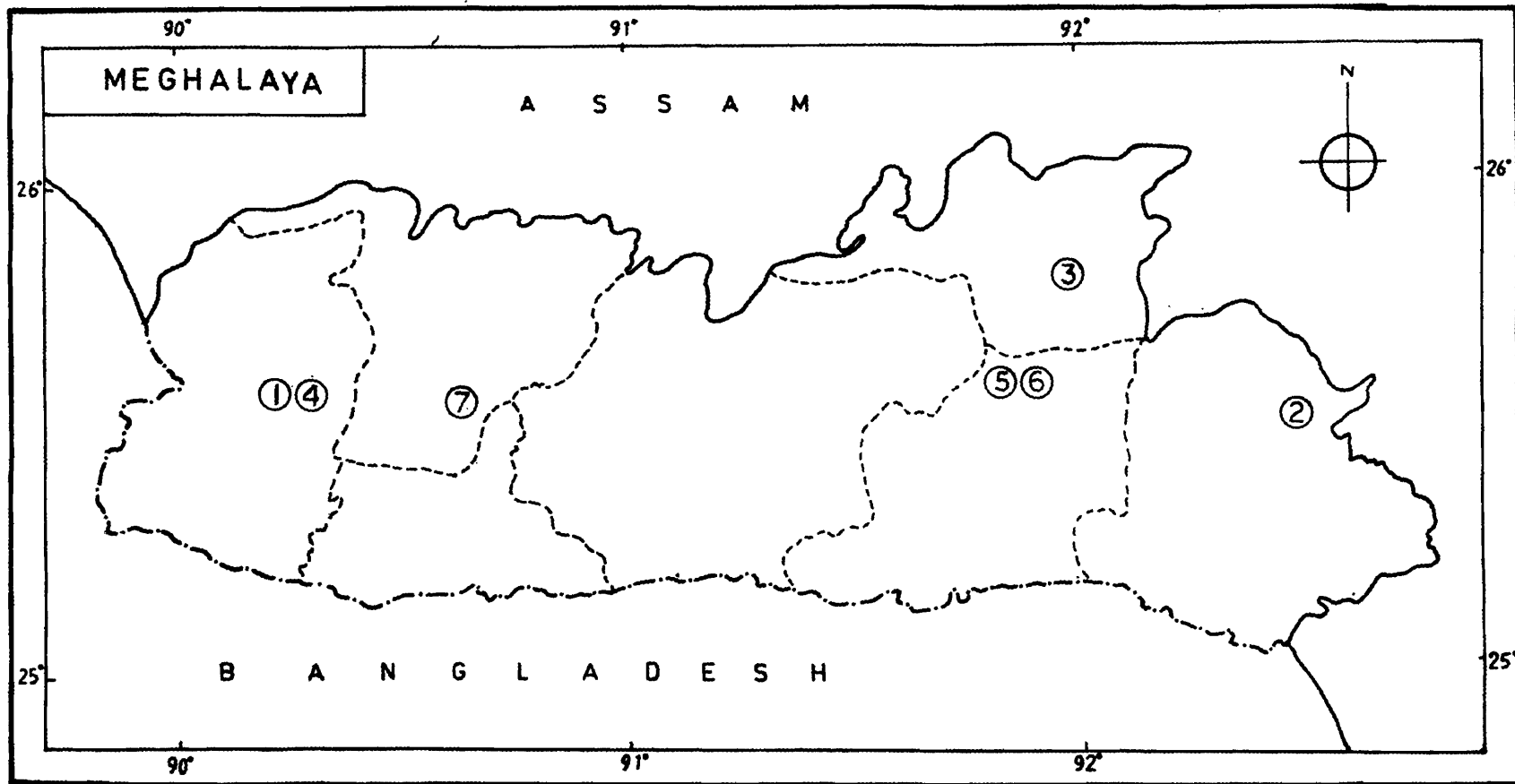
3. Subfamily Eurybrachinae

15. Genus *Massena* Stål1861. *Messena* Stål, *Ofv. Sevenskavet. Akad. Forh.*, **18** : 210.Type by original designation *Messema pulverosa* [nec Hope] Distant.19. *Messena radiata* Distant1892. *Messena radiata* Distant, *Trans. Ent. Soc. London*, 280.1919. *Messena radiata* Schmidt, *Stett. Ent. Zeit.*, **80** : 373.*Material examined* : 1 ex., Meghalaya; above Tura, West Garo Hills; 15.ix.17, Coll. S. Kemp.*Diagnosis* : Body brownish yellow with dark marking; tegmina brownish with purplish shade; at margin purplish spots, at base greyish brown spots, at central subapical spots, wing pale greyish; abdomen orange yellow.*Length* : 12.5 mm. (♀)*Distribution* : India : Meghalaya (West Garo Hills); Tamil Nadu.

4. Subfamily Flatinae

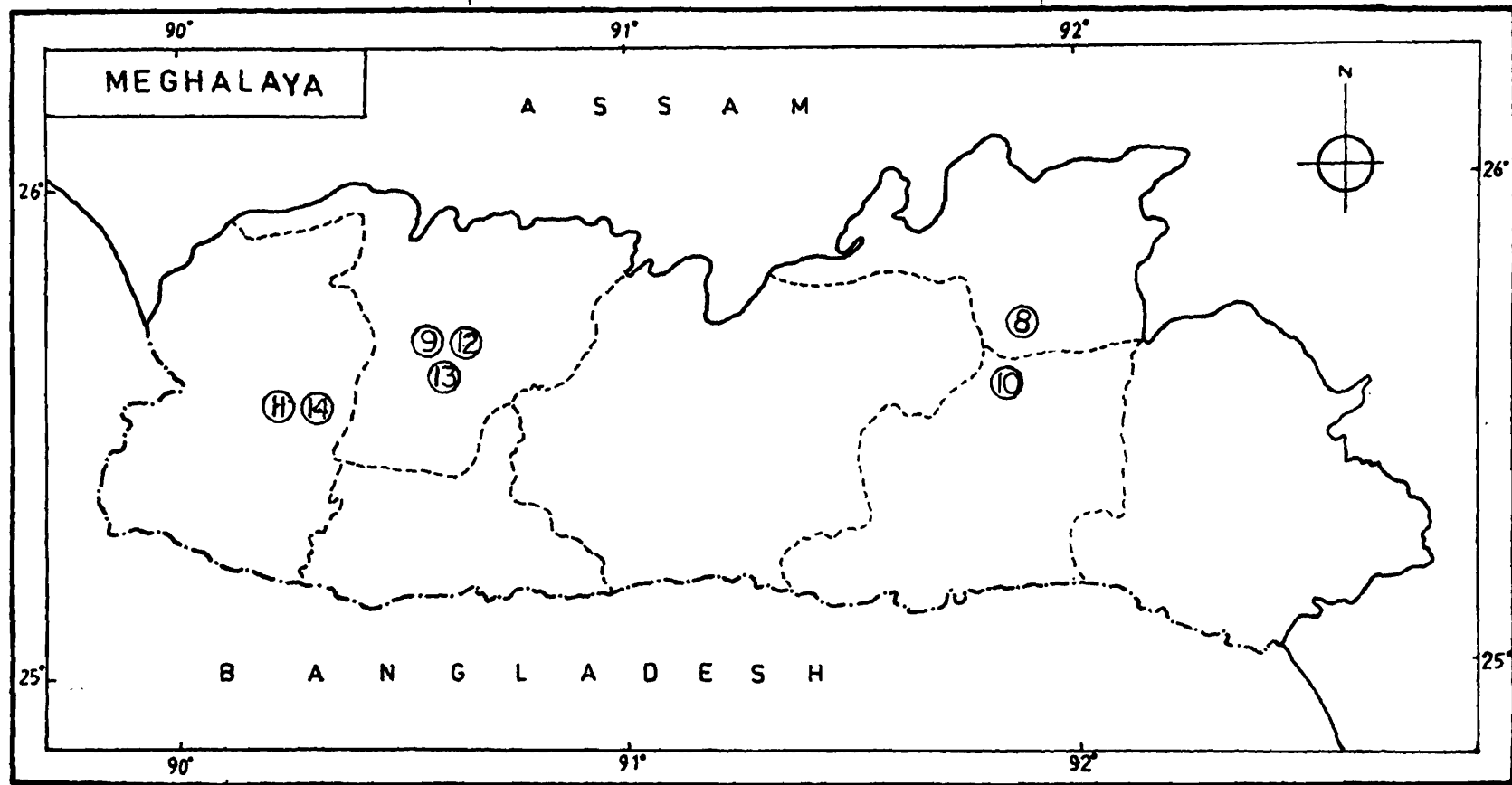
16. Genus *Farona* Melichar1901. *Farona* Melichar, *Ann. Nat. Hofmus. Wien*, **16** : 200.Type by original designation *Farona fuscipennis* Melichar.1902. *Farona fuscipennis* Melichar, *Ann. Nat. Hofmus. Wien* **17** : 142.20. *Farona fuscipennis* Melichar1923. *Farona fuscipennis* Melichar, *Gen. Insect.*, **182** : 96.1957. *Farona fuscipennis* Metcalf, *General Catalogue of Hem.* **13** : 434.*Material examined* : 1 ex., Meghalaya : Tura, West Garo Hills, 15.vii.1917, Coll. S. Kemp.*Diagnosis* : Body pale brown; pronotum and mesonotum with dark brown speckled; tegmina pale brown with white spots at costal margin, apical marginal area and apex of disk; wings creamy white.*Length* : 9 mm. (♀)*Distribution* : Meghalaya (West Garo Hills); Assam. Elsewhere : Burma.

MAP-1. SHOWING DISTRIBUTION OF THE SPECIES OF FULGORIDAE



1. <u>Andes plagosa</u> Stal	4. <u>Laternaria viridirostris</u> Westwood
2. <u>Oliarus caudatus</u> Walker	5. <u>Lycorma jole</u> Stal
3. <u>Laternaria candelaria</u> (Linn.)	6. <u>Penthicodes (Atomaria) nigropunctata</u> Guerin-Menevillo
7. <u>Zanna chennili</u> Distant	

MAP-2. SHOWING DISTRIBUTION OF THE SPECIES OF FULGORIDAE



8. Zanna chinensis Distant

9. Zanna dohrni Stal

10. Indogaetulia nigrovenosa Melichar

14. Sogana extrema Melichar

11. Pochazia atkinsoni Distant

12. Ricania speculum Walker

13. Ricania pulverosa Stal

MAP-3. SHOWING DISTRIBUTION OF THE SPECIES OF FULGORIDAE

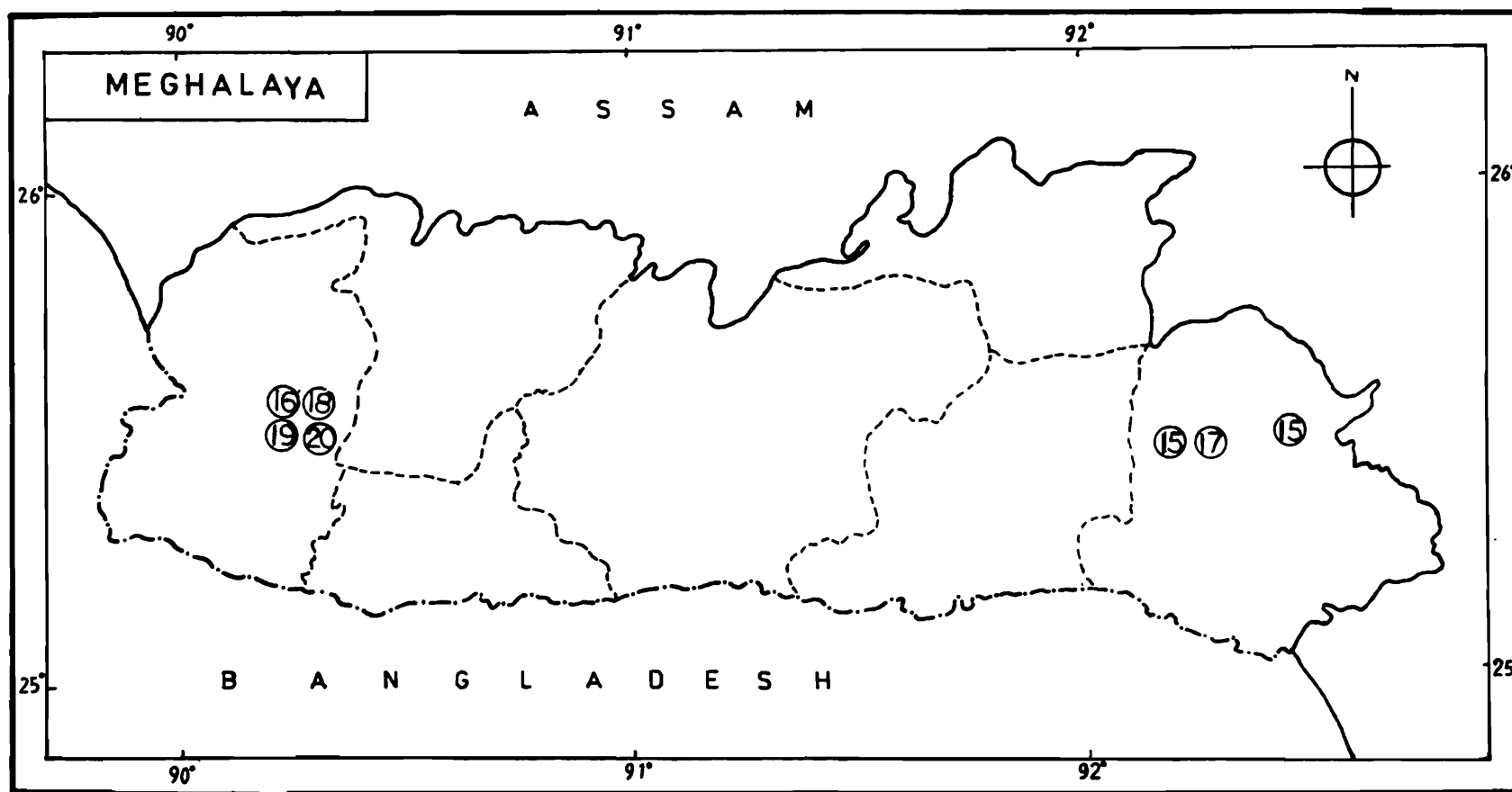
15. Centromeria simulata Distant16. Chanithus pallidus Donovan17. Faventia pustulata Walker18. Kinnara spectra Distant19. Messena radiata Distant20. Farona fuscipennis Melichar

Table - 1. Distribution of Fulgoridae in different districts of Meghalaya.

Name of the species	WEST GARO HILLS	EAST GARO HILLS	SOUTH GARO HILLS	WEST KHASI HILLS	EAST KHASI HILLS	JAINTIA HILLS	RI-BHOI
	1	2	3	4	5	6	7
1. <i>Andes plagosa</i> Stal	+	-		-	-	-	
2. <i>Oliarus caudatus</i> Walker	-	-	-		-	+	-
3. <i>Laternaria candelaria</i> (Linn.)	-	-	-			-	+
4. <i>Laternaria viridirostris</i> Westwood	+	-		-	-		
5. <i>Lycorma jole</i> Stal	-		-	-	+	-	
6. <i>Penthicodes (Atomaria) nigropunctata</i> Guerin-Menevillo	-	-	-	-	+	-	-
7. <i>Zanna chennlli</i> Distant	-	+	-	-	-	-	-
8. <i>Zanna chinensis</i> Distant	-	-	-	-	+	-	-
9. <i>Zanna dohrni</i> Stal	-	+	-	-	-	-	-
10. <i>Indogaetulia nigrovenosa</i> Melichar	-	-	-	-	+	-	-
11. <i>Pochazia atkinsoni</i> Distant	+	-	-	-	-	-	-
12. <i>Ricania speculum</i> Walker	-	+	-	-	-	-	-
13. <i>Ricaniapulverosa</i> Stal	-	+	-	-	-		-
14. <i>Sogana extrema</i> Melichar	+	-	-	-	-	-	-
15. <i>Centromeria simulata</i> Distant	-	-	-	-	-	+	
16. <i>Chanithus pallidus</i> Donovan	+	-	-	-	-	-	
17. <i>Faventia pustulata</i> Walker	-	-	-	-	-	+	
18. <i>Kinnara spectra</i> Distant	+	-	-	-	-	-	
19. <i>Messena radiata</i> Distant	+	-	-	-	-	-	
20. <i>Farona fuscipennis</i> Melichar	+	-	-	-	-	-	-

SUMMARY

The paper deals with a consolidated account of Superfamily Fulgoroidea from Meghalaya State in Eastern India. Out of 20 species belonging to 17 genera, 5 species (marked*) are of new distributional record from the State. Keys to various taxa are given. General diagnosis of the species (not included in key) is also provided. Besides, distribution of each species in India and elsewhere is given.

ACKNOWLEDGEMENTS

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INSECTA : HEMIPTERA : COREOIDEA

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INTRODUCTION

The superfamily Coreoidea is represented by four families from India, and comprises medium to large sized hemipteran insects. They are commonly known as leaf-footed bugs which generally exhibit their phytophagous food habit, though a few are known to be predaceous. They are known to be occurred in hills and plains in abundance while a few are predominant in agricultural fields and cultivated gardens.

Economically some of them are reported as important pest particularly on cereals, pulses, vegetables and fruits. These bugs often secrete obnoxious odours to avoid their predators. Distant (1904, 1908, 1918) contributed to the general studies on the coreid fauna as a pioneer worker from Indian sub-continent. Since then stray works have been done by some authors like Paiva (1919), Kumar (1965), Dolling (1978), O'Shea and Schaefar (1980). The Coreid bugs of India are distributed among four families, *i.e.* Coreidae, Alydidae, Rhopalidae and Stenocephalidae. Classification is based upon Richards and Davies, 1977.

This present study is based on the collections of Coreoid from Meghalaya region by different survey parties from Zoological Survey of India as well as the named collections housed in the National Zoological Collection.

Nearly 190 species of Coreoids have, so far, been recorded from India. The present study has recorded 50 species under 22 genera belonging to two families from the state of Meghalaya, six of which are being recorded for the first time from the state and these are cited in the text with asteric marks.

MATERIAL AND METHOD

Coreids like most of the hemipteran insects are phytophagous in nature and are found in agricultural fields, vegetable gardens and other herbs and shrubs.

As these insects are well fliers like other hemipteran insects they are being collected by sweeping the habitat with insect net or by hand picking with forceps and light-trapping during night time.

The collected materials are killed in a killing jar using Benzene or Chloroform vapour and preserved dry with paradichlorobenzene and naphthalene. In the field the insects are kept in the insect-envelopes and labelled properly mentioning locality, altitude, date of collection and name of the collector with ecological notes. In the laboratory the specimens are set, pinned and mounted to display

properly for easy handling and observation under binocular microscope during the process of identification. For detailed specific identification the genitalia are also dissected out properly and mounted on slide for further study.

SYSTEMATIC ACCOUNT

List of the Meghalaya coreoid species studied in this paper. Species with asteric marks indicate new record from the State.

Super family	COREOIDEA
Family	Alydidae
Subfamily	Leptocorisinae
Genus	1. <i>Leptocorisa</i> Latreille 1825
Genus	1. <i>Leptocorisa acuta</i> (Thunberg)
Subfamily	Alydinae
Genus	2. <i>Riptortus</i> Stål 1859
	2. <i>Riptortus linearis</i> (Fabricius)
	3. <i>Riptortus strenuus</i> Horvath
Genus	3. <i>Babaranus</i> Distant 1908
	4. <i>Babaranus ornatulus</i> Distant*
Family	Coreidae
Subfamily	Coreinae
Tribe	Mictini
Genus	4. <i>Derepteryx</i> White 1839
	5. <i>Derepteryx grayi</i> White*
	6. <i>Derepteryx hardwicki</i> White
Genus	5. <i>Helcomeria</i> Stål 1873
	7. <i>Helcomeria spinosa</i> Signoret
Genus	6. <i>Prionolomia</i> Stal 1873
	8. <i>Prionolomia gigas</i> Distant
	9. <i>Prionolomia fulvicornis</i> (Fabricius)
Genus	7. <i>Ochrochira</i> Stål 1873
	10. <i>Ochrochira biplagiata</i> (Walker)
	11. <i>Ochrochira nigrorufa</i> (Walker)
	12. <i>Ochrochira albiditarsis</i> (Westwood)*

13. *Ochrochira granulipes* (Westwood)
- Genus 8. *Mictis* Leach 1814
14. *Mictis pictor* (Fabricius)
15. *Mictis tenebrosa* (Fabricius)
16. *Mictis gallina* Dallas
- Genus 9. *Anoplocnemis* Stål 1873
17. *Anoplocnemis phasiana* (Fabricius)
- Tribe Cloresmini
- Genus 10. *Notobitus* Stål 1859
18. *Notobitus excellens* Distant
19. *Notobitus abdominalis* Distant
20. *Notobitus meleagris* (Fabricius)
- Genus 11. *Cloresmus* Stål 1859
21. *Cloresmus khasianus* Distant
22. *Cloresmus antennatus* Distant*
23. *Cloresmus nepalensis* (Westwood)
- Tribe Gonocerini
- Genus 12. *Cletus* Stål 1859
24. *Cletus punctiger* (Dallas)
25. *Cletus bipunctatus* (Westwood)
26. *Cletus punctulatus* (Westwood)
- Genus 13. *Cletomorpha* Mayr 1866
27. *Cletomorpha raja* Distant*
28. *Cletomorpha hastata* (Fabricius)
- Tribe Dasynini
- Genus 14. *Dasynus* Burmeister 1834
29. *Dasynus orientalis* (Distant)
30. *Dasynus relatus* Paiva
- Tribe Anisoscelidini
- Genus 15. *Leptoglossus* Guérin 1830
31. *Leptoglossus membranaceus* (Fabricius)

- Tribe **Homoecerini**
- Genus 16. ***Homoecerus*** Burmeister 1835
32. *Homoecerus consisus* var. A. Walker
33. *Homoecerus albiguttulus* Stal
34. *Homoecerus simiolus* Distant
35. *Homoecerus biguttatus* Westwood*
36. *Homoecerus subjectus* Walker
37. *Homoecerus striicornis* Scott
38. *Homoecerus walkeri* Kirby
39. *Homoecerus signatus* Walker
40. *Homoecerus inornatus* Stål
- Genus 17. ***Physomerus*** Burmeister 1835
41. *Physomerus grossipes* (Fabricius)
- Genus 18. ***Acanthocornis*** Amyot & Serville
42. *Acanthocornis scabrator* (Fabricius)
- Subfamily **Pseudophoelinae**
- Genus 19. ***Trallianus*** Distant 1904
43. *Trallianus chennelli* Distant
- Subfamily **Hydarinae**
- Genus 20. ***Hydarella***
44. *Hydarella orientalis* (Distant)
- Subfamily **Colpurinae**
- Genus 21. ***Colpura*** Bergroth 1894
45. *Colpura nodulosa* (Distant)
46. *Colpura obscura* Dallas
47. *Colpura sulcata* Paiva
48. *Colpura erebus* Distant
49. *Colpura funebris* Distant
- Genus 22. ***Hygia*** Uhler 1861
50. *Hygia touchi* (Distant)

Superfamily COREOIDEA

Coreid bugs are generally medium to large insects, head much narrower than pronotum; antennae four segmented, inserted on the upper side of the head; ocelli present; rostrum four segmented; scent glands opening on thorax conspicuous. Mostly dull coloured and capable of producing pungent scent, in some genera they exhibit extraordinary dialation of the antennae, many species have flattened and leaf like legs, therefore they are called leaf-footed bugs. A few species are known to be predacious in nature.

The superfamily Coreoidea is represented in Meghalaya by two families, namely Coreidae and Alydidae.

Key to the families of superfamily Coreoidea found in Meghalaya

1. Bucculae short, not extending to the insertion of antennae; pronotum posteriorly slightly longer than the head along the mid-longitudinal axis; scutellum not reaching the base of metanotum and generally narrower than the interocular space ALYDIDAE
- Bucculae long, extending to near insertion of antennae; pronotum posteriorly three times or more longer than head along the mid-longitudinal axis; scutellum reaching or surpassing the base of metanotum and generally broader than the interocular space COREIDAE

Family I. ALYDIDAE

In Meghalaya the family Alydidae is represented by two subfamilies.

Key to the subfamilies of the family Alydidae found in Meghalaya.

1. Pronotum at widest point usually at least half as wide as and distinctly longer than head; aedeagus always with a ventral pair of thecal appendages; ocelli minute to large, usually centrally placed and moderately separated from each other behind the compound eyes subfamily Leptocorisinae
- Pronotum at widest point only slightly wider and longer than head; aedeagus usually without ventral pair of thecal appendages; ocelli usually large, generally centrally placed and narrowly separated from each other subfamily Alydinae

Subfamily Leptocorisinae

Genus 1. *Leptocorisa* Latreille 1825

1825. *Leptocorisa* Latreille, *Fam. Nat.*, : 421

1. *Leptocorisa acuta* (Thunberg)

1783. *Cimex acutus* Thunberg, *Nov. Ins. Sp.*, 2 : 34.

1853. *Gerris varicornis* : Fabricius, *Syst. Rhyn.*, : 260.

1904. *Leptocorisa acuta* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 410.

1904. *Leptocorisa varicornis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 409.

1965. *Leptocorisa acuta* : Ahmed, *Bull. Brit. Mus. (nat. Hist.) Suppl.* 5 : 78.

Material examined : 10 exs. Moues mai, Cherrapungi, East Khasi Hill Dist., 20.vii.1973, A. K. Ghosh coll.

Diagnosis : Body length of adult insect may vary from 13-16 mm; body cylindrical, pale brown in colour; head elongated; antennae uniformly pale, first and fourth joints longest and subequal in length while second and third shortest and subequal; rostrum short, hardly reaching apices of second coxae; a small distinct tubercle near each lateral pronotal angle; pronotum with a distinct mid-longitudinal carina.

Distribution : India : Meghalaya (East Khasi Hills); Assam; Bihar; Karnataka; Kerala; Maharashtra; Sikkim; Tamil Nadu; West Bengal. Elsewhere : Australia, Bhutan, Burma, Formosa, Hong Kong, Malaya, New Guinea, Pakistan, Sri Lanka, Sumatra, Solomon, Islands, Thailand, Vietnam.

Subfamily Alydinae

Key to the genera of the subfamily Alydinae found in Meghalaya

1. Posterior femora well developed and armed with spines beneath; rostrum with second joint not or slightly longer than the fourth joint.....**Riptortus**
 Posterior femora not modified and not armed with spines but finely spinulose; rostrum with second joint about as long as third and fourth joints together**Babaranus**

Genus 2. *Riptortus* Stal 1859

1859. *Riptortus* Stal, *Ofv. Vet.-Akad. Forh.*, : 460.

Key to the species of the genus *Riptortus*

1. Body dark cinemon brown; lateral pronotal spines less acute and small; pronotal disc with no distinct rugocities; posterior femora with a ventro-lateral row of thin spines**linearis**
 Body cinemon brown; lateral pronotal spines more acute and long; pronotal disc with distinct scattered rugocities; posterior femora with ventro-lateral row of thick spines**strenuus**

2. *Riptortus linearis* (Fabricius) 1775

1775. *Lygaeus linearis* Fabricius, *Syst. Ent.*, : 710.

1904. *Riptortus linearis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 415.

Material examined : 5 exs., William Nagar, East Garo Hills Dist., 9.iii.1991, B. N. Das coll.

Diagnosis : Adult insect may reach upto 15 mm in length, linear in appearance. Other diagnostic characters as in species key.

Distribution : India : Meghalaya (East Garo Hills); Karnataka; Sikkim; West Bengal. Elsewhere : Burma, Malayan Archipelago, Sri Lanka.

3. *Riptortus strenuus* Horvath

1889. *Riptortus strenuus* Horvath, *Term. Fuzetek*, : 35.

1904. *Riptortus strenuus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 415.

Material examined : 5 exs., Tura, West Garo Hills Dist., 10.iv.1991, B. N. Das coll.

Diagnosis : Adult insect may reach upto 16 mm in length; stout and wider in appearance in comparison to *R. linearis*. Other diagnostic characters as in species key.

Distribution : India : Meghalaya (West Garo Hills): NEFA; Uttar Pradesh.

Genus 3. *Babaranus* Distant

1908. *Babaranus* Distant, *Fauna Brit. India, Rhynchota*, 4 : 482.

4. *Babaranus ornatulus* Distant *

1908. *Babaranus ornatulus* Distant, *Fauna Brit. India, Rhynchota*, 4 : 482.

Material examined : 3 exs., William Nagar, East Garo Hills Dist., 9.iii.1991, B. N. Das coll.

Diagnosis : Body length of adult insect may reach upto 16 mm., head with two longitudinal lines on anterior area and a small spot on disc; antennae with first, second and third joints subequal in length; fourth longest; pronotum very thickly darkly punctate and anterior area with two short erect spines while lateral angles produced into few long horizontal spines; legs long slender finely spinlose; femora not modified; posterior tibiae a little curved and as long as femora; posterior tarsi with basal joint a little longer than the remaining two joints together.

Distribution : India : Meghalaya (East Garo Hills); Assam. Elsewhere : Burma.

Family II. COREIDAE

Key to the subfamilies of the family Coreidae found in Meghalaya

1. Tibiae sulcate or non-sulcate above..... 2
Tibiae otherwise..... 3
2. Tibiae sulcate above Subfamily Corinae
Tibiae non-sulcate and rounded above Subfamily Pseudophoelinae
3. Antenal first joint with clavate apices; lateral angles of pronotum with long spines.....
..... Subfamily Hydarinae
Antenal first joint without clavate apices; lateral angles of pronotum without long spines.....
..... Subfamily Colpurinae

Subfamily Corinae

Tribe Mictini

Key to the genera of the tribe Mictini

1. Pronotum produced anteriorly remarkably beyond the tip of the head *Derepteryx*
Pronotum not produced anteriorly beyond the tip of the head 2
2. Pronotum expanded remarkably laterally 3
Pronotum not expanded laterally 5

3. Scutellum tuberculate at the apex; posterior femora in both the sexes strongly tuberculate; posterior tibiae dilated remarkably on both sides while anterior and middle tibiae dilated dorsally ***Helcomeria***
 Scutellum not tuberculate at the apex; posterior femora of male only tuberculate; posterior tibiae moderately dilated on both sides but no dialation on anterior and middle tibiae 4
4. Posterior femora in male longitudinally tuberculate above; on each posterior tibial dialation in male an acute process at the middle ventrally ***Prionolomia***
 Posterior femora in male not tuberculate above; on each posterior tibial dialation in male the acute process near the base ventrally ***Ochrochira***
5. Abdomen beneath in male distinctly tuberculate; posterior tibiae dentate on inner margin in male ***Mictis***
 Abdomen beneath in male very strongly gibbously tuberculate; posterior tibiae not dentate in either sex ***Anoplocnemis***

Genus 4. *Derepteryx* White 1839

1839. *Derepteryx* White, *Charlesworth's Mag. nat. Hist.*, (2)3 : 542.

Key to the species of the genus *Derepteryx*

1. Pronotum above with small scattered tubercles; lateral process of pronotum strongly toothed on inner margin while outer margin finely serrated; posterior femora of male incrassated and armed with two well developed spines on the vantral side on each; posterior tibiae of male dilated on both inner and outer sides ***grayi***
 Pronotum above rugose, not tuberculate; lateral process of pronotum strongly spined on both inner and outer margins; posterior femora of male incrassated and armed with a single well developed spine on the ventral side on each; posterior tibiae of male dilated only on inner side ***hardwicki***

5. *Derepteryx grayi* White *

1839. *Derepteryx grayi* White, *Charlesworth's Mag. nat. Hist.*, (2)3 : 542.

1904. *Derepteryx grayi* : Distant, *Fauna Brit. India, Rhynchota* 1 : 334.

Material examined : 2 exs., Jowai, East Khasi Hills, 26.ix.1991, *R. S. Burman* coll.; 2 exs., Jowai, East Khasi Hills, 9.xi.1991, *R. C. Basu* coll.

Diagnosis : Body length 33 mm, breadth between the pronotal angles 19 mm. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); Sikkim; West Bengal. Elsewhere : Burma, Nepal.

6. *Derepteryx hardwicki* White

1839. *Derepteryx hardwicki* White, *Charlesworth's Mag. nat. Hist.*, (2)3 : 542.

1904. *Derepteryx hardwicki* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 334.

Material examined : 2 exs., Cherrapunji, East Khasi Hills, 15.v.1909, R. Warren coll.

Diagnosis : Body length 26-28 mm., breadth between the pronotal angles 15-16 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills). Elsewhere : Burma.

Genus 5. *Helcomeria* Stal 1873

1873. *Helcomeria* Stål, *En. Hem.*, 3 : 40.

7. *Helcomeria spinosa* Signoret

1851. *Helcomeria spinosa* Signoret, *Ann. Soc. ent. France*, : 123.

1904. *Helcomeria spinosa* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 336.

1919. *Helcomeria spinosa* : Paiva, *Rec. Indian Mus.*, 16 : 356

Material examined : 5 exs., Jowai, Jaintia Hills, 13.xii.1991, R.C. Basu coll.; 1 ex., Tura, West Garo Hills, 15.viii.1971, S. Kemp coll.

Diagnosis : Body length 34-38 mm, breadth between the pronotal angles 19-20 mm.; anterior margins of pronotum strongly spined, lateral margins of the dialated processes more irregularly spinous, upper side finely tuberculated and rugose; posterior femora strongly tuberculate in both sexes, in male strongly spined before apex; posterior tibiae dialated on both sides, inwardly spined in male only, middle and anterior tibiae outwardly dialated.

Distribution : India : Meghalaya (West Garo Hills, Jaintia Hills); Assam; Nagaland; Sikkim.

Genus 6. *Prionolomia* Stal 1873

1873. *Prionolomia* Stal, *En. Hem.*, 3 : 37.

Key to the species of the genus *Prionolomia*

1. Pronotum rugose and obscurely granulated; lateral processes of pronotum produced somewhat upward and forward, gradually narrowed to the apex; posterior femora in male tuberculated above and prominently spined beneath near apex; posterior tibiae in male prominently dialated on both sides with strongly angulate beyond middle on the inner side.....

..... *gigas*

Pronotum distinctly granulated anteriorly; lateral processes of pronotum produced horizontally with the apices narrowed and obtusely pointed; posterior femora in male tuberculated on both above and beneath; posterior tibiae in male dialated on the inner side with prominently angulated..... *fulvicornis*

8. *Prionolomia gigas* Distant

1879. *Prionolomia gigas* Distant, *Ann. Mag. nat. Hist.*, (5)3 : 128.

1904. *Prionolomia gigas* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 337.

Material examined : 3 exs., Tura, West Garo Hills., 15.iii.1991, R. S. Burman coll.

Diagnosis : Body length 43 mm, breadth between the pronotal angles 19 mm. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills, West Garo Hills). Elsewhere : Burma.

9. *Prionolomia fulvicornis* (Fabricius)

1787. *Cimex fulvicornis* Fabricius, *Mant.*, 2 : 288

1904. *Prionolomia fulvicornis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 338

Material examined : 3 exs., Tura, West Garo Hills, 15.iii.1991, R. S. Burman coll.

Diagnosis : Body length 26-29 mm, breadth between the pronotal angles 12-13.5 mm. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills, West Garo Hills).

Genus 7. *Ochrochira* Stal 1873

1873. *Ochrochira* Stal, *En. Hem.*, 3 : 39

Key to the species of the genus *Ochrochira*

1. Pronotum with distinct mid-longitudinal depression..... 2
 Pronotum with inconspicuous or no mid-longitudinal depression..... 3
2. Pronotal angles more produced and dentation on the posterior margin of lateral angles; first and fourth antennal joints subequal in length, while second and third joints almost equal; male with posterior femoral spine on each more stronger and longer in structure *biplagiata*
 Pronotal angles less produced and no dentation on the posterior margin of lateral angles; first antennal joint longest, while third joint longer than second; male with posterior femoral spine on each thin and smaller *nigrorufa*
3. Pronotum with lateral margins prominently produced, strongly and coarsely dentated; posterior femur of male with prominent spine placed a little beyond the middle *albiditarsis*
 Pronotum with lateral margins moderately reflexed and horizontally produced, also minutely serrated; posterior femur of male with prominent spine placed a little anterior to the middle ..
 *granulipes*

10. *Ochrochira biplagiata* (Walker)

1871. *Myctis biplagiata* Walker, *Cat. Hist.*, 4 : 22.

1893. *Ochrochira biplagiata* : Distant, *Ann. Mag. nat. Hist.*, (6)12 : 121.

1904. *Ochrochira biplagiata* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 343.

Material examined : 3 exs., Damalgiri, Tura, West Garo Hills, 17.iii.1991, R. S. Burman coll.

Diagnosis : Body length 26-27 mm, breadth between pronotal angles 11-12.5 mm. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills, West Garo Hills); Sikkim. Elsewhere : Burma, Nepal.

11. *Ochrochira nigrorufa* (Walker)1871. *Physomerus nigrorufa* Walker, *Cat. Het.*, 4 : 601893. *Ochrochira nigrorufa* : Distant, *Ann. Mag. nat. Hist.*, (6)12 : 121.1904. *Ochrochira nigrorufa* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 344.*Material examined* : 4 exs., East Khasi Hills, no data, Major G. A. coll.*Diagnosis* : Body length 25-28 mm, breadth between the pronotal angles 9-10 mm. Other characters as in key.*Distribution* : India : Meghalaya (East Khasi Hills). Elsewhere : Burma.12. *Ochrochira albiditarsis* (Westwood) *1842. *Myctis albiditarsis* Westwood, in *Hope Cat.*, 2 : 11.1873. *Ochrochira albiditarsis* : Stal, *En. Hem.*, 3 : 44.1904. *Ochrochira albiditarsis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 342*Material examined* : 3 exs., Tura, West Gora Hills, 17.iii.1991, R. S. Burman coll.*Diagnosis* : Body length 23 mm, breadth between pronotal angles 8 mm. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills); Himachal Pradesh. Elsewhere : Bangladesh.13. *Ochrochira granulipes* (Westwood)1842. *Myctis granulipes* Westwood, in *Hope Cat.*, 2 : 11.1904. *Elasmomia granulipes* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 339.1919. *Elasmomia granulipes* : Paiva, *Rec. Indian Mus.*, 16 : 356.1980. *Ochrochira granulipes* : O'Shea & Schaefer, *Oriental Ins.*, 14(2) : 244.*Material examined* : 1 ex., Tura, West Garo Hills, 15.vii.1917, S. Kemp coll.*Diagnosis* : Body length 21-25 mm, breadth between pronotal angles 8-10 mm. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills); Sikkim.Genus 8. *Mictis* Leach 18141814. *Mictis* Leach, *Zool. Misc.*, 1 : 92Key to the species of the genus *Mictis*

1. Length of the adult about 30-32 mm; pronotum densely punctate and slightly rugulose ..*pictor*
Length of the adult generally does not exceed 26 mm; pronotum otherwise..... 2
2. Pronotum with lateral angles moderately prominent and subacutely rounded; fourth antennal segment longest, and slightly longer than the first segment..... *tenebrosa*
Pronotum with lateral angles moderately prominent and apices not rounded but subacute to pointed processess; fourth antennal segment longest and much longer than the first segment..
.....*gallina*

14. *Mictis pictor* (Fabricius)1794. *Lygaeus pictor* Fabricius, *Ent. Syst.*, 4 : 1381904. *Mictis pictor* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 346.*Material examined* : 2 exs., West Garo Hills, 30.viii.1917, S. Kemp coll.*Diagnosis* : Body length 30-32 mm, breadth between pronotal angles 12-14 mm., pronotal lateral angles moderately prominent and margins serrated. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills); Assam.15. *Mictis tenebrosa* (Fabricius)1787. *Cimex tenebrosa* Fabricius, *Mant.*, 2 : 288.1842. *Mictis fasciatus* : Westwood, in *Hope Cat.*, 2 : 11.1904. *Mictis tenebrosa* : Distant, *Fauna Brit. India, Rhynchota* 1 : 344.1919. *Mictis tenebrosa* : Paiva, *Rec. Indian Mus.*, 16 : 356.*Material examined* : 2 exs., Umang, East Khasi Hills, 21.i.1964, A. K. Mondal coll.*Diagnosis* : Body length 23-26 mm, breadth between the pronotal angles 8-9 mm, posterior femora in male strongly curved and incrassated but in female less curved and moderately thickened. Other characters as in key.*Distribution* : India : Meghalaya (East Khasi Hills, West Garo Hills); Assam; Sikkim. Elsewhere : Burma, China, Malay Peninsula.16. *Mictis gallina* Dallas1852. *Mictis gallina* Dallas, *List Hem.*, 2 : 403.1904. *Mictis gallina* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 345.1919. *Mictis gallina* : Paiva, *Rec. Indian Mus.*, 16 : 356.*Material examined* : 3 exs., Tura, West Garo Hills, 15.vii.1917, Major G. A. coll.*Diagnosis* : Body length 25-26 mm, breadth between pronotal angles 9-10 mm, pronotal lateral margins finely serrated; posterior femora of male very much incrassated and distally thickened, in female apically incrassated but less prominently so than in male. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills). Elsewhere : Burma.Genus 9. *Anoplocnemis* Stal 18731873. *Anoplocnemis* Stal, *En. Hem.*, 3 : 47.17. *Anoplocnemis phasiana* (Fabricius)1781. *Lygaeus phasiana* Fabricius, *Spec. Ins.*, 2 : 361.1871. *Mictis ferrifera* : Walker, *Cat. Het.*, 4 : 24.1904. *Anoplocnemis phasiana* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 346.*Material examined* : 3 exs., Shillong, East Khasi Hills, 2 xii.1965, S. N. Prasad coll.

Diagnosis : Body length 22-28 mm, breadth between pronotal angles 7-10 mm, posterior femora of male distinctly curved at the base and incrassated, inwardly broadly dentate near apex and outer margin serrated.

Distribution : India : Meghalaya (East Khasi Hills); Assam; Karnataka; Kerala; Maharashtra; Nagaland; Tamil Nadu. Elsewhere : Burma, Malay Peninsula, Sri Lanka.

Tribe Cloresmini

Key to the genera of the tribe Cloresmini

1. Rostrum about reaching the base of mesosternum; antennae with first, second and third joints of nearly equal length.....*Notobitus*
Rostrum not reaching the base of mesosternum; antennae with the first joint shorter than the second.....*Cloresmus*

Genus 10. *Notobitus* Stål 1859

1859. *Notobitus* Stål, *Ofv. Vet.-Ak. Forh.* : 451.

Key to the species of the genus *Notobitus*

1. Adult insect may reach upto 28-30 mm in body length; male with posterior femora not extending beyond the tip of the abdomen and each armed with a strong and curved spine at the middle.....*excellens*
Adult insect scarcely reaches upto 25 mm in body length; posterior femora of male otherwise.....2
2. Posterior femur of male on the inner side with a strong and most prominent spine placed at about one-third from the distal end, and the femur not reaching beyond the tip of the abdomen.....*abdominalis*
Posterior femur of male on the inner side with strong and prominent spine placed a little beyond the middle, and the femur reaching considerably beyond the apex of the abdomen.....*meleagris*

18. *Notobitus excellens* Distant

1879. *Notobitus excellens* Distant, *Ann. Mag. nat. Hist.*, (5)3 : 129.

1904. *Notobitus excellens* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 370.

Material examined : 2 exs., Khera Pasa, West Garo Hills, 4.ix.1991, R. K. Varshney coll.

Diagnosis : Body length 28-30 mm, breadth between pronotal angles 8-9 mm; antennae with first, second and third joints subequal in length; rostrum extending upto the base of mesonotum. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Nagaland; Sikkim; West Bengal.

19. *Notobitus abdominalis* Distant

1901. *Notobitus abdominalis* Distant, *Ann. Mag. nat. Hist.*, (7)7 : 13.

1904. *Notobitus abdominalis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 372.

Material examined : 2 exs., Modymmai, Jaintia Hills, 14.iii.1991, K. K. Roy coll.

Diagnosis : Body length 21-23 mm, breadth between pronotal angles 5-6 mm; lateral margins of abdomen beneath and posterior margins of 3rd, 4th and 5th abdominal segments yellowish. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Nagaland; Sikkim; West Bengal.

20. *Notobitus meleagris* (Fabricius)

1787. *Cimex meleagris* Fabricius, *Mant.*, 2 : 297.

1835. *Nematopus meleagris* : Burmeister, *Handb.*, 2 : 337.

1904. *Notobitus meleagris* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 371.

Material examined : 3 exs., Barapani, East Khasi Hills, 21.iv.1991, A. K. Sanyal coll.

Diagnosis : Body length 22-25 mm, breadth between pronotal angles 6-7 mm; posterior tibiae of male with inner margins strongly serrate. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); Maharashtra; Tamil Nadu. Elsewhere : Burma, China, Malaya Archipelago.

Genus 11. *Cloresmus* Stål 1859

1859. *Cloresmus* Stål, *Ofv. Vet.-Ak. Forh.*, : 451:

Key to the species of the genus *Cloresmus*

1. Body length 18-22 mm; posterior tibiae with inner side conspicuously serrated.....
..... *khasianus*
Body length does not exceed 17 mm; posterior tibiae with inner side less serrated.....2
2. Antennae distinctly longer than half of the body length and slender; antennal first and third joints subequal in length while fourth longest of all*antennatus*
Antennae considerably shorter than half of the body length and comparatively thick; antennal first and third joints subequal in length but shorter than second and fourth joints each
.....*nepalensis*

21. *Cloresmus khasianus* Distant

1901. *Cloresmus khasianus* Distant, *Ann. Mag. nat. Hist.*, (7)7 : 14.

1904. *Cloresmus khasianus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 374.

Diagnosis : Body length 18-22 mm; rostrum scarcely exceeding beyond the anterior coxae; posterior femora in male moderately incrassated with an elongate spine a little beyond the middle of underside on each. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills); Sikkim; West Bengal. Elsewhere : Burma.

Remarks : Collection was not available for present studies. Distant (1901, 1904) recorded it from Khasi Hills.

22. *Cloresmus antennatus* Distant

1908. *Cloresmus antennatus* Distant, *Fauna Brit. India, Rhynchota*, 4 : 471.

Material examined : 2 exs., Nongstoin, East Khas Hills, 21.viii.1991, R. S. Burman coll.

Diagnosis : Body length 12-13 mm; antennal basal joints clothed with long hairs; rostrum reaching the anterior coxae; posterior femora conspicuously spined underside on the apical half. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills), Sikkim

23. *Cloresmus nepalensis* (Westwood)

1842. *Nematopus nepalensis* Westwood, in *Hope Cat.*, 2 : 14.

1904. *Cloresmus nepalensis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 373.

Diagnosis : Body length 14-17 mm, posterior femora of male moderately incrassated armed with a strong spine on the middle of underside on each; rostrum just passing the anterior coxae. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills); Sikkim; Tamil Nadu; West Bengal. Elsewhere : Burma.

Remarks : No collection was available for present studies. Distant (1904) recorded the species from Khasi Hills in his *Fauna of British India, Rhynchota*, Volume.

Tribe Gonocerini

Key to the genera of the tribe Gonocerini

1. Lateral angles of pronotum acutely upwardly produced; abdominal segmental angles not exteriorly acutely produced *Cletus*
 Lateral angles of pronotum horizontally produced; abdominal segmental angles exteriorly acutely produced..... *Cletomorpha*

Genus 12. *Cletus* Stål 1859

1859. *Cletus* Stål, *Freg. Resa, Ins. Hem.*, : 236.

Key to the species of the genus *Cletus*

1. Adult insect may reach upto 12 mm in length; pronotum with lateral angles prominently acutely produced and apices with black spines, one on each..... *punctiger*
 Adult insect may reach upto 10 mm in length; pronotum with lateral angles otherwise 2
2. Breadth between the pronotal angles 3.5-4 mm; pronotal angles shortly but acutely produced, apices ending with sharp pointed fuscous spines; femora without castaneous spots *bipunctatus*
 Breadth between the pronotal angles 4.5-5 mm; pronotal angles widely and acutely produced, apices ending with short thick castaneous spines; all femora covered with numerous castaneous spots..... *punctulatus*

24. *Cletus punctiger* (Dallas)

1852. *Gonocerus punctiger* Dallas, *List. Hem.*, 2 : 494.
 1871. *Homocerus minax* : Walker, *Cat. Het.*, 4 : 99.
 1904. *Cletus punctiger* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 393.
 1919. *Cletus punctiger* : Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 3 exs., Ranikar, West Khasi Hills, 3.vii.1981, M. R. Rynth coll.

Diagnosis : Body length 11-12 mm, breadth between pronotal angles 5-5.5 mm; sternum coarsely punctate with a small black spot on the lateral area on each side. Other charactes as in key.

Distribution : India : Meghalaya (West Khasi Hills); West Bengal. Elsewhere : Burma, China.

25. *Cletus bipunctatus* (Westwood)

1842. *Coreus bipunctatus* Westwood, in *Hope Cat.*, 2 : 23.
 1904. *Cletus bipunctatus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 393.
 1919. *Cletus bipunctatus* : Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 2 exs., Ranikar, West Khasi Hills, 3.viii.1981, M. R. Rynth coll.

Diagnosis : Body length scarcely 10 mm; breadth between pronotal angles 3.5-4 mm. Other characters as in key.

Distribution : India : Meghalaya (West Khasi Hills); Karnataka; Maharashtra; West Bengal. Elsewhere : Burma.

26. *Cletus punctulatus* (Westwood)

1842. *Coreus punctulatus* Westwood, in *Hope Cat.*, 2 : 23.
 1904. *Cletus punctulatus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 392.
 1919. *Cletus punctulatus* : Paiva, *Rec. Indian Mus.*, 16 : 358.

Diagnosis : Body length scarcely 10 mm; breadth between pronotal angles 4.5-5 mm. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills); Assam, Nagaland; Sikkim, West Bengal.

Remarks : No collection was available for present studies. According to Distant (1904) the species has been included in the Fauna of Meghalaya.

Genus 13. *Cletomorpha* Mayr 1866

1866. *Cletomorpha* Mayr, *Reise Nov. Hem.*, : 118.

Key to the species of the genus *Cletomorpha*

1. Antennae dark brown in colour; antennal first and second joints subequal in length; pronotum with lateral angles acutely produced and distinctly recurved on each *raja*
 Antennae yellowish in colour; antennal first and third joints subequal in length; pronotum with lateral angles produced into a short spine on each *hastata*

27. *Cletomorpha raja* Distant *

1901. *Cletomorpha raja* Distant, *Ann. Mag. nat. Hist.*, (7)7 : 423.
 1904. *Cletomorpha raja* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 397.
 1919. *Cletomorpha raja* : Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 2 exs., Tura, West Garo Hills, 19.vi.1991, B. N. Das coll.

Diagnosis : Body length 9 mm, breadth between pronotal angles 4 mm. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Assam; Sikkim; West Bengal. Elsewhere : Burma.

28. *Cletomorpha hastata* (Fabricius)

1787. *Cimex hastata* Fabricius, *Mant.*, 2 : 287.

1904. *Cletomorpha hastata* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 396.

Material examined : 2 exs., Rongsagiri, West Garo Hills, 1.iv.1991, B. N. Das coll.

Diagnosis : Body length 8-8.5 mm, breadth between the pronotal angles 4-4.5 mm. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Maharashtra; West Bengal. Elsewhere : Pakistan.

Tribe Dasynini

Genus 14. *Dasynus* Burmeister 1834

1834. *Dasynus* Burmeister, *Nov. Act. Ac. Leop.*, 16 (Suppl.) : 297.

Key to the species of the genus *Dasynus* of Meghalaya

1. Antennal first, second and fourth joints subequal in length while third much shorter than others; scutellum tinged with red; posterior pronotal angles moderately prominent...*orientalis*
 Antennal first and second joints subequal in length and those are longer than third and fourth which are subequal in length; scutellum brownish yellow; posterior pronotal angles very prominent.....*relatus*

29. *Dasynus orientalis* (Distant)

1889. *Pendulinus orientalis* Distant, *Ent. month. Mag.*, 25 : 231.

1908. *Pendulnus orientalis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 388.

Material examined : 3 exs., Tura, West Garo Hills, 13.vii.1917, S. Kemp coll.

Diagnosis : Body Length 16-18 mm, breadth between pronotal angles 5-5.25 mm; rostrum reddish, apex black and reaching the intermediate coxae. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Assam; Sikkim.

30. *Dasynus relatus* Paiva

1919. *Dasynus relatus* Paiva, *Rec. Indian Mus.*, 16 : 358.

Diagnosis : Body length 17-21 mm, breadth between pronotal angles 6-8. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills).

Remarks : No collection was available for present studies but Paiva (1919) recorded this species from Tura.

Tribe Anisoscledidini

Genus 15. *Leptoglossus* Guerin 1830

1830. *Leptoglossus* Guerin, *Voy. Coq. zool.*, 2(2) : 174.

31. *Leptoglossus membranaceus* (Fabricius)

1781. *Cimex membranaceus* Fabricius, *Spec.*, 2 : 351.

1835. *Anisoscelis membranaceus* : Burmeister, *Handb.*, 2 : 332.

1904. *Leptoglossus membranaceus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 382.

Diagnosis : Body length 19-22 mm, breadth between pronotal angles 7 mm; an arcuated yellowish fascia crossing anterior area of pronotum; first antennal joint as long as head, second and fourth joints subequal in length and longer than third; inner margin of posterior femur prominently spined but outer margin less spined; posterior tibia strongly dilated for more than basal half of the length.

Distribution : India : Meghalaya (Khasi Hills) ; Andaman and Nicobar Islands. Elsewhere : Australia, Burma, Africa, Malayan Archipelago, Sri Lanka.

Remarks : Distant (1904) recorded the species from Khasi Hills.

Tribe Homoeocerini

Key to the genera of the tribe Homoeocerini

1. Posterior femora and tibiae not modified; pronotal angles moderately prominent.....*Homoeocerus*
 Posterior femora and tibiae modified; pronotal angles either not prominent or moderately prominent.....2
2. Claval suture about as long as apical margin of corium; 4th antennal joint slightly shorter than the 3rd joint; posterior femora strongly incrassate.....*Physomerus*
 Claval suture a little longer than the apical margin of corium; 4th antennal joint distinctly shorter than the 3rd joint; posterior femora moderately incrassate.....*Acanthocoris*

Genus 16. *Homoeocerus* Burmeister, 1835

1835. *Homoeocerus* Burmeister, *Handb.*, 2(1) : 316.

Key to the species of the genus *Homoeocerus*

1. Pronotal angles not prominent to form any acute spine like structures.....2
 Pronotal angles may be moderately prominent or conspicuously prominent.....4
2. Antennal first joint longest, third and fourth joints subequal; rostral third and fourth segments almost subequal in length; corium with a large whitish spot placed on lateral border but not to reach to the inner margin.....*consisus* var A
 Antennal second joint longest; rostral segment otherwise; corium different.....3
3. Antennal first joint longer than third, fourth joint distinctly thickened than third; rostral third segment slightly longer than fourth; corium with a thin transverse pale spot placed near the inner angle*albiguttulus*

- Antennal first and third joints subequal in length, fourth joint cylindrical and slightly thickend than third; rostral third segment considerably longer than fourth; corium without any spot..... *simiolus*
4. Pronotal angles moderately prominent to form small process on each..... 5
- Pronotal angles conspicuously prominent and each terminating with an acute spine like structure 6
5. Antennal first and second joints subequal in length but third a little longer than fourth; rostral third and fourth segments subequal in length; corium with a pale small obscure discal spot placed near to the inner angle..... *biguttatus*
- Antennal first and second joints subequal in length but third shorter than fourth; rostral third segment slightly shorter than fourth; corium with a rounded pale spot placed at the inner angle..... *subjectus*
6. Antennal third joint shortest and considerably shorter than fourth; corium with no pale spot but a subcostal black line..... *striicornis*
- Antennal fourth joint shortest and longer than third; corium with pale spot but no subcostal black line 7
7. Antennal first joint considerably shorter than second; corium with two small transverse spots placed at the inner angle *walkeri*
- Antennal first joint a little shorter than second; corium with spot otherwise..... 8
8. Antennal third joint a little shorter than first; rostral third and fourth segment almost subequal in length; corium with a large transverse pale spot placed only near the inner angle..... *signatus*
- Antennal first and third joints subequal in length; rostral third segment longer than fourth; corium with a large transverse pale spot which laterally touches both inner and other margin..
- *inornatus*

32. *Homoeckerus consisus* var. A Walker

1871. *Homoeckerus consisus* Walker, *Cat. Het.*, 4 : 97.

1904. *Homoeckerus consisus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 364.

1919. *Homoeckerus consisus* : Paiva, *Rec. Indian Mus.*, 16 : 357.

Material examined : 2 exs., Tura, West Garo Hills, 15.vii.1917, S. Kemp coll.

Diagnosis : Body length 14-16 mm, breadth between pronotal angles 3-4 mm; pronotum about as long as broad at base; rostrum with third and fourth joints almost subequal in length. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills): Sikkim; West Bengal. Elsewhere : Burma, Thailand.

33. *Homoeckerus albiguttulus* Stål

1873. *Homoeckerus albiguttulus* Stal, *En. Hem.*, 3 : 61.

1904. *Homoeckerus albiguttulus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 361.

Diagnosis : Body length 16-20 mm, breadth between pronotal angles 4.5-5 mm. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills) ; Assam, Sikkim. Elsewhere : Burma, Cochin, China, Malay Peninsula, Sumatra.

Remarks : Collection was not available for present studies. Distant (1904) recorded the species from Khasi Hills.

34. *Homoeckerus simiolus* Distant

1904. *Homoeckerus simiolus* Distant, *Fauna Brit. India, Rhynchota*, 1 : 363.

1919. *Homoeckerus simiolus* : Paiva, *Rec. Indian Mus.*, 16 : 356.

Material examined : 2 exs., Tura, West Garo Hills, 15.vii.1917, S. Kemp coll.

Diagnosis : Body length 15.5-17 mm, breadth between pronotal angles 4 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (Khasi Hills, West Garo Hills) : Assam; Sikkim. Elsewhere : Burma.

35. *Homoeckerus biguttatus* Westwood *

1842. *Homoeckerus biguttatus* Westwood, in *Hope Cat.*, 2 : 22.

1904. *Homoeckerus biguttatus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 360.

Material examined : 2 exs., Barapani, Shillong, East Khasi Hills, 10.ix.1968, A. R. Lahiri coll.

Diagnosis : Body length 21 mm, breadth between pronotal angles 6 mm. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); Sikkim.

36. *Homoeckerus subjectus* Walker

1871. *Homoeckerus subjectus* Walker, *Cat. Het.*, 4 : 97.

1904. *Homoeckerus subjectus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 361.

1919. *Homoeckerus subjectus* : Paiva, *Rec. Indian Mus.*, 16 : 356.

Material examined : 3 exs., Tura, West Garo Hills, 12.vii.1917, S. Kemp coll.

Diagnosis : Body length 17-18 mm, breadth between pronotal angles 5 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills), Assam. Elsewhere : Thailand.

37. *Homoeckerus striicornis* Scott

1874. *Homoeckerus striicornis* Scott, *Ann. Mag. nat. Hist.*, (4)14 : 362.

1904. *Homoeckerus striicornis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 360.

Material examined : 3 exs., Cherrapunjee, East Khasi Hills, 2.ix.1965, S. N. Prasad coll.

Diagnosis : Body length 17-20 mm, breadth between pronotal angles 4.5-5.5 mm. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); Assam; Maharashtra; Sikkim. Elsewhere : Japan, Sri Lanka.

38. *Homoeckerus walkeri* Kirby

1891. *Homoeckerus walkeri* Kirby, *J. Linn. Soc. Zool.*, **24** : 91.

1904. *Homoeckerus walkeri* : Distant, *Fauna Brit. India, Rhynchota*, **1** : 358.

Material examined : 3 exs., Williamnagar, East Garo Hills; 30.ix.1991, R. K. Varshney coll.

Diagnosis : Body length 18-19 mm, breadth between pronotal angles 5.5-6 mm. Other characters as in key.

Distribution: India : Meghalaya (Khasi Hills, East Garo Hills); Assam; Nagaland; Sikkim. Elsewhere : Burma, Sri Lanka.

39. *Homoeckerus signatus* Walker

1871. *Homoeckerus signatus* Walker, *Cat. Het.*, **4** : 97.

1891. *Homoeckerus signatus* : Kirby, *J. Linn. Soc. Zool.*, **24** : 91.

1904. *Homoeckerus signatus* : Distant, *Fauna Brit. India Rhynchota*, **1** : 356.

Material examined : 2 exs., Tura, West Garo Hills, 9.ix.1991, R. K. Varshney coll.

Diagnosis : Body length 19-21 mm, breadth between pronotal angles 6 mm. Other characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Maharashtra; Sikkim. Elsewhere : Sri Lanka.

40. *Momoeckerus inornatus* Stål

1873. *Homoeckerus inornatus* Stål, *En. Hem.*, **3** : 58.

1904. *Homoeckerus inornatus* : Distant, *Fauna Brit. India, Rhynchota*, **1** : 355.

Material examined : 3 exs., William nagar, East Garo Hills, 9.ix.1991, R. K. Varshney coll.

Diagnosis : Body length 13-16 mm, breadth between pronotal angles 4.-4.5 mm. Other characters as in key.

Distribution : India : Meghalaya (East Garo Hills). ; Pondicherry; Sikkim. Elsewhere : Burma, China.

Genus 17. *Physomerus* Burmeister 1835

1835. *Physomerus* Burmeister, *Hanbd.*, **2** : 341.

41. *Pysomerus grossipes* (Fabricius)

1794. *Lygaens grossipes* Fabricius, *Ent. Syst.*, **4** : 135.

1871. *Physomerus dilineatus* : Walker, *Cat. Het.*, **4** : 59.

1904. *Physomerus grossipes* : Distant, *Fauna Brit. India, Rhynchota*, **1** : 383.

Material examined : 2 exs., Cherrapunjee, East Khasi Hills, 9.ix.1991, R. C. Basu coll.

Diagnosis : Body length 20-24 mm, breadth between pronotal angles 5.5-6.5 mm; posterior tibiae strongly incrassated, finely longitudinally tuberculate on upper and outer areas and obtusely spinous

beneath, each with a long spine at the middle of inner margin and finely serrated upto apex; rostrum reaching the intermediate coxae.

Distribution : India : Meghalaya (East Khasi Hills); Assam; Andaman and Nicobar Islands; Maharashtra; Sikkim; West Bengal. Elsewhere : Burma, Malay Archipelago, Sri Lanka.

Genus 18. *Acanthocoris* Amyot & Serville 1843

1843. *Acanthocoris* Amyot & Serville, Hem., : 213.

42. *Acanthocoris scabrator* (Fabricius)

1803. *Coreus scabrator* Fabricius, Syst. Rhyng., : 195.

1904. *Acanthocoris scabrator* : Distant, Fauna Brit. India, Rhynchota, 1 : 385.

Material examined

Diagnosis : Body length 13-14.5 mm, breadth between pronotal angles 5-5.5 mm; pronotum with lateral angles acutely produced with serrated anterior margin; posterior femora moderately incrassated with serrated inner margin; rostrum reaching the intermediate coxae.

Distribution : India : Meghalaya (West Khasi Hills); Assam; Karnataka; Maharashtra; Sikkim. Elsewhere : Burma, Malay Archipelago.

Subfamily Pseudophoelinae

Genus 19. *Trallianus* Distant 1904

1904. *Trallianum* Distant, Fauna Brit. India, Rhynchota, 1 : 404.

43. *Trallianus chennelli* Distant

1904. *Trallinus chennelli* Distant, Fauna Brit. India, Rhynchota, 1 : 405.

Diagnosis : Body length 13 mm; head elongate and moderately produced in front of antenniferous tubercles; antennae with first joint incrassate and subequal to fourth joint, second joint longest longer than third; rostrum reaching the intermediate coxae; pronotum with a distinct foviate impression, lateral angles sub-prominent and rounded; legs moderately short and stout, posterior femora not extending much beyond the middle of abdomen.

Distribution : India : Meghalaya (Khasi Hills).

Remarks : Collection was not available for present studies. Distant (1904) recorded this species from Khasi Hills.

Subfamily Hydarinae

Genus 20. *Hydarella*

44. *Hydarella orientalis* (Distant)

1904. *Hydara orientalis* Distant, Fauna Brit. India, Rhynchota, 1 : 398.

1975. *Hydarella orientalis* : Ahmad and Shadab, Pakistan J. Soc. Ins. Res., 18 (3-4) : 135.

Material examined : 3 exs., Jowai, Jaintia Hills, 26.ix.1991, R. S. Burman coll.

Diagnosis : Body length 7 mm; thickly punctate, punctures very coarse on the corium, arranged in longitudinal series on clavus, very profound in a single longitudinal submarginal series to corium, pronotum with lateral angles spinous; abdomen more coarsely punctate laterally.

Distribution : India : Meghalaya (Jaintia Hills).

Subfamily Colpurinae

Key to the genus of the subfamily Colpurinae

1. Head long and longer than broad between eyes; first joint of rostrum extending considerably beyond the base of head; pronotum with anterior lateral angles not produced *Colpura*
 Head subquadrate and not or scarcely longer than broad between eyes; first joint of rostrum reaching basal margin of head, pronotum with anterior lateral angles prominently produced ...
 *Hygia*

Genus 21. *Colpura* Bergroth 1894

1894. *Colpura* Bergroth, *Rev. Ent. Franc.*, 8 : 154.

Key to the species of the genus *Colpura*

1. Rostrum extending considerably beyond the posterior coxae 2
 Rostrum extending upto the posterior coxae, not surpassing the first abdominal segment
 *nodulosa*
2. Rostrum extending to the fourth abdominal segment 3
 Rostrum does not reach upto the fourth abdominal segment but to the third segment 4
3. Rostrum reaching upto the basal margin of fourth abdominal segment; a small yellowish spot near the middle of apical margin of corium *obscura*
 Rostrum reaching upto the apical margin of fourth abdominal segment; corium with no yellowish spot but costal margin yellowish red in colour *sulcata*
4. Rostrum reaching the middle of the third abdominal segment; a small dark spot near the posterior margin of corium *erebus*
 Rostrum reaching upto the posterior margin of the third abdominal segment; a large black spot near the claval apex of corium *funnebris*

45. *Colpura nodulosa* (Distant)

1889. *Lybas nodulosa* Distant, *Ent. Month. Mag.*, 25 : 231.

1904. *Colpura nodulosa* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 379.

Diagnosis : Body 8-10 mm in length; pronotum with the lateral angles distinctly subnodulose; abdomen with marginal incisural spots and lateral series of black segmental spots of which last three most distinct. Other characters as in key.

Distribution : India : Meghalaya (Khasi Hills); Sikkim; West Bengal. Elsewhere : Burma.

Remarks : Collection was not available for present studies. Distant (1904) recorded this species from Khasi Hills.

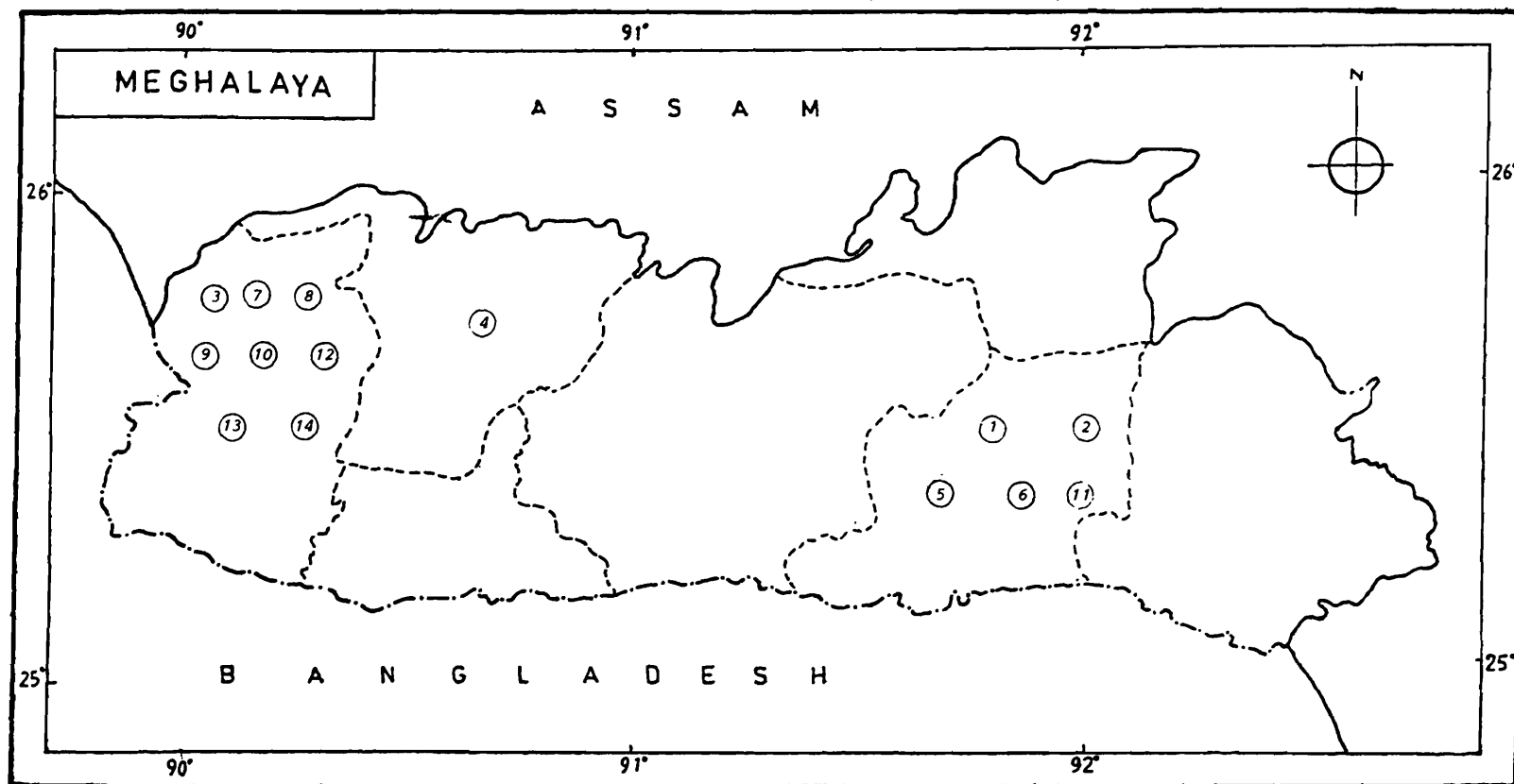
46. *Colpura obscura* Dallas1852. *Lybas obscura* Dallas, *List Hem.*, 2 : 4631904. *Colpura obscura* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 377.*Material examined* : 2 exs., Umang, East Khasi Hills, 21.i.1964, A. K. Mondal coll.*Diagnosis* : Body length 16-17mm; a small yellowish spot near middle of apical margin of corium. Other characters as in the key.*Distribution* : India : Meghalaya (East Khasi Hills). Elsewhere : Java, Korea, Malay, Sumatra.47. *Colpura sulcata* Paiva1919. *Colpura sulcata* Paiva, *Rec. Indian Mus.*, 16 : 357-358.*Material examined* : 2 exs., Tura, West Garo Hills, 15.vii.1917, S. Kemp coll.*Diagnosis* : Body length 16-17 mm; pronotum with lateral margins slightly reflexed. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills).48. *Colpura erebus* Distant1901. *Colpura erebus* Distant, *Ann. Mus. nat. Hist.*, (7)7 : 18.1904. *Colpura erebus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 377.1919. *Colpura erebus* : Paiva, *Rec. Indian Mus.*, 16 : 357.*Material examined* : 2 exs., Tura, West Garo Hills, 15.vii.1917, S. Kemp coll.*Diagnosis* : Body length 11-15 mm; breadth between pronotal angles 3.5-4.5 mm; antennae with first joint thickened and slightly curved, second longest, fourth cylindrical and shorter than third; pronotum with the anterior angles moderately and distinctly prominent, anterior margin concavely sinuate; elytra with membrane not reaching apex of abdomen. Other characters as in the key.*Distribution* : India : Meghalaya (West Garo Hills); Nagaland; Sikkim; West Bengal.49. *Colpura funebris* Distant1901. *Colpura funebris* Distant, *An. Mag. Nat. Hist.*, (7)7 : 16.1904. *Colpura funebris* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 378.*Material examined* : 2 exs., Tura, West Garo Hills, 15.vi.1917, S. Kemp coll.*Diagnosis* : Body length 15 mm, breadth between pronotal angles 4.5 mm; antennae with the basal joints stoutest and curved, second joint much longer than third, fourth cylindrical and shortest, pronotum with the anterior angles rounded. Other characters as in key.*Distribution* : India : Meghalaya (West Garo Hills); Assam; Sikkim.Genus 22. *Hygia* Uhler 18611861. *Hygia* Uhler, *Proc. Ac. N. S. Phil.*, : 287.50. *Hygia touchi* (Distant)1901. *Pachycephalus touchi* Distant, *Ann. Mag. nat. Hist.*, (7)7 : 19.1904. *Hygia touchi* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 380.1919. *Hygia touchi* : Paiva, *Rec. Indian Mus.*, 16 : 358.

Material examined : 3 exs., Tura, West Garo Hills., 15.vii.1917, S. Kemp coll.

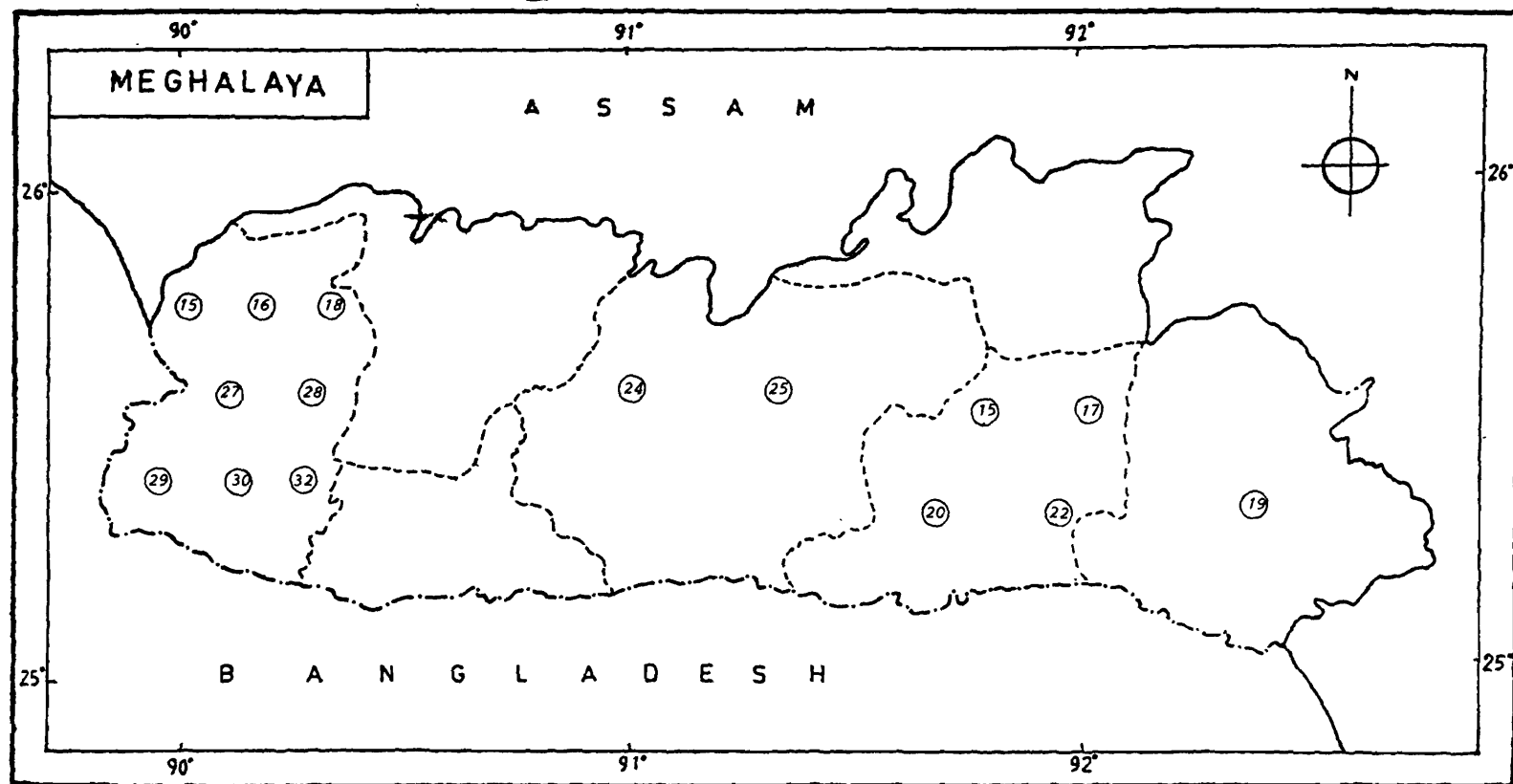
Diagnosis : Body length 9-11 mm, breadth between the pronotal angles 3-3.5 mm, rostrum just passing the posterior coxae; abdomen beneath with four central basal spots, and a black spot on the lateral area of each of the last three segments.

Distribution : India : Meghalaya (West Garo Hills); Assam; Sikkim. Elsewhere : China.

MAP I. DISTRIBUTION OF COREOID BUGS (ORDER HEMIPTERA)

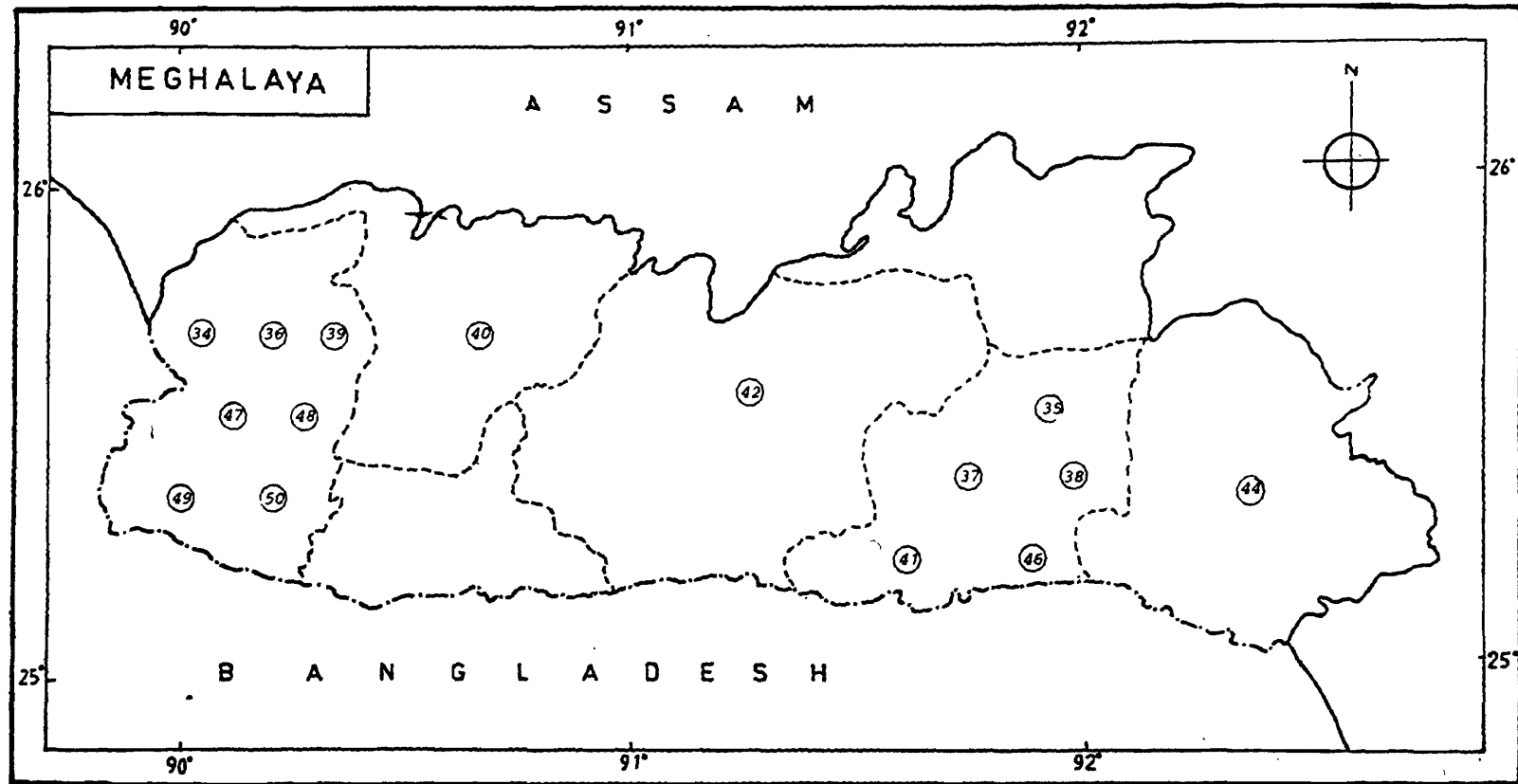


MAP - II. DISTRIBUTION OF COREOID BUGS (ORDER HEMIPTERA)



15. <i>Mictis tenebrosa</i>	24. <i>Cletus punctiger</i>
16. <i>Mictis gallina</i>	25. <i>Cletus bipunctatus</i>
17. <i>Anoplocnemis phasiana</i>	27. <i>Cletomorpha raja</i>
18. <i>Notobitus excellens</i>	28. <i>Cletomorpha hastata</i>
19. <i>Notobitus abdominalis</i>	29. <i>Dasynus orientalis</i>
20. <i>Notobitus meleagris</i>	30. <i>Dasynus relatus</i>
22. <i>Cloresmus antennatus</i>	32. <i>Homoecerus consisus</i> var. A

MAP III. DISTRIBUTION OF COREOID BUGS (ORDER HEMIPTERA)



- 34. *Homoeocerus similus*
- 35. *Homoeocerus biguttatus*
- 36. *Homoeocerus subjectus*
- 37. *Homoeocerus stricornis*
- 38. *Homoeocerus walkeri*
- 39. *Homoeocerus signatus*
- 40. *Homoeocerus inornatus*
- 41. *Physomerus grossipes*

- 42. *Acanthocoris scabrator*
- 44. *Hyderella orientalis*
- 46. *Colpura obscura*
- 47. *Colpura sulcata*
- 48. *Colpura erebus*
- 49. *Colpura funebris*
- 50. *Hygia touchi*

SUMMARY

The paper presents an account of 50 species belonging to 22 genera of the superfamily Coreoidea. Out of four families of Coreoidea only two families viz., Alydidae and Coreidae are represented in Meghalaya. Most of the species belong to the family Coreidae which is the largest family of the superfamily Coreoidea. A considerable number of species infest on cereals, pulses, vegetables and other economically important plants causing serious damage to the yield. In the present paper 6 species under 6 genera are added as new record of the coreoid fauna from the State of Meghalaya. Diagnostic characteristics of each of the species studied along with the distributional pattern in various districts of Meghalaya and other States of India as well as abroad has been mentioned. Distribution of almost all the studied Coreoid species has been also cited in the Map of Meghalaya.

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INSECTA : HEMIPTERA : HETEROPTERA : PENTATOMOIDEA

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INTRODUCTION

The Pentatomids, commonly known as "Shield Bugs", are heteropteran insects. They are mostly phytophagous, some are carnivorous in habit. Some are pests on vegetable crops. Some families like Asopidae are predaceous on lepidopterous larvae. These insects are remarkable for their beautiful colouration and also for a nauseous odour emitted by them. The group is abundant in tropical regions and also spread over temperate zones.

A perusal of literature reveals that about 550 species of Pentatomoidea are known from India (Distant 1902, 1908, 1918; Paiva 1919; Datta *et al.* 1985; Chakraborty *et al.* 1993).

Pentatomid fauna of Meghalaya is rather meagre. So far, 65 species belonging to 51 genera are known from the State. (Distant 1902, 1908; Paiva 1919).

The present work is an attempt to provide a consolidated account of the superfamily Pentatomoidea from Meghalaya. The paper deals with 46 species in 37 genera belonging to 9 families. Of these, 15 species (marked *) belonging to 12 genera are being reported for the first time from Meghalaya. The paper is based on the material collected during mopping surveys of Meghalaya. It is also supplemented by the materials deposited in the National Zoological Collections made by the earlier survey parties of Zoological Survey of India. A list of species so far known from Meghalaya is appended.

Material and Methods, general diagnosis have been dealt in Fauna of West Bengal (State Fauna Series, 3 : 1993). So, these are not included here. Keys to various taxa are provided. Also, diagnosis of the species (not included in key) is also given.

The classification is basically followed by Distant (1902, 1908, 1918) and Ahmad and Kamaluddin (1982). The material is in the Zoological Survey of India, Calcutta.

CLASSIFIED LIST OF PENTATOMOIDEA OF MEGHALAYA

Order		HEMIPTERA
Sub order		HETEROPTERA
Super Family		PENTATOMOIDEA
Family	1.	PENTATOMIDAE
Divisional	I.	Antestiaria
Genus	1.	<i>Antestia</i> Stal

	1.	<i>Antestia anchora</i> (Thunberg)
Genus	2.	<i>Plautia</i> Stal
	2.	<i>Plautia fimbriata</i> (Fabricius)
Division	II.	Carpocoraria
Genus	3.	<i>Dolycoris</i> Mulsant and Rey
	3.	* <i>Dolycoris baccarum</i> (Linnaeus)
	4.	* <i>Dolycoris indicus</i> Stal
Genus	4.	<i>Halyomorpha</i> Mayr
	5.	<i>Halyomorpha picus</i> (Fabricius)
Genus	5.	<i>Tolumnia</i> Stal
	6.	<i>Tolumnia latipes</i> (Dallas)
Division	III.	Eurydemaria
Genus	6.	<i>Agonoscelis</i> Spinola
	7.	<i>Agonoscelis nubila</i> (Fabricius)
Genus	7.	<i>Bagrada</i> Stal
	8.	* <i>Bagrada picta</i> (Fabricius)
Genus	8.	<i>Eurydema</i> Laporte
	9.	<i>Eurydema pulchrum</i> (Westwood)
Genus	9.	<i>Strachia</i> Hahn.
	10.	<i>Strachia crucigera</i> Hahn.
Division	IV.	Eusarcocoriaria
Genus	10.	<i>Carbula</i> Stal
	11.	* <i>Carbula indica</i> (Westwood)
Genus	11.	<i>Eysarcoris</i> Hahn.
	12.	* <i>Eysarcoris guttiger</i> (Thunberg)
	13.	<i>Eysarcoris montivagus</i> (Distant)
	14.	* <i>Eysarcoris ventralis</i> (Westwood)
Division	V.	Halyaria
Genus	12.	<i>Dalpada</i> Amyot & Serville
	15.	<i>Dalpada oculata</i> (Fabricius)
	16.	<i>Dalpada</i> sp.

* New record from Meghalaya

- Genus 13. *Erthesina* Spinola
 17. **Erthesina fullo* (Thunberg)
- Genus 14. *Halys* Fabricius
 18. *Halys dentatus* Fabricius
- Division VI. Hoplistoderaria
 Genus 15. *Hoplistodera* Westwood
 19. **Hoplistoodera virescens* Dallas
 20. *Hoplistodera* sp.
- Division VII. Nezaria
 Genus 16. *Nezara* Amyot & Serville
 21. *Nezaraviridula* (Linnaeus)
- Genus 17. *Piezodorus* Fieber
 22. **Piezodorus rubrofasciatus* (Fabricius)
- Division VIII. Sciocoraria
 Genus 18. *Sciocoris* Fallen
 23. *Sciocoris* sp.
- Division IX. Tropicoraria
 Genus 19. *Placosternum* Amyot & Serville
 24. *Placosternum taurus* (Fabricius)
- Family II. SCUTELLERIDAE
 Genus 20. *Cantao* Amyot & Serville
 25. *Cantao ocellatus* (Thunberg)
- Genus 21. *Chrysocoris* Hahn.
 26. *Chrysocoris stollii* (Wolff)
- Genus 22. *Hotea* Amyot & Serville
 27. *Hotea curculionoides* (Herr.-Sch.)
- Genus 23. *Poecilocoris* Dallas
 28. *Poecilocoris druriei* (Linnaeus)
 29. *Poecilocoris hardwickii* (Westwood)
- Family III. GRAPHOSOMATIDAE
 Genus 24. *Scotinophara* Stal
 30. *Scotinophara* sp.
- Genus 25. *Stortheconis* Horvath
 31. *Stortheconis* sp.

- Family IV. DINIDORIDAE
- Genus 26. *Coridius* Illiger
32. *Coridius brunneus* (Thunberg)
33. *Coridius* sp.
- Genus 27. *Cyclopelta* Amyot & Serville
34. *Cyclopelta siccifolia* (Westwood)
- Family V. ASOPIDAE
- Genus 28. *Andrallus* Bergroth
35. *Andrallus spinidens* (Fabricius)
- Genus 29. *Picromerus* Amyot & Serville
36. **Picromerus obtusus* Walker
- Genus 30. *Zicrona* Amyot & Serville
37. **Zicrona caerulea* (Linnaeus)
- Family VI. UROSTYLIDAE
- Genus 31. *Anaxandra* Stal
38. *Anaxandra* sp.
- Family VII. PLATASPIDAE
- Genus 32. *Coptosoma* Dallas
39. **Coptosoma feanum* Montandon
40. **Coptosoma w. nigram* Varshney
- Family VIII. TESSARATOMIDAE
- Genus 33. *Eusthenes* Laporte
41. *Eusthenes cupreus* (Westwood)
42. *Eusthenes scutellaris* (Herrich-Schaffer)
- Genus 34. *Mattiphus* Amyot & Serville
43. **Mattiphus oblongus* Dallas
- Genus 35. *Pycanum* Amyot & Serville
44. *Pycanum ochraceum* Distant
- Genus 36. *Tessaratomya* Lepeletier & Serville
45. **Tessaratomya papillosa* (Drury)
- Family IX. CYDNIDAE
- Genus 37. *Stibaropus* Dallas
46. *Stibaropus callidus* (Schiodte)

* New record from Meghalaya

SYSTEMATIC ACCOUNT

Key to families of Pentatomoidea

1. Head always clypeated; hemelytra longer than the body, folded in at the base of membrane.
..... Plataspidae
- Head normal; hemelytra straight, not folded in at the base of membrane..... 2
2. Hamus present; scutellum covering the whole of the hemelytra, excepting extreme base of outer margin..... Scutelleridae
- Hamus absent..... 3
3. Scutellum large, whole of outer margin of corium exposed..... Graphosomatidae
- Scutellum variable in size and shape..... 4
4. Scutellum large, nearly covering the whole of abdomen..... Cydnidae
- Scutellum Extending to rarely beyond middle of abdomen; tarsi 3-segmented..... 5
5. Spiracles of basal ventral segment not hidden by metasternum..... Tessaratomidae
- Spiracles at basal ventral segment hidden by metasternum..... 6
6. Rostrum short not usually passing anterior coxae..... Urostylidae
- Rostrum long, always passing anterior coxae..... 7
7. Membrane very large..... Dinidoridae
- Membrane small..... 8
8. Basal segment of rostrum inserted at labrum..... Asopidae
- Basal segment of rostrum not inserted at labrum..... Pentatomidae

Family I PENTATOMIDAE

Key to Division :

1. Scutellum broad..... 2
- Scutellum triangular..... 3
2. Body short and broad..... Hoplistoderaria
- Body obovate; scutellum always broad and short; lateral lobes of head never meet in front of central lobe..... Eusarcocoriaria
3. Abdomen armed at base..... 4
- Abdomen unarmed at base..... 5
4. Lateral pronotal angles strongly produced..... Tropicoraria
- Lateral pronotal angles usually rounded..... Nezaria
5. Lateral margins of pronotum serrate or dentate..... Halyaria
- Lateral margins of pronotum normal..... 6
6. Head clypeated, foliaceously dilated..... Sciocoraria

- Head not clypeated 7
7. Body oval, abdomen with a short basal furrow *Carpocoraria*
- Abdomen without basal furrow 8
8. Body obovate, head subtriangular..... *Antestiaria*
- Body elongate, head obovate..... *Eurydemaria*

Division I. *Antestiaria*

Key to genera :

- Head emarginate in front of eyes; anterior lateral margins of pronotum normal *Plautia*
- Head deflected, anterior lateral margins of pronotum elevated and callous..... *Antestia*

Genus 1. *Antestia* Stål, 1864

1864. *Antestia* Stål, *Hem. Afr. 1* : 200

Type species : *Antestia maculata* (Dallas)

1. *Antestia anchora* (Thunberg)

1783. *Cimex anchora* Thunberg, *Nov. Ins.*, 2 : 47.

1985. *Antestia anchora* (Thunberg) : Datta, Ghosh and Dhar, *Rec. zool. Surv. India Occ. paper No. 80* : 8.

Material examined : 1 ex., East Khasi hills, Charrapunjee, 17.v.1977, Coll. H. Khajuria.

Diagnostic characters : Orange-yellow; a lineate spot before each eye and two discal lines black; pronotum with two lateral discal suffusions luteous, a transverse black spot on each side of anterior margin and 4 discal spot black; scutellum with 4 spots, 2 on anterior margin and two angulated ones on apical half black; membrane fuliginous with the apical margin greyish; body beneath luteous with discal transverse, and marginal lineate spots black; antennae black but 1st and 2nd segments and base of third rufous.

Length : 10 to 12 mm.

Distribution : India, Meghalaya (East Khasi hills); Nagaland, Sikkim, West Bengal. Elsewhere : Burma; Java; Malay Peninsula, Sumatra.

Genus 2. *Plautia* Stål, 1867

1867. *Plautia* Stål, *Ofv. Vet. AK. Forh.* : 514

Type-species : *Plautia fimbriata* (Fabricius)

2. *Plautia fimbriata* (Fabricius)

1787. *Cimex fimbriata* Fabricius, *Mant. Ins.*, 11 : 295.

1904. *Plautia fimbriata* (Fabr.) : Distant, *Fauna Brit. India Rhyn.* 1 : 191.

1989. *Plautia fimbriata* (Fabr.) : Ghosh, Biswas, Chakraborty & Sen, *Fauna of Orissa : State Fauna Series No. 1* : 205.

Material examined : 2 exs., Jaintia hills, Shungpung, 13.iii.1991, Coll. K.K. Roy & party; 1 ex., Garo hills, Diana Dubi, 13.v.1979, Coll. S.B. Roy & party.

Diagnostic characters : Head, pronotum and scutellum bright pale olivaceous-green; corium purplish-red with greenish lateral margins and usually with posterior discal spots; membrane fuliginous with two brown spots on base; abdomen above red; the central disk of abdomen beneath greenish ochraceous.

Length : 10 to 11 mm.

Distribution : India : Meghalaya (Jaintia hills, Garo hills, Khasi hills); Assam, Maharashtra, Nagaland, Orissa, Sikkim, Tamil Nadu, West Bengal. Elsewhere : Burma, China, Japan, Malay Archipelago, Malay Peninsula, Sri Lanka.

Division II. Carpocoraria

Key to genera :

1. Lateral lobes of head longer than central lobe; odoriferous orifices on metasternum abruptly abbreviated.....***Dolycoris***
- Head not as above, odoriferous orifices on metasternum long and acuminate..... 2
2. Lobes of head equal in length; margins of pronotum normal..... ***Halyomorpha***
- Central lobe of head longer than lateral lobes; margins of pronotum elevated or callous
..... ***Tolumnia***

Genus 3. *Dolycoris* Mulsant & Rey, 1866

1866. *Dolycoris* Mulsant & Rey, *Pun. France Pent.* : 238

Type- species : *Dolycoris baccharum* (Linnaeus)

Key to the species of *Dolycoris*

1. Anterior lateral margin of pronotum narrowly luteous; larger in size (12-14 mm.)....***baccharum***
Anterior lateral margin of pronotum not as above but broadly pallid; smaller in size (9-10 mm).....***indicus***

3. **Dolycoris baccharum* (Linnaeus)

1761. *Cimex baccharum* Linnaeus, *Faun. Suec.*, 2 : 249.

1866. *Dolycoris baccharum* Muls. & Rey, *Pun. France Pent.*, 238.

1977. *Dolycoris baccharum*, Datta & Chakraborty, *News. zool. Surv. India*, 3(4) :212.

Material examined : 7 exs., West Garo hills, Gasua Para, 28.iv.1991, Coll. B.N. Das & party; 1 ex., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. Das & party; 1 ex., East Khasi hills, Umrang, 1.ii.1991, Coll. S.K. Saha & party; 1 ex., Garo hills, Diana Dubi, 13.v.1979, Coll. S.B. Roy & party.

Distribution : India : Meghalaya (Garo hills, Khasi hills); Kashmir, Maharashtra, West Bengal. Elsewhere : West Pakistan, Common in Palaearctic region.

Remarks : The species is a new distributional record for the State of Meghalaya.

4. **Dolycoris indicus* Stål

1876. *Dolycoris indicus* Stål, *Ent. Hem.*, 5 : 76.
 1904. *Dolycaris indicus* Stal, Distant, *Fauna Brit. India, Rhyn.*, 4 : 160.
 1977. *Dolycoris indicus* Stal, Datta and Chakraborty, *News. zool. Surv. India*, 3(4) : 212.

Material examined : 17 exs., Khasi hills, Naya Bunglow, 22.xi.1978, Coll. S. J. Hatter; 7 exs., West Garo hills, Gasuapara, 28.iv.1991, Coll. B.N. Das & party; 2 exs., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. Das & party; 4 exs., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Distribution : India : Meghalaya (Garo hills, Khasi hills); Maharashtra, Nagaland, South India, West Bengal.

Remarks : This is a new record from the state.

Genus 4. *Halyomorpha* Mayr, 1864

1864. *Halyomorpha* Mayr, *Verh. Z. -b. Ges. Wien*, 14 : 911
 Type-species : *Halyomorpha picus* (Fabricius)

5. *Halyomorpha picus* (Fabr.)

1794. *Cimex picus* Fabricius, *Ent. Syst.*, 4 : 115.
 1904. *Halyomorpha picus* (Fabr.) : Distant, *Fauna Brit. India Rhyn.*, 1 : 152 - 153.

Material examined : 1 ex., East Garo hills, Sangsok, 2.v.1991, Coll. B.N. Das & party.

Diagnostic characters : Very variable in colour and size; head, anterior and lateral areas of pronotum marked with dark fuscus or brownish; a small dark spot margined with levigate ochraceous at basal angles of scutellum; body beneath and legs pale luteous. Rostrum reaching 2nd abdominal segment; 2nd antennal segment smaller than third; 4th and 5th segments subequal in length.

Length : 12 to 17 mm.

Distribution : India : Meghalaya (Khasi hills, Garo hills); Kerala, Maharashtra, Tamil Nadu, West Bengal. Elsewhere : Burma, China, Japan, Malayasia and Sri Lanka.

Genus 5. *Tolumnia* Stål, 1867

1867. *Tolumnia* Stål, *Ofv. Vet.-AK. Forh.* : 515
 Type-species : *Tolumnia trinotata* Westwood

6. *Tolumnia latipes* (Dall.)

1857. *Pemtatoma latipes* Dallas, *List. Hem.*, 1 : 238.
 1904. *Tolumnia latipes* (Dallas) : Distant, *Fauna Brit. India Rhyn.*, 1 : 154.

Material examined : 1 ex., East Khasi hills, Upper Shillong, Elephant Falls, 20.viii.1974, Coll. Dr. A.K. Ghosh; 2 exs., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Diagnostic characters : Body above dark-brown, thickly punctate and faintly irrorated with ochraceous; scutellum with apex and two large spots on basal angles luteous; body beneath and legs luteous; three small spots on each lateral area of the sternum, apices of femora, tibiae and tarsi and apex of rostrum black. Antennae ochraceous with 1st segment black.

Length : 9 - 11 mm.

Distribution : India : Meghalaya (Khasi hills); Kerala, Nagaland, Sikkim. Elsewhere : Burma, Hong knong, Indonesia and Malay Peninsula.

Division III. Eurydemaria

Key to genera :

1. Body elongately ovate, remotely pilose.....*Agonoscelis*
- Body not as above, not pilose 2
2. Body ovate, eyes sessile *Eurydema*
- Body elongately oval 3
3. Body oval, eyes stylate, basal joint of antennae not reaching apex of head *Bagrada*
- Body elongately subovate; basal joint of antennae extending beyond apex of head.. *Strachia*

Genus 6. *Agonoscelis* Spinola, 1837

1837. *Agonoscelis* Spinola, *Ess.* : 327

Type-species : *Agonoscelis nubila* Fabricius

7. *Agonoscelis nubila* (Fabricius)

1775. *Cimex nubila* Fabricius, *Syst. Ent.* : 712.

1851. *Agonoscelis nubila*, Dallas, *List. Hem.*, 1 : 179.

1989. *Agonoscelis nubila* (Fabricius) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series No. 1* : 203.

Material examined : 7 exs., West Garo hills, Gasuapara, 28.iv.1991, Coll. B.N. Das & party; 7 exs., East Garo hills, Nongal, 28.v.1990, Coll. M.S. Sishodia & party.

Diagnostic characters : Body yellow-brown, covered with black puncture excepting the lateral margins and central fascia to head, an irregular central fascia to pronotum, apex of scutellum which are levigate; luteous rugosities on the anterior lateral areas of the scutellum; body beneath and legs luteous; antennae, apex of rostrum, tibiae, tarsi and apices of femora black; membrane fuliginous with viens piceous.

Length : 10 - 11 mm.

Distribution : India, Meghalaya (Garo hills, Khasi hills); Bihar, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, West Bengal. Elsewhere : Burma, China, Japan, Malayan Archipelago, Malay Peninsula and Sri Lanka.

Genus 7. *Bagrada* Stål, 1862

1862. *Bagrada* Stål, *Stett. ent. Zeit.* 23 : 105

Type-species : *Bagrada picta* (Fabricius)

8. **Bagrada picta* (Fabricius)

1775. *Cimex picta* Fabricius, *Syst. Ent.* : 715

1862. *Bagrada picta* (Fabr.) Stål, *Stett-ent. Zeit.* 23 : 105.

1904. *Bagrada picta* (Fabr.), Distant, *Fauna Brit. India Rhyn.* 1 : 193 - 194.

Material examined : 1 ex., East Khasi hills, Shillong, 3.iv.1959, Coll. A.P. Kapur.

Diagnostic characters : Body black excepting lateral lobes of head before eyes and lateral margins and a central fascia to pronotum, a central fascia, a spot near each basal angle and a spot on each margin before apex of scutellum, a little beyond base and terminating in a rounded discal spot before apex ochraceous; membrane fuliginous; body beneath ochraceous, legs ochraceous spotted and streaked with black; antennae black.

Length : 5 - 7 mm.

Distribution : India : Meghalaya (Khasi hills); Bihar, Maharashtra, Manipur, Uttar Pradesh, West Bengal. Elsewhere : Sri Lanka.

Remarks : This is a new record from the State.

Genus 8. *Eurydema* Laporte

1832. *Eurydema* Laporte, *Ess. Hem.* : 61

Type-species : *Eurydema oleraceum* (Linnaeus)

9. *Eurydema pulchrum* (Westwood)

1837. *Pentatoma pulchrum* Westwood, *Hope Cat.*, 1 : 34.

1904. *Eurydema pulchrum* (Westwood), Distant, *Fauna Brit. India, Rhyn.*, 1 : 190 - 191.

Material examined : 6 exs., East Garo hills, Nongal, 28.v.1990, Coll. M.S. Sishodia & party; 7 exs., Jaintia hills, Jalong, 9.iii.1991, Coll. K.K. Roy & party; 3 exs., Jaintia hills, Jawai, 17.ix.1988, V.D. Srivastava & party.

Diagnostic characters : Reddish-ochraceous, spotted with black; head black with margins ochraceous; pronotum with 6 black spots 2 anterior and transverse, four discal; scutellum with a large spot at base and two marginal subapical spots black; body beneath and legs luteous; lateral margins of sternum and abdomen orange- yellow and both with lateral and central series of transverse black spots.

Distribution : India : Meghalaya (Jaintia hills, Khasi hills), Assam, Nagaland. Elsewhere : Burma, China, Sumatra and Queensland.

Genus 9. *Strachia* Hahn, 1831

1831. *Strachia* Hahn., *Wanz.* 1 : 180

Type-species : *Strachia crucigera* Hahn

10. *Strachia crucigera* Hahn.

1831 *Strachia crucigera* Hahn. *Wanz.* 1 : 184.

1904. *Strachia crucigera* Hahn : Distant, *Fauna Brit. India Rhyn.*, 1 : 195 - 196.

Material examined : 1 ex., East Khasi hills, Cherrapunjee, 17.v.1977, Coll. H. Khajuria.

Diagnostic characters : Body above black but head with one central small linear and two apical ochraceous spots; anterior and anterior-lateral margins of pronotum narrowly ochraceous also a broad central fascia ochraceous; a transverse fascia on anterior area of pronotum brownish-ochraceous. Scutellum with a spot near centre of each lateral margin and a subapical spot black; corium with the basal area and lateral margins and a transverse fascia before apex pale luteous; sternum blackish with a carmine spot on the lateral area of each segment; abdomen beneath luteous with disk piceous, lateral margins carmine; legs, antennae and rostrum black.

Length : 8 to 10 mm.

Distribution : India : Meghalaya (Khasi hills). Elsewhere : Burma, Indonesia, (Borneo, Java), Malay Peninsula; (Sumatra).

Division IV. Eusarcocoriaria

Key to genera :

1. Head deflected; scutellum but little narrowed on posterior half, almost as long as corium *Eysarcoris*
2. Head normal; scutellum prominently narrowed and distinctly shorter than corium... *Carbula*

Genus 10. *Carbula* Stål, 1864

1864. *Carbula* Stål, *Hem. Afr.*, 1 : 140

Type-species : *Carbula decorata* Signoret

11. **Carbula indica* (Westwood)

1837. *Pentatoma indica* Westwood, *Hope Cat.*, 1 : 42.

1904. *Carbula indica* Distant, *Fauna Brit. India, Rhyncho.*, 1 : 171.

Material examined : 1 ex., East Garo hills, Sangsok, 2.v.1991, Coll. B.N. Das & party.

Diagnostic characters : Brownish-ochraceous but antennae, rostrum, body beneath and legs ochraceous; excepting apex of rostrum, a central spot on each of the two terminal abdominal segments, the stigmata and small marginal spots which are black; anterior lateral margins of the pronotum levigate; pronotal angles moderately produced and concave beneath; their apices broadly subacute.

Distribution : India : Meghalaya (Garo hills), Sikkim, West Bengal. Elsewhere : Nepal.

Remarks : This species is recorded for the first time from the state of Meghalaya.

Genus 11. *Eysarcoris* Hahn, 1834

1834. *Eysarcoris* Hahn, *Wanz.*, 11 : 66

Type-species : *Eysarcoris aeneus* (Scopoli)

Key to the species of *Eysarcoris*

1. Whole of abdominal ventral disc black 2
- Whole abdominal ventral disc not black but with a central angulate fascia being black; apical joint of antennae brownish yellow; lateral angles of pronotum acutely prominent *montivagus*

2. Anterior area of pronotum normal, without any spot; apical joint of antennae shining black; lateral angles of pronotum obtusely prominent *guttiger*
 Anterior area of pronotum with two large brassy-black spots, pronotal angles simple
 *ventralis*

12. **Eysarcoris guttiger* (Thunberg)

1783. *Cimex guttiger* Thunberg, *Nov. Ins. Sp.*, 2 : 32.
 1857. *Eysarcoris guttiger* (Thunberg), Dallas, *List Hem.*, 1 : 288.
 1989. *Eysarcoris guttiger* (Thunb.) : Ghosh, Biswas, Chakraborty & Sen, *Fauna of Orissa : State Fauna Series No. 1* : 204.

Material examined : 4 exs., West Garo hills, Tura, Damal giri, 21.iv.1991, Coll. B.N. Das & party; 1 ex., Garo hills, Darugiri F.R.H. 16.v.1976, Coll. S.B. Roy & party.

Distribution : India : Meghalaya (Garo hill), Maharashtra, Nagaland, Orissa, Sikkim, South India, West Bengal. Elsewhere : Sri Lanka.

Remarks : Recorded for the first time from Meghalaya.

13. *Eysarcoris montivagus* (Distant)

1904. *Eysarcoris montivagus* (Distant), *Fauna Brit. India*, 1 : 166.
 1989. *Eysarcoris montivagus* (Distant), Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series No. 1* : 204.

Material examined : : 1 ex., Jaintia hills, Jawai, 17.ix.88; Coll. V.D. Srivastava & party; 1 ex., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. Das & party.

Distribution : India : Meghalaya (Jaintia hills, Garo hills); Assam, Nagaland, Orissa, West Bengal.

14. **Eysarcoris ventralis* (Westwood)

1837. *Pentatoma ventralis* Westwood, *Hope Cat.*, 1 : 36.
 1904. *Eysarcoris ventralis* (Westwood), Distant, *Faun. Brit. India, Rhyn.*, 1 : 167.

Material examined : 3 exs., Garo hill, Dari, North of Tura, 10.x.1988, Coll. K.K. Roy & party.

Distribution : India : Meghalaya (Garo hills); Arunachal Pradesh, Bihar, Karnataka, Maharashtra, West Bengal. Elsewhere : Burma, Malay Peninsula.

Remarks : This is a new record from the State.

Division V. Halyaria

Key to genera :

1. Both anterior and posterior tibiae dilated *Erthesina*
- Anterior tibiae rarely dilated, posterior tibiae always normal 2
2. Head elongated, tapering at the apex, longer than pronotum *Halys*
- Head normal, rounded or truncated at the apex, not longer than pronotum *Dalpada*

Genus 12. *Dalpada* Amyot & Serville, 18431843. *Dalpada* Amyot & Serville, *Hem.* : 105Type-species : *Dalpada aspera* Amyot & Serville15. *Dalpada oculata* (Fabricius).1775. *Cimex oculata* Fabricius, *Syst. Ent.*, 703.1985. *Dalpada oculata* (Fabricius), Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 12.

Material examined : 2 exs., Garo hills, Rongius, 5.xi.1973, Coll. S. Biswas; 1 ex., Garo hills, Anogius, 7.xi.1973, Coll. S. Biswas; 1 ex., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Diagnostic characters : Ochraceous mottled with dark olivaceous- green; antennae brownish with bases of 4th and 5th segments ochraceous; body beneath and legs ochraceous, lateral margins of head, sternum and abdomen, apices of femora and subapical and anal appendage to abdomen very dark greenish or black. Lateral pronotal angles inwardly distinctly furrowed. Rostrum just passing the posterior coxae.

Length : 15 - 18 mm.

Distribution : India : Meghalaya (Garo hills, Khasi Hills); Sikkim, West Bengal. Elsewhere : Burma, Malay Peninsula.

16. *Dalpada* sp.

Material examined : 3 exs., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. Das & party; 1 ex., Garo hills, Sangsak, 17.xi.1993, Coll. S. Biswas.

Remarks : The material could not be identified upto species level due to poor condition of the insects and non availability of literature.

Genus 13. *Erthesina* Spinola, 18371837. *Erthesina* Spinola, *Ess.* : 291Type-species : *Erthesina fullo* (Thunberg)17. **Erthesina fullo* (Thunb.)1783. *Cimex fullo* Thunberg, *Nov. Ins. Spec.*, 11 : 420.1837. *Erthesina fullo* Spinola, *Ess.* : 291.1904. *Erthesina fullo* (Thunb.); Distant, *Fauna Brit. India Rhyn.*, 1 : 117.

Material examined : 6 exs., East Garo hills, Sangsok, 17.xi.1973, Coll. S. Biswas & party; 1 ex., Garo hills, Rongui, 5.xi.1973; Coll. S. Biswas.

Diagnostic characters : Head black, a central longitudinal line, lateral and inner margins of eyes, ocelli ochraceous; antennae piceous with base of apical joint ochraceous; a central line and anterior and lateral margins of pronotum ochraceous; body beneath pale ochraceous; 4 longitudinal lines to head beneath, sternal and abdominal incisures, marginal and subapical spot to abdomen black; second joint of antennae prominently longer than third; rostrum reaching the 3rd abdominal segment.

Length : 20 - 25 mm.

Distribution : India : Meghalaya (Garo hills); Andhra Pradesh, Assam, Kerala, West Bengal. Elsewhere : Bangladesh, China, Japan and Sri Lanka.

Remarks : The species is hitherto known for the first time from the state of Meghalaya.

Genus 14. *Halys* Fabricius 1803

1803. *Halys* Fabricius, *Syst. Rhyng.* : 180

Type-species : *Halys dentatus* Fabricius

18. *Halys dentatus* Fabricius

1803. *Halys dentatus* Fabricius, *Syst. Rhyn.* : 180.

1904. *Halys dentatus* Fabricius : Distant, *Fauna Brit. India Rhyn.*, 1 : 119.

1977. *Halys dentatus* Fabr. : Datta and Chakraborty, *Nowsl. zool. Surv. India*, 3(4) : 212.

Material examined : 1 ex., East Khasi hills, Shillong, Malki Forest, 25.vii.1973, Coll. M.S. Jyrwa.

Diagnostic characters : Dull ochraceous, head long tapering in front, abdomen sulcated; pronotum with indistinct oblique fasciae, scutellum with two marginal spots before apex black; apex of scutellum pale; body beneath and legs ochraceous; 2nd and 3rd also 4th and 5th segments of antennae subequal in length; rostrum normally extends beyond 5th abdominal segment.

Length : 17-23 mm.

Distribution : India : Meghalaya (Khasi hill); Karnataka, Maharashtra, Orissa, Sikkim, Tamil Nadu, West Bengal. Elsewhere : Pakistan, Sri Lanka.

Division VI. Hoplistoderaria

Genus 15. *Hoplistodera* Westwood, 1837

1837. *Hoplistodera* Westwood, *Hope Cat.*, 1 : 18

Type-species : *Hoplistodera testacea* Westwood

19. **Hoplistodera virescens* Dallas

1851. *Hoplistodera virescens* Dallas, *List. Hem.*, : 217.

1985. *Hoplistodera virescens* Dallas : Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 13.

Material examined : 8 exs., West Garo hills, Damalgiri, 21.iv.1991, Coll. B.N. Das & party; 1 ex., East Khasi hills, Shillong, Umtyngar, 9.vii.1964, Coll. S. Biswas & party.

Diagnostic characters : Head orange-yellow, brownish towards the vertex; pronotum with two ochraceous spots near anterior margin; lateral spines nearly horizontal, acute; basal area of scutellum with 4 brown spots; membrane pale hyaline; abdomen beneath concolourous.

Length : 8 mm.

Distribution : India : Meghalaya (Garo hills, Khasi hills); Nagaland, Sikkim. Elsewhere : Burma, West Yunnan.

Remarks : This species is a new distributional record from the State of Meghalaya.

20. *Hoplistodera* sp.

Material examined : 4 exs., Jaintia hills, Shungpung, 13.iii.1991, Coll. K.K. Roy & party; 8 exs., West Garo hills, Gasuapara, 28.iv.1991, Coll. B.N. Das & party.

Remarks : Species identification was not possible due to lack of proper literature.

Division VII. *Nezara*

Key to genera :

1. Abdomen tuberculously spinous at base; clavus without any spot.....*Nezara*
2. Abdomen acutely spinous at base; clavus with a small black apical spot.....*Piezodorus*

Genus 16. *Nezara* Amyot & Serville, 1843

1843. *Nezara* Amyot & Serville, *Hem.* : 143

Type-species : *Nezara viridula* (Linnaeus)

21. *Nezara viridula* (Linn.)

1758. *Cimex viridula* Linnaeus, *Syst. Nat. ed.*, **10** : 444.

1904. *Nezara viridula* (Linn.) : Distant, *Fauna Brit. India Rhyn.*, **1** : 220.

1958. *Nezara viridula* (Linn.) : Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No.* **80** : 14.

Material examined : 16 exs., East Khasi hills, Shillong Peak, 12.vi.1984, Coll. J.R. Dhanze; 4 exs., Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party; 6 exs., Jaintia hills, Jawai, 17.ix.1988, Coll. V.D. Srivastava & party.

Diagnostic characters : Above dark green or greenish ochraceous; antennae green with apices of 3rd, 4th and 5th segments purplish-brown; extremity of segmental angles to abdomen black. In some variety head (excluding base) and anterior area and lateral margins of pronotum pale luteous. In other there are two spots at base of head, 3 spots on anterior area of pronotum, 3 basal and apical spot to scutellum and a discal spot on corium.

Length : 12 - 16 mm.

Distribution : It is a widely distributed species and common to all regions in India.

Genus 17. *Piezodorus* Fieber, 1861

1861. *Piezodorus* Fieber, *Eur. Hem.* : 78 & 329

Type-species : *Piezodorus incarnatus* Germar

22. **Piezodorus rubrofasciatus* (Fabricius)

1787. *Cimex rubrofasciatus* Fabricius, *Mant. Ins.*, **11** : 293.

1904. *Piezodorus rubrofasciatus* (Fabricius) : Distant, *Fauna Brit. India Rhyn.*, **1** : 224.

1989. *Piezodorus rubrofasciatus* (Fabr.) : Ghosh, Biswas, Chakraborty & Sen, *Fauna of Orissa : State Fauna Series No. 1* : 205.

Material examined : 3 exs., East Garo hills, Sangsak, 2.v.1991, Coll. B.N. Das & party; 1 ex., East Khasi hills, Shillong, Malki Forest, 25.vii.1973, Coll. M.S. Jyrwa.

Diagnostic characters : Above pale greenish or luteous; pronotum with the lateral margins ochraceous with a transverse pale or purplish fascia between the pronotal angles; clavus with a small black apical spot; membrane hyaline; body beneath with legs pale luteous; 4th and 5th antennal segment purplish.

Length : 8 10 mm.

Distribution : India : Meghalaya (Khasi hills, Garo hills); Assam, Maharashtra, Orissa, West Bengal. Elsewhere : Australia, Burma, Japan, Malay Archipelago, Malay Peninsula, Sri Lanka.

Remarks : This is a new record from the state of Meghalaya.

Division VIII. Sciocoraria

Genus 18. *Sciocoris* Fallen, 1829

1829. *Sciocoris* Fallen, *Hem. Suec.* : 20

Type-species : *Sciocoris terreus* Schrank

23. *Sciocoris* sp.

Material examined : 3 exs., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Remarks : Due to nonavailability of recent literature the material could not be identified upto species level.

Division IX. Tropicoraria

Genus 19. *Placosternum* Amyot & Serville, 1843

1843. *Placosternum* Amyot & Serville, *Hem.* 174

Type-species : *Placosternum taurus* (Fabricius)

24. *Placosternum taurus* (Fabricius)

1781. *Cimex taurus* Fabricius, *Spec. Ins.*, 11 : 344.

1904. *Placosternum taurus* (Fabr.) : Distant, *Fauna Brit. India Rhyn.*, 1 : 210.

Material examined : 1 ex., East Khasi hills, Naya Bunglow, 23.v.1978, Coll. J.S. Hatter.

Diagnostic characters : Ochraceous, coarsely and blackly punctate, the punctures frequently confluent forming irregular black spots or patches. There are two such prominent transverse and linear on anterior area and two irregularly rounded on disk of pronotum and two on anterior area of scutellum; antennae piceous with bases ochraceous; the apices of the pronotal angles are truncate and bisinuate.

Distribution : India : Meghalaya (Khasi hills), Kerala. Elsewhere : Burma, Sri Lanka.

Family II. Scutelleridae

Key to genera:

1. Body elongate, obovate; head elongate gradually narrowed to apex; lateral angles of pronotum prominent or spined..... ***Cantao***
- Body ovate, convex; head large broad or slightly elongate, lateral angles of pronotum not as above 2
2. Lateral pronotal angles acuminate; median lobes of head longer than lateral lobes ***Hotea***
- Lateral angles of pronotum normal..... 3
3. Abdomen distinctly sulcate beneath..... ***Poecilocoris***
- Abdomen not sulcated beneath..... ***Chrysocoris***

Genus 20. ***Cantao*** Amyot & Serville, 18431843. *Cantao* Amyot & Serville, *Hem.* : 29Type-species : *Cantao ocellatus* (Thunberg)25. ***Cantao ocellatus*** (Thunberg)1784. *Cimex ocellatus* Thunberg; *Nov. Ins. Sp.* iii : 60.1843. *Cantao ocellatus* Amy. et Serv., *Hem.* : 29, 1.1904. *Cantao ocellatus* Distant, *Fauna Brit. India*, 1 : 43.**Material examined** : 4 exs., East Khasi hill, Naya Bunglow, 27.ii.1978, Coll. S.J. Hatter.**Diagnostic characters** : Ochraceous or reddish-ochraceous; base and central fascia to head and antennae bluish-black, pronotum with some times two black spots near anterior margin, sometimes containing 8 spots.**Length** : 16 - 28 mm.**Distribution** : India : Meghalaya (Khasi hills); Bor Ghat, Maharashtra, Sikkim, Uttar Pradesh. Elsewhere : Bangladesh, Borneo, Burma, China, Java, Malabar, Malay Peninsula, Sumatra, Sri Lanka.**Remarks** : The species prefers 'Moon' tree (*Macaranga roxburghii*) as its host plant and the pollination of the plant depends on this insect.Genus 21. ***Chrysocoris*** Hahn, 18341834. *Chrysocoris* Hahn., *Wanz. Ins.*, 11 : 38Type-species : *Chrysocoris dilaticollis* (Guerin)26. ***Chrysocoris stollii*** (Wolff.)1801. *Cimex stollii* Wolff., 2 : 48.1904. *Chrysocoris stollii* Distant, *Fauna Brit. India*, 1 : 58.1989. *Chrysocoris stollii* (Wolff.) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series No. 26*.**Material examined** : 7 exs., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Diagnostic characters : Above bluish or purplish green; pronotum with eight spots, three near anterior margins, three larger on posterior base and on each lateral angles; scutellum with 7 spots of which arranged in pairs with central one large, subovate.

Length : 13 - 14 mm.

Distribution : India : Meghalaya (East Khasi hills).

Remarks : The species is found throughout the country.

Genus 22. *Hotea* Amyot & Serville, 1843

1843. *Hotea* Amyot & Serville, *Hem.* : 41

Type-species : *Hotea gambiae* Westwood

27. *Hotea curculionoides* (Herrich-Schaffer)

1843. *Pachycoris curculionoides* Herrich-Schaffer, *Wanz. Ins. III* : 106, 331.

1904. *Hotea curculionoides* Distant, *Fauna Brit. India*, 1 : 65-66.

1985. *Hotea curculionoides*, Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 18-19.

Material examined : 1 ex., Ronkhon river side, Tura, West Garo hills, 16.iii.1991, Coll. Dr. A.K Hazra & party.

Diagnostic characters : Ochraceous, central lobe to head, lateral margins and three obscure longitudinal fasciae to pronotum, a central longitudinal line to scutellum terminating in an apical spot and a curved anterior discal area levigate; head and lateral pronotal angles beneath piceous : 4th segment (excluding base) and 5th antennal segment piceous.

Length : 8 to 9.5 mm.

Distribution : India : Meghalaya (Garo hills, Khasi hills); Nagaland. Elsewhere : Burma, China; Malayan Archipelago; Malay Peninsula.

Genus 23. *Poecilocoris* Dallas, 1848

1848. *Poecilocoris* Dallas, *Trans. Ent. Soc.*, v : 100.

Type-species : *Poecilocoris druriei* (Linnaeus)

Key to the species of *Poecilocoris*

1. Anterior margin of pronotum reddish yellow; scutellum bears usually with eleven spots; anterior and anterolateral margins of pronotum sparsely punctate..... *druriei*
Anterior margin of pronotum black; scutellum usually with 14 spots; anterior and anterolateral margins of pronotum thickly and coarsely punctate..... *hardwickii*

28. *Poecilocoris druriei* (Linn.)

1771. *Cimex druriei* Linn. *Mant.* : 534.

1848. *Poecilocoris druriei* Dallas, *Trans. Ent. Soc.*, V : 103.

1904. *Poecilocoris druriei* Distant, *Fauna Brit. India*, 1 : 45 - 46.

Material examined : 1 ex., Upper Shillong, Khasi hills, 30.v.1972, Coll. S. Biswas.

Distribution : India : Meghalaya (Khasi Hills); Assam, Bhutan, Nagaland, Sikkim. Elsewhere : Burma, Formosa, Hong Kong.

29. *Poecilocoris hardwickii* (Westwood)

1837. *Tectocoris hardwickii* Westwood, *Hope Cat.*, 1 : 13.
 1848. *Poecilocoris hardwickii* Dallas, *Trans. Ent. Soc.*, V : 107.
 1904. *Poecilocoris hardwickii* Distant, *Fauna Brit. India*, 1 : 45.
 1985. *Poecilocoris hardwickii*, Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 19.

Material examined : 8 exs., Elephant Falls, Upper Shillong, East Khasi hills, 20.vii.1974, Coll. Dr. A.K. Ghosh; 7 exs., Shillong, Matinagar Forest, Khasi Hills, 2.vii.1973, Coll. M.S. Jyrwa; 1 ex., Upper Shillong, Khasi hills, 30.v.1972, Coll. S. Biswas; 3 exs., Jalong, Jaintia hills, 9.iii.1991, Coll. K.K. Roy & party.

Distribution : India : Meghalaya (Khasi & Jaintia hills); Assam, Bhutan, Nagaland. Elsewhere : Burma; Hong Kong; West China.

Remarks : The species is a minor pest to Tea plants.

Family III. Graphosomatidae

Genus 24. *Scotinophara* Stål, 1867

1867. *Scotinophara* Stål, *Ofv. Vet.-AK. Forh.* : 502
 Type-species : *Scotinophara inuncta* (Fabricius)

30. *Scotinophara* sp.

Material examined : 1 ex., Shangpung, Jaintia hills, 13.iii.1991, Coll. K.K. Roy & party.

Remarks : Species identification could not be done due to poor condition of the specimen.

Genus 25. *Stortheccoris* Horvath, 1883

1883. *Stortheccoris* Horvath, *Wien. ent. Zeit.*, 2 : 296.
 Type-species : *Stortheccoris nigriceps* Horvath

31. *Stortheccoris* sp.

Material examined : 5 exs., Jawai, Jaintia hills, 17.ix.1988, Coll. V.D. Srivastava & party.

Remarks : Due to nonavailability of literature the material could not be identified upto species.

Family IV. Dinidoridae

Key to genera :

1. Antennae 4 segmented; rostrum reaching the intermediate coxae; membrane with reticulated veins *Cyclopelta*
- Antennae 5 segmented; rostrum reaching beyond the anterior coxae; membrane with anastomosed veins *Coridius*

Genus 26. *Coridius* Illiger, 18071807 *Coridius* Illiger, Rossi. *Fauna Etrusca*, (2) 2 : 361.Type-species : *Coridius janus* (Fabricius)32. *Coridius brunneus* (Thunb.)1783. *Cimex brunneus* Thunberg, *Nov. Ins. Sp.*, II : 45.1879. *Aspongopus brunneus* Distant, *A.M.N.H.*, (5) : 52.1987. *Coridius brunneus* Durai, *Oriental Ins.*, 21 : 195-196.

Material examined : 1 ex., East Khasi hills, Risa colony, Shillong, 17.vi.1975, Coll. M.S. Jyrwa; 2 exs., Garo hills, Rongram, 3.iii.1975, Coll. S. Biswas.

Diagnostic characters : Above brownish ochraceous, body beneath and legs more or less infuscated; antennae fuscous with apical segment luteous, sometimes with its apex narrowly black; abdomen above red; third segment of the antennae a little longer than the second, shorter than 4th or 5th segments.

Length : 17-20 mm.

Distribution : India : Meghalaya (Garo hills, Khasi hills); Assam, Bihar, Maharashtra, West Bengal. Elsewhere : Burma, Indonesia, Malaysia and Malayan Archipelago.

33. *Coridius* sp.

Material examined : 1 ex., Garo hills, Darugiri, 16.v.197 : Coll. S.B. Roy & party; 1 ex., Garo hills, Rongram, 3.iii.1975, Coll. S. Biswas.

Genus 27. *Cyclopelta* Amyot & Serville1843. *Cyclopelta* Amyot & Serville, *Hem.* : 172.Type-species : *Cyclopelta obscura* (Lepeletier & Serville)34. *Cyclopelta siccifolia* (Westwood)1837. *Aspongopus siccifolia* Westwood, *Hope Cat.*, 1 : 26.1904. *Cyclopelta siccifolia* (Westwood); Distant, *Fauna Brit. India, Rhyn.*, 1 : 280-281.1985. *Cyclopelta siccifolia* (Westwood); Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 5-6.

Material examined : 3 exs., East Khasi hills, Umran, 1.ii.1991, Coll. S.K. Saha & party.

Diagnostic characters : Entirely black or subcupreous black; variable in size, the abdomen much suffused with red; pronotum and scutellum obsoletely transversely wrinkled; scutellum usually with a minute sanguineous spot at base; conexivum concolourous; membrane more or less brownish-ochraceous.

Length : 11-16 mm.

Distribution : India : Meghalaya (Khasi hills); Maharashtra, Sikkim, West Bengal. Elsewhere : Burma, Sri Lanka.

Remarks : This species is said to infest plants belonging to Leguminosae.

Family V. Asopidae

Key to genera :

1. Anterior femora with a prominent spine; pronotum elongate and narrowed anteriorly *Picromerus*
.....
Anterior femora unarmed; pronotum not as above 2
2. Body elongate; pronotum deflected anteriorly *Andrallus*
Body short, obovate; pronotum normal *Zicrona*

Genus 28. *Andrallus* Bergroth, 1906

1906. *Andrallus* Bergroth, *Ann. Soc. Ent. Belg.*, 49 : 370

Type-species : *Andrallus spinidens* (Fabricius)

35. *Andrallus spinidens* (Fabricius)

1787. *Cimex spinidens* Fabricius, *Ment. Inst.*, 11 : 285.

1906. *Andrallus spinidens* Bergroth, *Ann. Soc. ent. Belg.*, 49 : 370.

Material examined : 1 ex., East Garo hills, Sangsak, 2.v.1991, Coll. B.N. Das & party.

Diagnostic characters : Pale brownish ochraceous; 4th and 5th antennal segments and apex of the 3rd segment black; head with a blackish punctate fascia on each side of central lobe; pronotum with a pale central broken levigate line extending between the pronotal angles which are black and emarginate, the posterior spine being very small; scutellum with the apex and a central apical line luteous; lateral margins of corium broadly luteous.

Length : 13-16 mm.

Distribution : India : Meghalaya (Garo hills, Khasi hills), Assam, Bihar, Maharashtra, Elsewhere : Abissinia, Africa, Bangladesh, Fiji, Malayan Archipelago, Mexico, Tahiti and virtually widely distributed.

Genus 29. *Picromerus* Amyot & Serville, 1843

1843. *Picromerus* Amyot & Servile, *Hem.* : 84

Type-species : *Picromerus bidens* (Linnaeus)

36. **Picromerus obtusus* Walker

1867. *Picromerus obtusus* Walker, *Cat. Het.*, 1 : 133.

1904. *Picromerus obtusus* Distant, *Fauna Brit. India Rhyn.*, 1 : 252.

1985. *Picromerus obtusus* Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 2.

Material examined : 1 ex., West Garo hills, Balphakram National Park, 12.v.1988, Coll. C. Radhakrishnan.

Diagnostic characters : Fuscous brown with legs a little paler; antennae ochraceous with apex of 3rd segment and 4th and 5th segments excluding base black; lateral pronotal margin crenulated and pronotal angles black produced very slightly backwardly at apices which are emarginate, the anterior spine much the longest; abdomen beneath with a more or less welldefined central black fascia.

Length : 11-13 mm.

Distribution : Meghalaya (Garo hills), Nagaland, Sikkim. Elsewhere : Burma.

Remarks : This species is hitherto known for the first time from Meghalaya.

Genus 30. *Zicrona* Amyot & Serville, 1843

1843. *Zicrona* Amyot & Serville, *Hem.* : 86

Type-species : *Zicrona caerulea* (Linnaeus)

37. **Zicrona caerulea* (Linnaeus)

1758. *Cimex caerulea* Linnaeus, *Syst. Nat. ed.*, 10 : 445.

1985. *Zicrona caerulea* (Linnaeus) : Datta, Ghosh & Dhar, *Rec. zool. Surv. India Occ. Paper No. 80* : 10.

Material examined : 1 ex., East Garo hills, Sangshok, 2.v.1991, Coll. B.N. Das & party.

Diagnostic characters : Body entirely blue or violaceous; antennae and membrane black; scutellum a little gibbous at base.

Length : 9-10 mm.

Distribution : India : Meghalaya (Garo hills); Nagaland, Kashmir, West Bengal. Elsewhere : Burma, China, Japan, Malayan Archipelago, Pakistan, Palaearctic Region.

Remarks : This is a new record from the State of Meghalaya.

Family VI. (UROSTYLIDAE)

Genus 31. *Anaxandra* Stal, 1876

1876. *Anaxandra* Stal, *En. Hem. V* : 110

Type-species : *Anaxandra rufescens* (Dallas)

38. *Anaxandra* sp.

Material examined : 1 ex., East Khasi hills, Malki Forest, 28.viii.1978, Coll. M.S. Jyrwa.

Remarks : Due to damaged condition, the material could not be identified upto species.

Family VII. (PLATASPIDAE)

Genus 32. *Coptosoma* Dallas, 1851

1851. *Coptosoma* Dallas, *List. Hem.* 1 : 61

Type-species : *Coptosoma globus* (Fabricius)

Key to the species of *Coptosoma*

1. Apical area of scutellum simple; abdomen beneath with a series of large bifid ray-like brownish yellow spots; larger in size (4 mm).....*feanum*
Apical area of scutellum with a large "W" shaped spot; abdomen beneath with ochraceous spots at apex of each abdominal segment; smaller in size (3 mm).....*'W' nigram*

39. **Coptosoma feanum* Montandon1894. *Coptosoma feanum* Montandon *Ann. Mus. Civ. Gen.*, **34** : 142.1904. *Coptosoma feanum* Distant, *Fauna Brit. India Rhyn.*, **1** : 34.*Material examined* : 4 exs., East Khasi hills, Upper Shillong, Elephant Falls; 20.viii.1974, Coll. A.K. Ghosh.*Distribution* : India : Meghalaya (Khasi hills), Nagaland, Sikkim, Tamil Nadu. Elsewhere : Burma.*Remarks* : This species is hitherto known for the first time from Meghalaya.40. **Coptosoma W. nigram* Varshney1893. *Coptosoma W.* Montand. *Rev. Ent. Franc.*, **12** : 237.1904. *Coptosoma W.* Distant, *Fauna Brit. India Rhyn.*, **1** : 28-29.1964. *Coptosoma W. nigram* Varshney, *Ann. Mag. nat. Hist.*, (13) **7** : 415.*Material examined* : 1 ex., West Garo hills, Ronkhon river side, 16.iii.1991, Coll. A.K. Hazra.*Distribution* : India : Meghalaya (Garo hills), Madhya Pradesh. Elsewhere : Burma.*Remarks* : Recorded for the first time from Meghalaya.

Family VIII (TESSARATOMIDAE)

Key to genera :

1. Posterior femora in male strongly incrassated and with long spine near base *Eusthenes*
- Posterior femora in male normal, without any long spine..... 2
2. 2nd abdominal segment centrally elevated and reaching the base of the metasternum
..... *Mattiphus*
- 2nd abdominal segment normal..... *Pycanum*

Genus 33. *Eusthenes* Laporte, 18321832. *Eusthenes* Laporte, *Ess. Hem.* : 64Type-species : *Eusthenes robustus* (Lepeletier & Serville)41. *Eusthenes cupreus* (Westwood)1837. *Tessaratomy cupreus* Westwood, *Hope Cat.*, **1** : 27.1904. *Eusthenes cupreus*, Distant, *Fauna Brit. India Rhyn.*, **1** : 266.*Material examined* : 2 exs., West Garo hills, Tura, Ronkhon river side, 16.iii.1991, Coll. Dr. A.K. Hazra & party; 1 ex., West Garo hills, Tura, Dmalgiri, 21.iv.1991, Coll. B.N. Das & party; 3 exs., West Garo hills, Tura, Dalu, 22.iv.1991, Coll. B.N. Das & party; 3 exs., West Garo hills, Barangapara, 23.iv.1991, Coll. B.N. Das & party.*Distribution* : India : Meghalaya (Garo hills, Khasi hills); Assam, Himachal Pradesh, Uttar Pradesh.42. *Eusthenes scutellaris* (Herrich-Schaffer)1839. *Tessaratomy scutellaris* Herrich-Schaffer, *Wanz. Inst.*, **4** : 81.1904. *Eusthenes scutellaris*, Distant, *Fauna Brit. India Rhyn.*, **1** : 267.1985. *Eusthenes scutellaris*, Datta, Ghosh & Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 23.

Material examined : 3 exs., West Garo hills, Barangapara, 23.iv.1991, Coll. B.N. Das & party; 3 exs., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. Das & party; 3 exs., West Garo hills, Tura, Dalu, 22.iv.1991, Coll. B.N. Das & party.

Distribution : India : Meghalaya (Khasi hills, Garo hills). Elsewhere : Nepal.

Genus 34. *Mattiphus* Amyot & Serville, 1843

1843. *Mattiphus* Amyot & Serville, *Hem.* : 168

Type-species : *Mattiphus laticollis* (Westwood)

43. **Mattiphus oblongus* Dallas

1851. *Mattiphus oblongus* Dallas, *List. Hem.*, 1 : 344.

1904. *Mattiphus oblongus*, Distant, *Fauna Brit. India Rhyn.*, 1 : 270 - 271.

Material examined : 2 exs., East Khasi hills, Umtyngar, 9.vii.1964, Coll. S. Biswas & party; 3 exs., Jaintia hills, Norting, 11.iii.1991, Coll. K.K. Roy & party.

Diagnostic characters : Above brilliant brassy-green, pronotum transversely quadrate with the anterior angles rather less than right angle; anterior margins nearly straight with the posterior margin gently rounded; margins of the abdomen projecting beyond the corium on each side, the posterior angles of the apical segment prominent, acute, making the apex of the abdomen nearly truncated and giving an oblong form to the whole body; body beneath golden yellow with legs fulvous brown; antennae darker with the apex of the 3rd and base of the 4th segments yellow.

Length : 25-27 mm.

Distribution : India : Meghalaya (Khasi hills), Uttar Pradesh.

Remarks : This species is hitherto known for the first time from Meghalaya.

Genus 35. *Pycanum* Amyot & Serville, 1843

1843. *Pycanum* Amyot & Serville, *Hem.* : 171

Type-species : *Pycanum rubens* (Fabricius)

44. *Pycanum ochraceum* Distant

1893. *Pycanum ochraceum* Distant, *A.M.N.H.*, (6) XI : 433.

Material examined : 1 ex., Garo hills, Rongli, 5.xi.1977, Coll. S. Biswas.

Diagnostic characters : Ochraceous; antennae black with the basal segments and extreme apex of 4th segment ochraceous. Pronotum with the lateral margins moderately amplified and rounded; scutellum with apical margin stramineous; membrane very pale brassy-brown; body beneath violaceous or greenish; legs ochraceous with femoral spines blackish; abdomen above bluish-black with two broken, narrow, central, longitudinal ochraceous fasciae.

Length : 24 to 28 mm.

Distribution : India : Meghalaya (Garo hills, Khasi hills), Assam, Nagaland, Sikkim, West Bengal. Elsewhere : Burma.

Genus 36. *Tessaratoma* Le Peletier & Serville, 18251825. *Tessaratoma* Lepeletier & Serville, *Encycl. Meth.*, 10 : 590.Type-species : *Tessaratoma papillosa* (Drury)45. **Tessaratoma papillosa* (Drury)1770. *Cimex papillosa* Drury, (III) 1 : 96.1904. *Tessaratoma papillosa*, Distant, *Fauna Brit. India Rhyn.*, 1 : 259-260.

Material examined : 1 ex., West Garo hills, Balphakram National Park, 2.v.1988, Coll. C. Radhakrishnan; 3 exs., West Garo hills, Tura, Damalgiri, 21.iv.1991, Coll. B.N. & party.

Diagnostic characters : Ochraceous or pale olivaceous brown; antennae black and margins of head and pronotum narrowly piceous; pronotum with the lateral margins moderately amplified and reflexed and oblique from the lateral angles to head; body beneath usually covered with white powdery substance; legs and tarsi dark castaneous. In the male the anal appendage is sinuate at the apex; the apical angles acute.

Distribution : India : Meghalaya (Garo hills), Assam, Nagaland, West Bengal. Elsewhere : Chiha.

Remarks : This is a new record from the state of Meghalaya.

Family IX. CYDNIDAE

Genus 37. *Stibaropus* Dallas, 18511851. *Stibaropus* Dallas, *List Hem.* 1 : 111; 125Type-species : *Stibaropus molginus* (Schiodte)46. *Stibaropus callidus* (Schiodte)1849. *Scaptocoris callidus* Schiodte, *Kroy. Nat. Tidsskr.*, (2)11 : 460.1904. *Stibaropus callidus* (Schiodte) : Distant, *Fauna Brit. India Rhyn.*, 1 : 85.1985. *Stibaropus callidus* (Schiodte) : Datta, Ghosh and Dhar, *Rec. zool. Surv. India, Occ. Paper No. 80* : 7.1990. *Stibaropus callidus* (Schiodte) : Maizuddin & Ahmed, *Oriental Ins.*, 24 : 333.

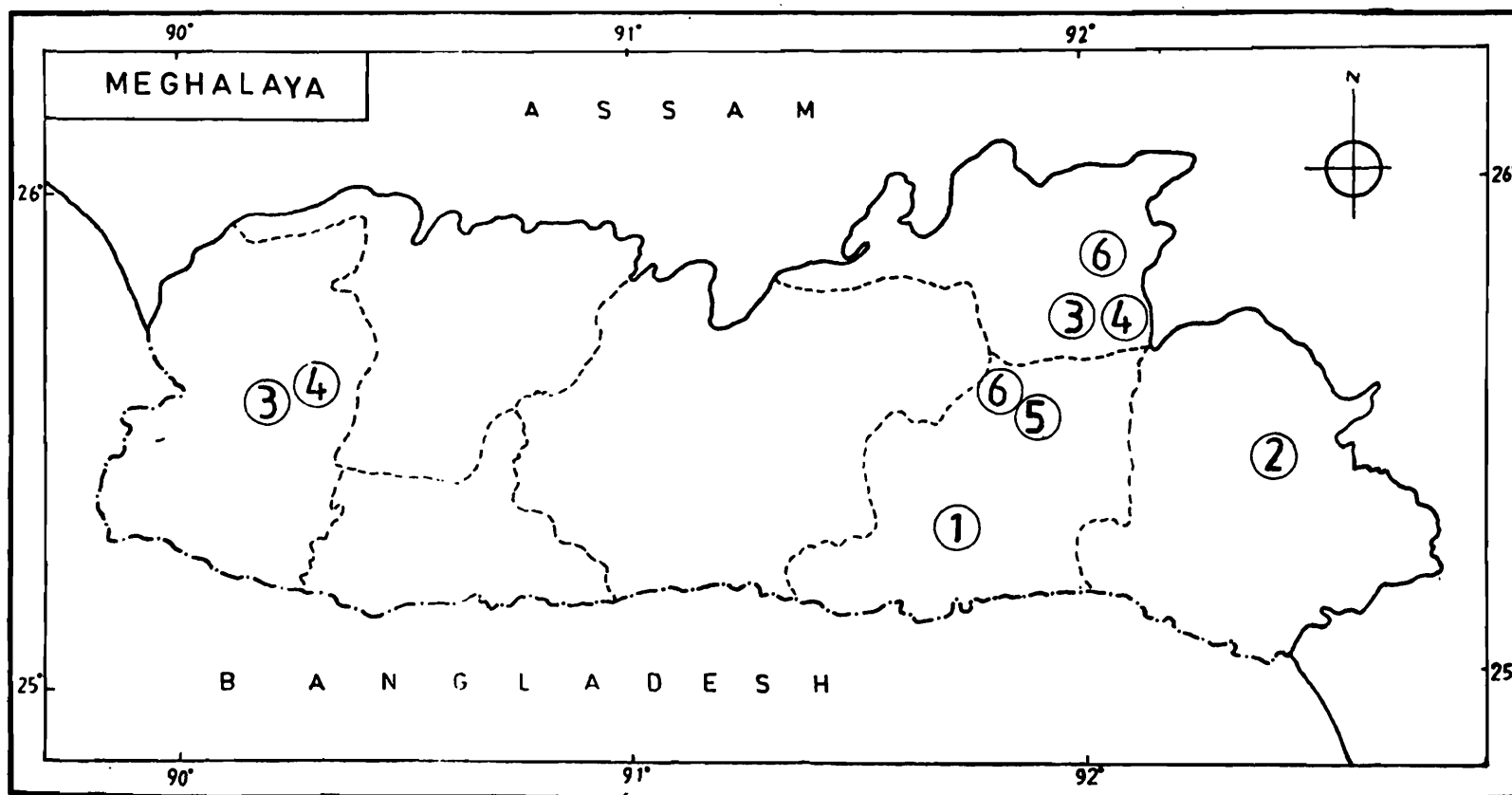
Material examined : 11 exs., West Garo hills, Gasuapara, 28.iv.1991, Coll. B.N. Das & party; 5 exs., Jaintia hills, Shangpung, 13.iii.1991, Coll. K.K. Roy & party; 5 exs., East Garo hills, Nongal, 28.v.1990, Coll. M.S. Shisodia & party.

Diagnostic characters : Suboval; head, pronotum and scutellum dark castaneous; body beneath pale castaneous, finely pilose; rostrum just passing the prosternum; 3rd antennal segment is subequal in length to 4th segment; scutellum transversely rugosely punctate; punctures more confluent at base; corium finely punctate.

Length : 5-5.5 mm.

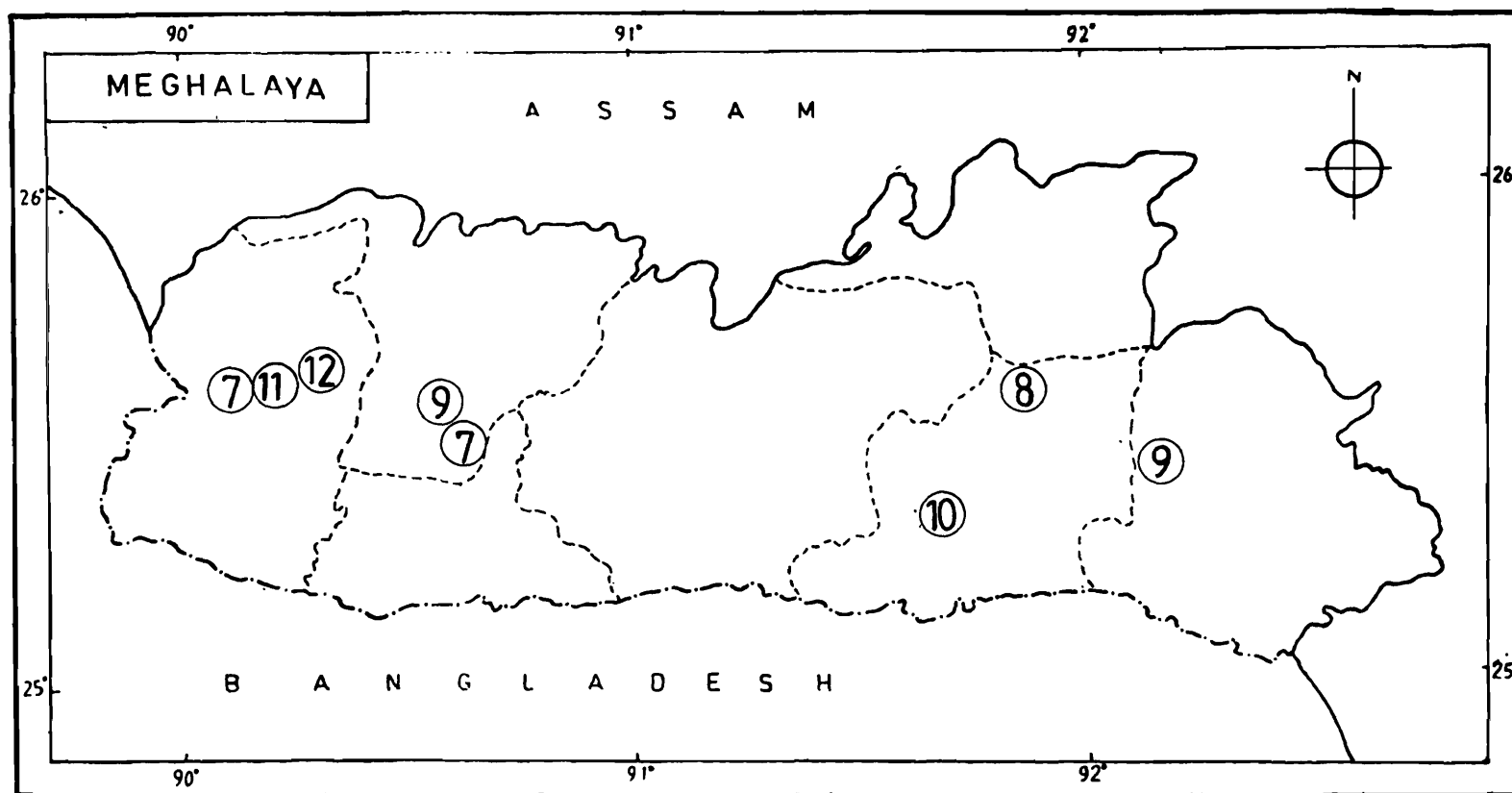
Distribution : India : Meghalaya (Garo hills, Jaintia hills); South India, West Bengal. Elsewhere : Burma.

MAP - I showing the distribution of species No. 1 - 6 of Pentatomoidea (Hemiptera)



1. <u>Antestia anchora</u> (Thunberg)	4. <u>Dolycoris indicus</u> Stal
2. <u>Plautia fimbriata</u> (Fabricius)	5. <u>Halyomorpha picus</u> (Fabricius)
3. <u>Dolycoris baccarum</u> (Linnaeus)	6. <u>Tolumnia latipes</u> (Dallas)

MAP - II showing the distribution of species 7-12



7. Agonoscelis nubila (Fabricius)

8. Bagrada picta (Fabricius)

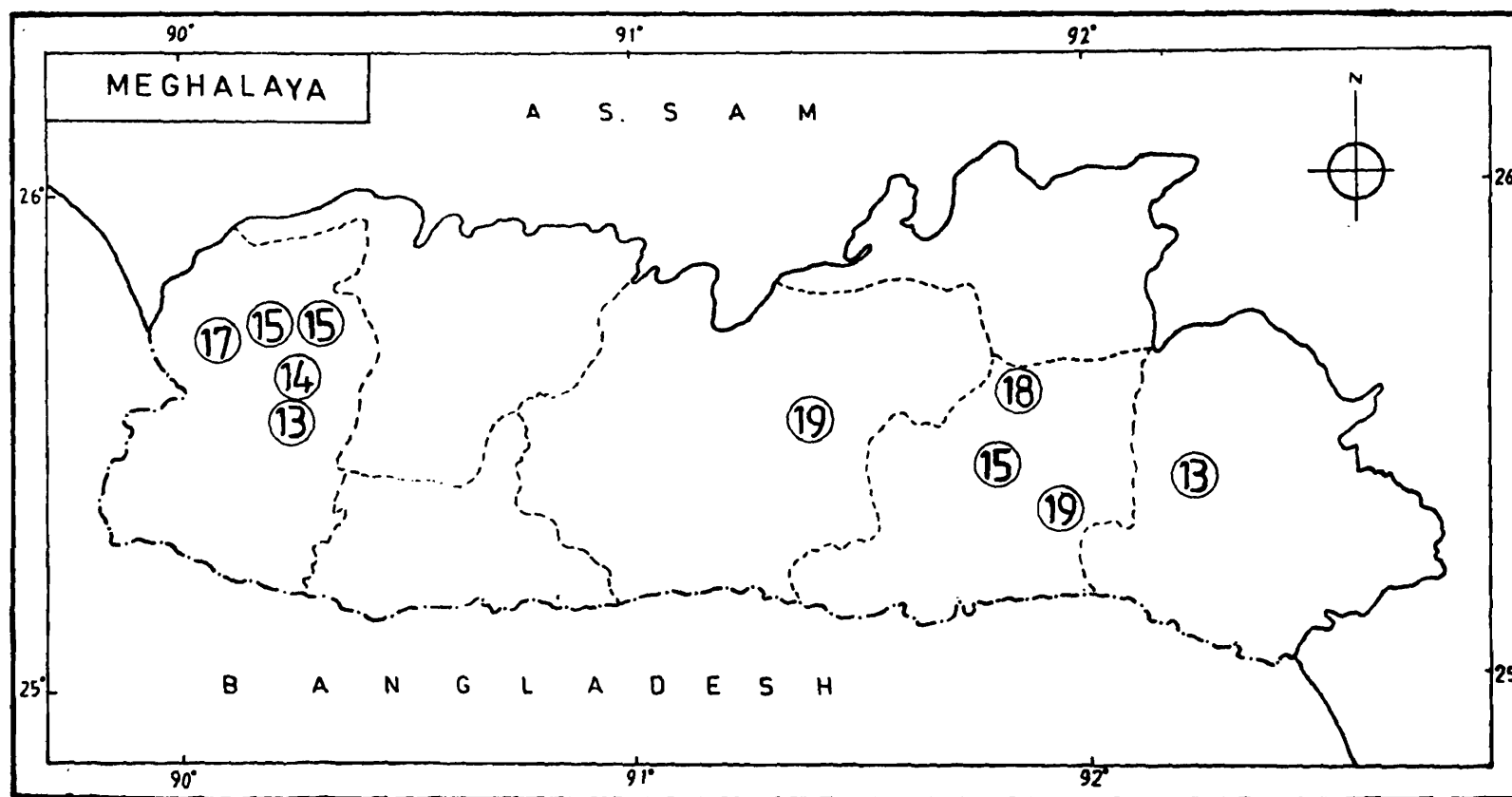
9. Eurydema pulchrum (Westwood)

10. Strachia crucigera Hahn

11. Carbula indica (Westwood)

12. Eysarcoris guttiger (Hunberg)

MAP - III showing the distribution of species 13 - 15 and 17 - 19



13. Eysarcoris montivagus (Distant)

14. Eysarcoris ventralis (Westwood)

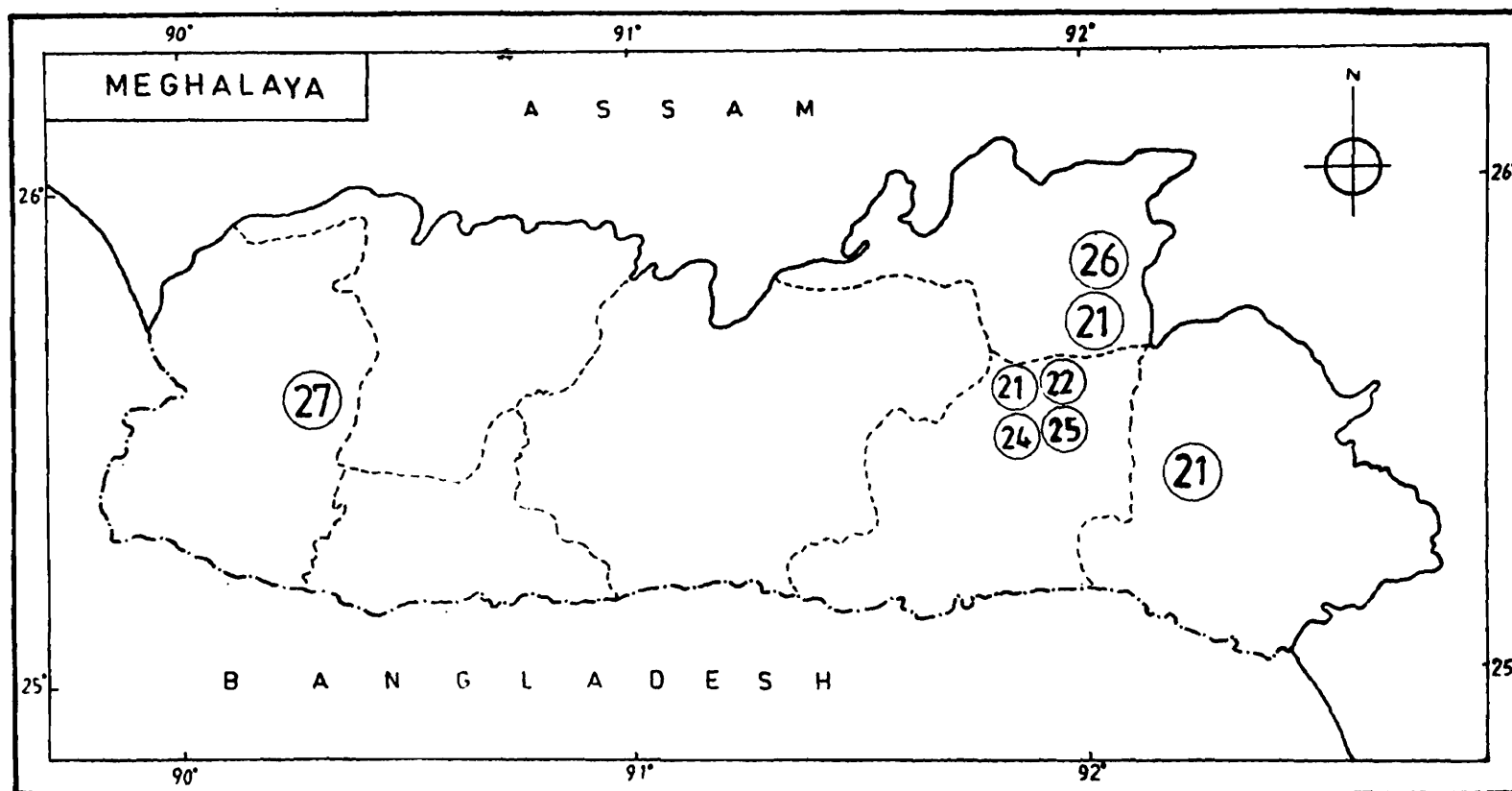
15. Dalpada oculata (Fabricius)

17. Erthesina fullo (Thunberg)

18. Halys dentatus Fabricius

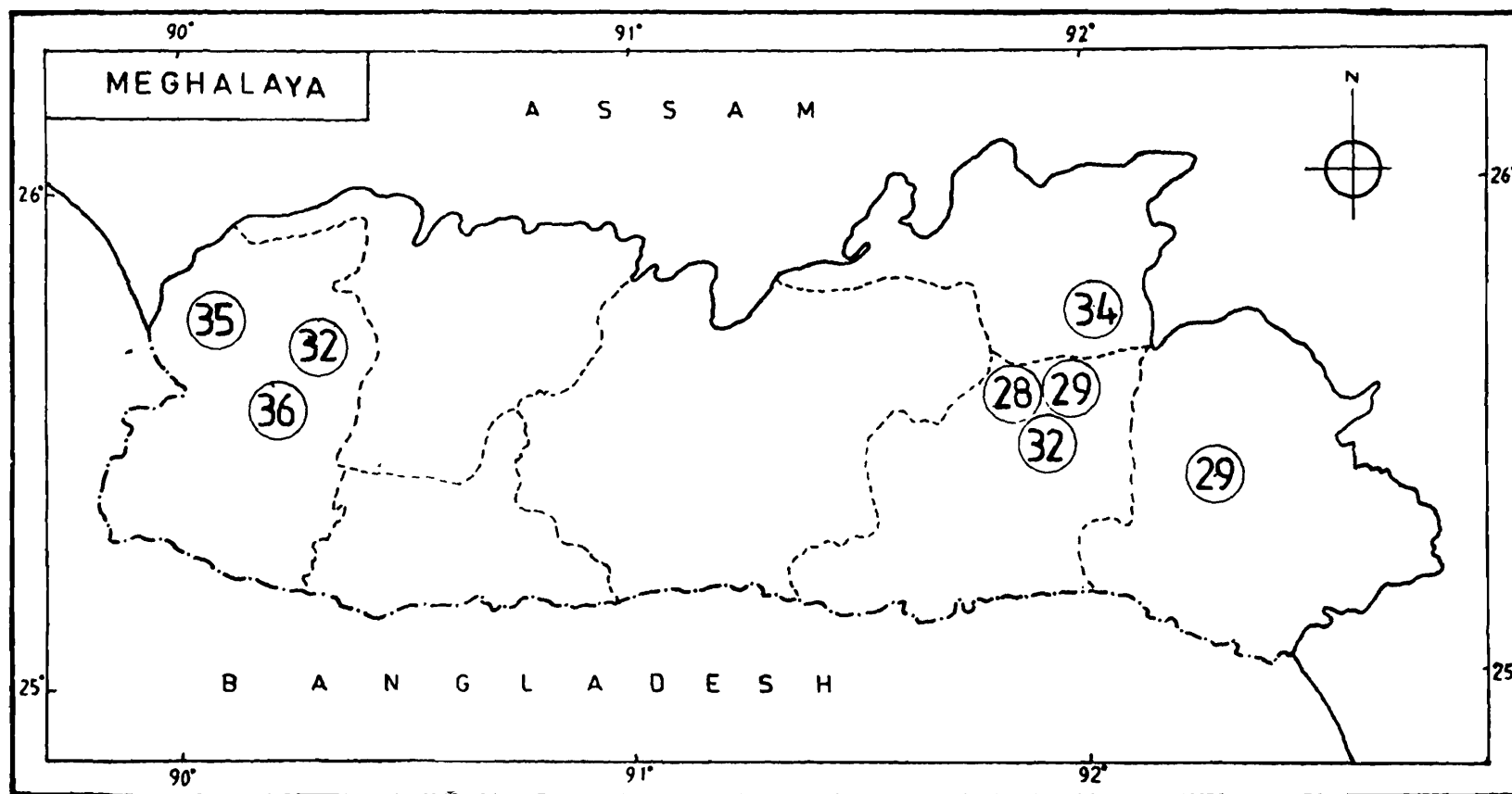
19. Hoplistodera virescens Dallas

MAP - IV showing the distribution of species No. 21, 22 and 24 - 27



21. <u>Nezara viridula</u> (Linnaeus)	25. <u>Cantao ocellatus</u> (Thunberg)
22. <u>Piezodorus rubrofasciatus</u> (Fabricius)	26. <u>Chrysocoris stollii</u> (Wolff)
24. <u>Placosternum taurus</u> (Fabricius)	27. <u>Hotea curculionoides</u> (Herrich-Schaffer)

MAP - V showing the distribution of species 28 - 29, 32 and 34 - 36



28. Poecilocoris druræi (Linnaeus)

34. Cyclopelta siccifolia (Westwood)

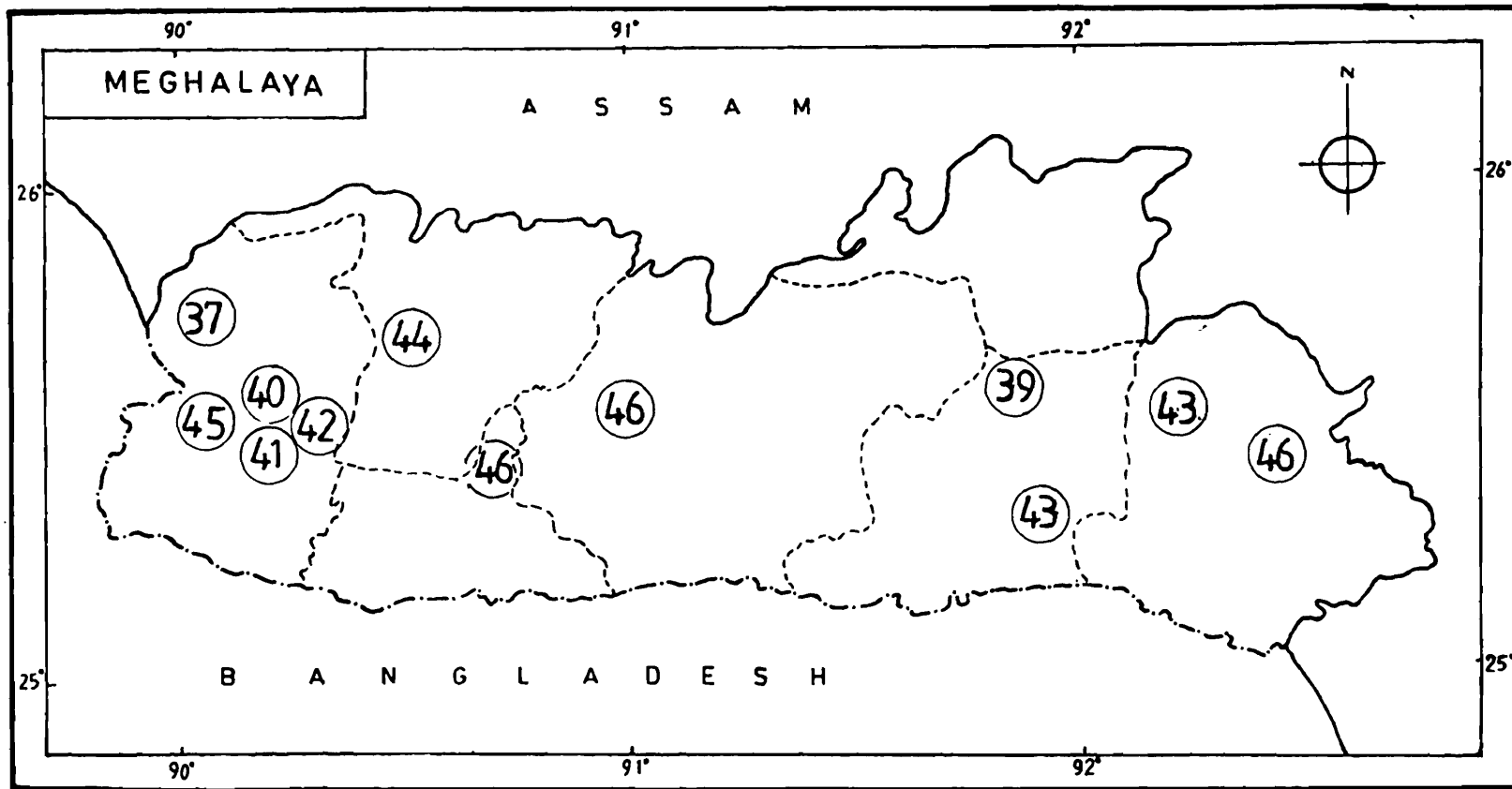
29. Poecilocoris hardwickii (Westwood)

35. Andrallus spinidens (Fabricius)

32. Coridius brunneus (Thunberg)

36. Picromerus obtusus Walker

MAP - VI showing the distribution of species No. 37 and 39 - 46



37. <u>Zicrona caerulea</u> (Linnaeus)	41. <u>Eusthenes cupreus</u> (Westwood)	44. <u>Pycanum ochraceum</u> Distant
39. <u>Coptosoma feanum</u> Montandon	42. <u>Eusthenes scutellaris</u> (Herrich-Schaffer)	45. <u>Tessaratomya papillosa</u> (Drury)
40. <u>Coptosoma w.</u> Montandon	43. <u>Mattiphus oblongus</u> Dallas	46. <u>Stibaropus callidus</u> (Schiodte)

Table - 1. Distribution of Pentatomid species in different districts of Meghalaya.

Name of the species	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	JAINTIA HILLS
	1	2	3	4	5	6	7
1. <i>Agonoscelis nubila</i> (Fabricius)	-	-	-	+	+	-	-
2. <i>Antestia anchora</i> (Thunberg)	+	-	-	-	-	-	-
3. <i>Bagrada picta</i> (Fabricius)	+	-	-	-	-	-	-
4. <i>Carbula indica</i> (Westwood)	-	-	-	+	-	-	-
5. <i>Dalpada oculata</i> (Fabricius)	-	-	+	+	+	-	-
6. <i>Dolycoris baccarum</i> (Linnaeus)	-	-	+	+	+	-	-
7. <i>Dolycoris indicus</i> Stal	+	-	+	-	+	-	-
8. <i>Erthesina fullo</i> (Thunberg)	-	-	-	+	+	-	-
9. <i>Eurydema pulchrum</i> (Westwood)	-	-	-	-	-	+	+
10. <i>Eysarcoris guttiger</i> (Thunberg)	-	-	-	+	+	-	-
11. <i>Eysarcoris montivagus</i> (Distant)	-	-	-	-	+	-	+
12. <i>Eysarcoris ventralis</i> (Westwood)	-	-	-	-	+	-	-
13. <i>Halys dentatus</i> Fabricius	+	-	-	-	-	-	-
14. <i>Halyomorpha picus</i> (Fabricius)	-	-	-	+	-	-	-
15. <i>Hoplistodera virescens</i> Dallas	+	-	-	-	+	-	-
16. <i>Nezara viridula</i> (Linnaeus)	+	-	+	-	-	-	+
17. <i>Piezodorus rubrofasciatus</i> (Fabricius)	+	-	-	+	-	-	-
18. <i>Placosternum taurus</i> (Fabricius)	+	-	-	-	-	-	-
19. <i>Plautia fimbriata</i> (Fabricius)	-	-	-	+	-	-	+
20. <i>Strachia crucigera</i> Hahn.	2	-	-	-	-	-	-

Table - 1. Distribution of Pentatomid species in different districts of Meghalaya.

Name of the species	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	JAINTIA HILLS
21. <i>Tolumnia latipes</i> (Dallas)	+	-	+	-	-	-	-
22. <i>Chrysocoris stollii</i> (Wolff)	-	-	+	-	-	-	-
23. <i>Cantao ocellatus</i> (Thunberg)	+	-	-	-	-	-	-
24. <i>Poecilocoris druriei</i> (Linnaeus)	+	-	-	-	-	-	-
25. <i>Poecilocoris hardwickii</i> (Westwood)	+	-	-	-	-	-	+
26. <i>Hotea curculionoides</i> (Herrich-Schaf.)	+	-	-	-	+	-	-
27. <i>Coridius brunneus</i> (Thunberg)	+	-	-	+	-	-	-
28. <i>Cyclopelta siccifolia</i> (Westwood)	+	-	+	-	-	-	-
29. <i>Stibaropus callidus</i> (Schiodte)	-	-	-	+	+	-	+
30. <i>Andrallus spinidens</i> (Fabricius)	-	-	-	+	-	-	-
31. <i>Picromerus obtusus</i> Walker	-	-	-	-	+	-	-
32. <i>Zicrona caerulea</i> (Linnaeus)	-	-	-	+	-	-	-
33. <i>Coptosoma feanum</i> Montandon	+	-	-	-	-	-	-
34. <i>Coptosoma w-nigrum</i> Varshney	-	-	-	-	+	-	-
35. <i>Eusthenes cupreus</i> (Wastwood)	-	-	-	-	+	-	-
36. <i>Eusthenes scutellaris</i> (Herrich-Schaf)	-	-	-	-	+	-	-
37. <i>Mattiphus oblongus</i> Dallas	+	-	-	-	-	-	+
38. <i>Pycanum ochraceum</i> Distant	-	-	-	-	+	-	-
39. <i>Tessaratoma papillosa</i> (Drury)	-	-	-	-	+	-	-

SUMMARY

The paper incorporates the account of 46 species belonging to 37 genera distributed over 9 families of Pentatomids from Meghalaya. Of these, 15 species (marked *) in 12 genera constitute new records from the State of Meghalaya. For each species is given the original reference, subsequent reference(s), distributional records within the State and elsewhere; keys to various taxa are provided. The species which is not included in the key is provided with diagnostic characters. The classification is chiefly after followed Distant (1902 - 1918). A list of Pentatomids so far known from Meghalaya State is appended. The study is based on the existing collection as well as mopping survey material of different survey parties in recent years.

ACKNOWLEDGEMENT

The authors are grateful to Dr. A.K. Ghosh, Director, Zoological Survey of India, Calcutta for Laboratory facilities. Grateful thanks are also due to Dr. J.R.B. Alfred, Additional Director and Chief Co-ordinator, Meghalaya Fauna for encouragement; to Dr. R.K. Varshney, Joint Director, to Dr. S.K. Tandon, Jt. Director, Z.S.I. for numerous courtesies. The authors are also thankful to Dr. J.K. Jonathan, Deputy Director for constructive suggestions to improve of the paper.

List of Species so far recorded from Meghalaya

Order	HEMIPTERA
Sub Order	HETEROPTERA
Super Family	PENTATOMOIDEA
Family	PENTATOMIDAE
Genus	1. <i>Dalpada</i> Amyot & Serville
	1. <i>Dalpada oculata</i> (Fabr.)
	2. <i>Dalpada jugatoria</i> Leth.
	3. <i>Dalpada clavata</i> (Fabr.)
Genus	2. <i>Erthesina</i> spinola
	4. <i>Erthesina fullo</i> Thunb.
Genus	3. <i>Halys</i> Westwood
	5. <i>Halys dentatus</i> (Fabr.)
Genus	4. <i>Nevisanus</i> Distant
	6. <i>Nevisanus alternaus</i> (Westw.)
Genus	5. <i>Sciocoris</i> Fallen
	7. <i>Sciocoris lewsi</i> (Distant)
Genus	6. <i>Laprius</i> Stal
	8. <i>Laprius varicornis</i> (Dall)

- Genus 7. ***Belopis*** Distant
 9. ***Belopis unicolor*** Dist.
- Genus 8. ***Amyntor*** Stal
 10. ***Amyntor obscurus*** (Dall)
- Genus 9. ***Cappaea*** Ellenr
 11. ***Cappaea taprobanesis*** (Dall)
- Genus 10. ***Niphe*** Stal
 12. ***Niphe subferruginea*** (Westw.)
- Genus 11. ***Halyomorpha*** Mayr
 13. ***Halyomorpha picus*** (Fabr.)
 14. ***Halyomorspha scutellata*** (Dist.)
- Genus 12. ***Tolumnia*** Stal
 15. ***Tolumnia tatipes*** (Dall.)
- Genus 13. ***Cratonotus*** Distant
 16. ***Cratonotus coloratus*** Dist.
- Genus 14. ***Axiagastus*** Dallas
 17. ***Axiagastus rosmarus*** Dall.
- Genus 15. ***Plautia*** Štal
 18. ***Plautia fimbriata*** (Fabr.)
- Genus 16. ***Agonoscelis*** Spinola
 19. ***Agonoscelis nubila*** (Fabr.)
 20. ***Agonoscelis femoralis*** Walker
- Genus 17. ***Eurydema*** Laporte
 21. ***Eurydema pulchrum*** (Westw.)
- Genus 18. ***Strachia*** Hahn
 22. ***Strachia crucigera*** Hahn
- Genus 19. ***Lelia*** (Walker)
 23. ***Lelia octopunctata*** (Dall.)
- Genus 20. ***Prionaca*** Dallas
 24. ***Prionaca lata*** Dall
- Genus 21. ***Placosternum*** (Amyot & Serville)
 25. ***Placosternum taurus*** (Fabr.)
 26. ***Plaeosternum urus*** Stal

- Genus 22. ***Rhynchocoris*** Westwood
 27. *Rhynchocoris humeralis* (Thunb.)
- Genus 23. ***Catacanthus*** Spinola
 28. *Catacanthus incarnatus* (Dru.)
- Genus 24. ***Menida*** (Motschulski)
 29. *Menida varipennis* (Westw.)
- Genus 25. ***Diplostira*** Dallas
 30. *Diplostira valida* Dall.
- Family DINIDORIDAE
- Genus 26. ***Cyclopelta*** Amyot & Serville
 31. *Cyclopelta siccifolia* Westwood
- Genus 27. ***Coridius*** Illiger
 32. *Coridius janus* (Fabr.)
 33. *Coridius ochreus* (Westwood)
 34. *Coridius brunneus* (Thunb.)
 35. *Coridius nepalensis* (Westwood)
 36. *Coridius chinensis* (Dallas)
- Genus 28. ***Megymenum*** Laporte
 37. *Megymenum brevicorne* (Fabr.)
- Family ASOPIDAE
- Genus 29. ***Cazira*** Amyot & Serville
 38. *Cazira verrucosa* (Westwood)
- Genus 30. ***Canthecona*** Amyot & Serville
 39. *Canthecona tibialis* Distant
- Genus 31. ***Andrallus*** Bergroth
 40. *Andrallus spinidens* (Fabr.)
- Family TESSARATOMIDAE
- Genus 32. ***Tessaratoma*** Lepell. & Serv.
 41. *Tessaratoma quadrata* Distant
- Genus 33. ***Eusthenes*** Laporte
 42. *Eusthenes robustus* (Lepell & Serv.)
 43. *Eusthenes saevus* Stal
 44. *Eusthenes polyphemus* Stal

45. *Eusthenes scutellaris* (Herr. Schaff)
 Genus 34. *Asiarcha* Stal
 46. *Asiarcha nigradorsis* (Stal)
 Genus 35. *Pycanum* Amyot & Serville
 47. *Pycanum ochraceum* Distant
 Family PHYLLOCEPHALIDAE
 Genus 36. *Dalsira* Amyot & Serville
 48. *Dalsira glandulosa* (Wolff)
 Genus 37. *Salvianus* Distant
 49. *Salvianus dilatatus* (Distant)
 Genus 38. *Gonopsis* Amyot & Serville
 50. *Gonopsis coccinea* (Walker)
 Genus 39. *Megarhynchus* Laporte
 51. *Megarhynchus truncatus* Westwood
 Family UROSTYLIDAE
 Genus 40. *Urochela* Dallas
 52. *Urochela pilosa* Stal
 Family ACANTHOSOMATIDAE
 Genus 41. *Sastragala* Amyot & Serville
 53. *Sastragala uniguttata* (Don.)
 Genus 42. *Anaxandra* Stal
 54. *Anaxandra tauriformis* Distant
 Family PLATASPIDAE
 Genus 43. *Brachyplatys* Boised
 55. *Brachyplatys vahliei* (Fabricius)
 Genus 44. *Coptosoma* Laporte
 56. *coptosoma duodecimpunctatum* (Germ.)
 Family SCUTELLERIDAE
 Genus 45. *Solenostethium* Spinola
 57. *Solenostethium rubropunctatum* (Guer.)
 Genus 46. *Cantao* Amyot & Serville
 58. *Cantao ocellatus* (Thunb.)

- Genus 47. *Poecilocoris* Dallas
 59. *Poecilocoris hardwickii* (Westwood)
 60. *Poecilocoris druriei* (Linnaeus)
- Genus 48. *Brachyaulax* Stal
 61. *Brachyaulax oblonga* (Westwood)
- Genus 49. *Chrysocoris* Hahn.
 62. *Chrysocoris grandis* (Thunberg)
 63. *Chrysocoris stolliei* (Wolff)
- Genus 50. *Lamprocoris* Stal
 64. *Lamprocoris roylli* (Westwood)
 65. *Lamprocoris spiniger* (Dallas)
- Family GRAPHOSOMATIDAE
- Genus 51. *Stortheccoris* Horv.
 66. *Stortheccoris nigriceps* Horv.

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INSECTA : HEMIPTERA : WATER-BUGS

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INTRODUCTION

The present paper is on the water-bugs of Meghalaya. It consists of a taxonomic treatment of nine families of water-bugs of the Order Hemiptera, of which seven families are aquatic, belonging to the Series Hydrocorisae, namely Ochteridae, Gelastocoridae (both are shore bugs), Corixidae, Nepidae, Notonectidae, Belostomatidae and Naucoridae while other two families are surface dwelling semiaquatic bugs belong to the Series Amphibicorisae, namely Gerridae and Veliidae (Classification is based upon Richards and Davies, 1977). The work is aimed to bring out a faunistic-cum-taxonomic study of water-bugs of Meghalaya, chiefly based on the collections made by various Survey parties of the Zoological Survey of India and other unnamed and a few named collections housed in the National Zoological Collection.

Distant (1902, 1906, 1910) had recorded only three species of water-bugs from the State of Meghalaya (the then Assam) in his valuable Fauna of British India, Rhynchota volumes. Since then so far, Paiva (1919) had presented the only systematic account of hemipterna fauna from Garo Hills, Meghalaya (the then Assam State), where he recorded 11 species of water-bugs belonging to two families. Hutchinson (1940) recorded two new species of Corixids from Khasi Hills.

The present study may be considered a comprehensive systematic work, first of its kind from the state, since it precisely includes the keys for different taxa, diagnostic characters for each species, distributional pattern of each species in the map of Meghalaya as well as their distribution in other states of India, and world.

Approximately 200 species of water-bugs have been recorded from India so far, belonging to the concerned nine families. The present paper has recorded 35 species under 24 genera from the State of Meghalaya, 17 of which are being recorded for the first time from the state and cited in the text with asteric marks. The studied materials are present in the National Zoological Collection, Calcutta.

COLLECTION AND PRESERVATION

The water-bugs of the Order Hemiptera have very wide range of habitat preferences. The habitat of nine families of water-bugs, those are included in the present paper, are being stated here in brief, along with their collection and preservation methods.

Both Ochterids and Gelastocorids are shore dwelling bugs found at the margin of ponds, lakes and other freshwater bodies, capable of running or short jumping rather than swimming. Corixids are the most abundant of all aquatic bugs in the world, with a wide range of habitat preferences. Nepids are awkward swimmers and live in trash and tangled aquatic plants. Notonectids are found in a variety of freshwater stagnant pools and in the quiet water of streams and lakes; adults can fly and disperse over considerable distances. Belostomatids are inhabiting in freshwater ponds, lakes, rivers, streams and also in salt water. They rest at the surface in the mats of aquatic vegetation by extending their body obliquely downwards and tip of the abdomen slightly above the surface film. Naucorids occur in ponds, lakes, rivers, hot springs and saline water. Gerrids are semiaquatic bugs, dwelling on the surface film of ponds, lakes and pools in streams. Veliids can walk over the surface water in protected and secluded places.

The water nets, the water screens and the light traps are useful methods of collecting water-bugs from different habitat. The water nets, made up of close meshed nylon thread supported by strong ring and long pole are used by the side of water bodies or from boats. The nets are also used to collect insects from streams by disturbing stones and aquatic vegetations which harbour the insects. The water screens, made up of metal sheets with numerous pores, fitted with wooden handle are used in the streams through dense vegetation to collect insects. All the adult water-bugs are quite capable of flight over considerable distances and can be trapped by using petromax gas light or other source of powerful light placed near the edge of water bodies during night.

The water-bugs can be preserved both dry and wet, as in case with other insects in general, depending upon purpose, nature of specimens, etc. Collected specimens in the field are generally kept dry in the insect-envelopes after killing them in killing bottle (Benzene, Ethyl acetate, Carbontetrachloride or Chloroform-any one can be used as killing agent). Water-bugs in the field are also preserved in 70% or 80% Ethyl alcohol as wet collection, by direct pouring them from the net to the alcohol filled glass jar container. Each collection is provided with collection data.

In the Laboratory the collected specimens are sorted out according to different taxa for further studies. After setting and pinning in the Laboratory the studied materials are kept in dry Insect Cabinet with proper labels, or a number of specimens can be kept as wet collection in 70% Ethyl alcohol with proper labels after changing the alcohol in the Laboratory.

SYSTEMATIC ACCOUNT

Following is the systematic list of all the species contained in the present paper. Asteric mark with the species denotes the new record from the State of Meghalaya.

SERIES - HYDROCORISAE

Family I. Ochteridae

Genus 1. *Ochterus* Latreille 1807

1. *Ochterus marginatus* (Latreille)

Family II Gelastocoridae

Genus 2. *Nerthra* Say 1932

2. *Nerthra indica* (Atkinson)

3. *Nerthra spissa* (Distant)*

Family III. Corixidae

Subfamily Micronectinae

Genus 3. *Micronecta* Kirkaldy 1897

4. *Micronecta (Dichaetonecta) haliploides* Horvath *

5. *Micronecta (Mesonecta) waltoniana* Hutchinson

6. *Micronecta (Mesonecta) khasiensis* Hutchinson

Subfamily Corixinae

Genus 4. *Cymatia* Flor 1860

7. *Cymatia apparens* (Distant)

Genus 5. *Corixa* Geoffroy 1762

8. *Corixa (Vermicorixa) kempi* Hutchinson *

Family IV. Nepidae

Genus 6. *Ranatra* Fabricius 1790

9. *Ranatra gracilis* Dallas *

10. *Ranatra sordidula* Dohra *

11. *Ranatra varipes* Stal *

Genus 7. *Laccotrephes* Stal 1865

12. *Laccotrephes robustus* Stal *

13. *Laccotrephes ruber* (Linnaeus)

14. *Laccotrephes griseus* (Guerin) *

Genus 8. *Montonepa* Lansbury 1973

15. *Montonepa erutus* (Montandon)

Family V. Notonectidae

Genus 9. *Anisops* Spinola 1837

16. *Anisops sardea* Herrich-Shaffer *

Genus 10. *Enithares* Spinola 1837

17. *Enithares fusca* Brooks *

Family VI. Belostomatidae

Genus 11. *Sphaerodema* Laporte 1832

18. *Sphaerodema annulatum* (Fabricius) *

Genus 12. *Lethocerus* Mayr 1853

19. *Lethocerus indicus* (Lepeletier & Serville)

Family VII. Naucoridae

Subfamily Cheirochelinae

Genus 13. *Cheirochela* Hope 1841

20. *Cheirochela assamensis* Hope *

Subfamily Laccocorinae

Genus 14. *Heleocoris* Stal 1876

21. *Heleocoris obliquatus* (Spinola) *

SERIES - AMPHIBICORISAE

Family VIII. Gerridae

Subfamily Ptilomerinae

Genus 15. *Ptilomera* Amyot & Serville 1843

22. *Ptilomera laticaudata* (Hardwicke)

Subfamily Halobatinae

Genus 16. *Metrocoris* Mayr 1865

23. *Metrocoris tenuicornis* Esaki *

24. *Metrocoris femoratus* (Paiva)

25. *Metrocoris nigrofasciatus* Distant

Subfamily Gerrinae

Genus 17. *Eotrechus* Kirkaldy 1902

26. *Eotrechus kalidasa* Kirkaldy

Genus 18. *Onychotrechus* Kirkaldy 1903

27. *Onychotrechus sakuntala* (Kirkaldy) *

Genus 19. *Chimarrhometra* Bianchi 1896

28. *Chimarrhometra orientalis* (Distant)

Genus 20. *Gerris* Fabricius 1794

29. *Gerris adelaidis* Dohrn *

Genus 21. *Limnogonus* Stal 1868

30. *Limnogonus nitidus* (Mayr) *

31. *Limnogonus parvulus* (Stal)

Family IX. Veliidae

Genus 22. *Rhagovelia* Mayr 186532. *Rhagovelia nigricans* (Burmeister)Genus 23. *Microvelia* Westwood 183433. *Microvelia lineatipes* Paiva34. *Microvelia atromaculata* PaivaGenus 24. *Perittopus* Fieber 186135. *Perittopus maculatus* Paiva

Key to the families

1. Antennae shorter than head, usually hidden in cavities beneath eyes and not visible from above (except Ochteridae). [Aquatic and shore bugs] Series - Hydrocorisae.....2
Antennae longer than head, inserted in front of eyes and clearly visible from above. [Semiaquatic bugs] Series Amphibicorisae.....8
2. Ocelli present; middle and hind legs without fringe of swimming hairs (Shore bugs).....3
Ocelli absent; middle and hind legs provided with more or less extensive fringe of long swimming hairs (Aquatic bugs). 4
3. Antennae small and exposed, can be seen from above; front legs similar to middle legs.**OCHTERIDAE**
Antennae concealed in grooves under the strongly protuded eyes; front legs raptorial with broad and grooved femora.**GELASTOCORIDAE**
4. Rostrum very short and broad with no distinct segmentation; front tarsi spatulate and developed into comblike palae; base of head overlapping the anterior margin of pronotum**CORIXIDAE**
Rostrum cylindrical or cone shaped with distinctly 3-4 segmented; front tarsi normal and not modified into palae; base of head inserted into pronotum. 5
5. Abdomen with a pair of long, slender posterior appendages; hind coxae short, free and rotatory.....**NEPIDAE**
Abdomen without paired long slender posterior appendages; hind coxae broadly jointed to the thoracic pleura. 6
6. Body elongated; head spherical; hind legs long, slender and oarlike without distinct claws.**NOTONECTIDAE**
Body dorso-ventrally flattened; head otherwise; hind legs otherwise; with distinct paired claws. 7
7. Membrane of hemelytra with reticulate veins; abdomen with a pair of short, flat, retractile posterior appendages; head nearly triangular at the anterior margin...**BELOSTOMATIDAE**
Membrane of hemelytra without veins; abdomen without any straplike appendages; head strongly curved posteriorly at the anterior margin.....**NAUCORIDAE**

8. Rostrum 4-segmented; middle and hind legs elongated; hind femora long, greatly exceeding the apex of abdomen; adult with median metasternal scent gland opening **GERRIDAE**

Rostrum 3-segmented; middle and hind legs not elongated; hind femora scarcely, if at all, surpassing the tip of the abdomen; adult with lateral metathoracic scent gland openings.

..... **VELIIDAE**

SERIES - HYDROCORISAE

Family I. OCHTERIDAE

Genus 1. *Ochterus* Latreille 1807

1807. *Ochterus* Latreille, *Ges. Crust. Ins.*, 3 : 142

1. *Ochterus marginatus* (Latreille)

1804. *Acanthia marginatus* Latreille, *Hist. Ins.*, 12 : 242

1807. *Ochterus marginatus* : Latreille, *Ges. Crust. Ins.*, 3 : 143

1906. *Pelogonus marginatus* : Distant, *Fauna Brit. India, Rhynochota*, 3 : 14

1979. *Ochterus marginatus* : Polhemus, *Bull. Fish Res. Stn., Sri Lanka*, 29 : 91

Material examined : 1 ex., Tura, on the way to Tura peak, West Garo Hills Dist., 1.V.1979, J. K. Jonathan and party coll.

Diagnosis : Adult insects may attain a length of 4-6 mm; body moderately depressed; antennae short and 4-jointed, inserted beneath the eyes; pronotum transverse and hexangular, lateral margin laminately amplified and moderately rounded; yellowish spots to the margins of the abdomen; hemelytra totally covering the abdomen.

Distribution : India : Meghalaya (West Garo Hills); West Bengal; Bihar; Orissa; Maharashtra; U.P. Elsewhere : Burma, Nepal, Sri Lanka.

Family II. GELASTOCORIDAE

Genus 2. *Nerthra* Say 1832

1832. *Nerthra* Say, *Descr. Het. Hem. N. Amer.*, : 37

Key to the species of the genus *Nerthra*

1. Head between eyes about three times wider than long and provided with two short distinct projecting spines at the middle of anterior margin; pronotum with lateral margins angularly dilated; pronotum provided with a prominent anteriorly directed spine at the anterior angle just behind each eye; scutellum irregularly gibbous with no distinct tubercle.

..... *indica*

Head not provided with any spine at the anterior angle; scutellum with three distinct tubercles, one on each side near base and median one at the apex..... *spissa*

2. *Nerthra indica* (Atkinson)

1889. *Mononyx indicus* Atkinson, *J. Asiat. Soc. Bengal*, 57 : 345

1906. *Mononyx indicus* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 15

1910. *Mononyx projectus* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 310

1955. *Nerthra indica* : Todd, *Kans. Univ. Sci. Bull.*, 37(11) : 405

Material examined : 1 ex., Above Tura, West Garo Hills Dist., 3500-3900 ft., Reg. No. 8624/H1, 15.VII. 1930, S. Kemp coll.

Diagnosis : Adults attain a length of 9-10 mm.; breadth between the pronotal angles approx. 7 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills); Assam; Sikkim.

3. *Nerthra spissa* (Distant) *

1906. *Mononyx spissus* Distant, *Fauna Brit. India, Rhynchota*, 5 : 312

1955. *Nerthra spissa* : Todd, *Kans. Univ. Sci. Bull.*, 37(11) : 412

Material examined : 1 ex., Damalgiri, Tura, West Garo Hills Dist., 21.IV. 1991, B.N. Das and party coll.; 1 ex., Wageasi, East Garo Hills Dist., 5.IV.1973, S. Biswas coll.

Diagnosis : Adults may attain a length of about 10 mm.; breadth of pronotum about 6.5 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (Districts - East Garo Hills, West Garo Hills); Assam.

Family III. CORIXIDAE

Key to the subfamilies and genera of the family Corixidae

1. Antennae three-jointed; scutellum exposed; in male 9th segment and upper paramere not forming supports or sheaths for the aedeagus; small species, hardly over 4.5 mm in length. ... Subfamily Micronectinae and genus *Micronecta*
 Antennae four-jointed; scutellum hidden under posteriorly produced pronotum; in male the posterior projection of 9th segment and the modified upper paramere forming supports or sheaths for the aedeagus; larger species, rarely under 4.5 mm..... Subfamily Corixinae.....2
2. Rostrum without transverse sulcations; palea subcylindrical in cross section in both the sexes; pronotum with very obscure markings; elytra with transverse bands, more regular at the base of clavus. *Cymatia*
 Rostrum provided with transverse sulcations; palae triangular in cross section in both the sexes; pronotum and elytra marked with transverse alternating yellow and dark vermiculations or bands..... *Corixa*

Genus 3. *Micronecta* Kirkaldy 1897

1897. *Micronecta* Kirkaldy, *Entomologist*, 30 : 260

Key to the species of the genus *Micronecta*

1. Elytron pale with punctiform black spot. *M. (Dichaetonecta) haliploides*
 Elytron without punctiform black spots but obscurely linear dark lines.....2
2. Larger, over 2.5 mm in length; head without any orange stripe on frons; in male anterior femur with a row of 12 long spines on the flexor margin; male pala with a row of about 20 hairs on the posterior flexor margin. *M. (Mesonecta) waltoniana*
 Smaller, under 2.5 mm in length; head with a dull orange stripe on frons; in male anterior femur with two long spines on the flexor margin; male pala with a row of more than 30 hairs on the posterior flexor margin. *M. (Mesonecta) khasiensis*

4. *Micronecta (Dichaetonecta) haliploides* Horvath *

1904. *Micronecta haliploides* Horvath, *Ann. Hist. nat. Mus. Hung. Budapest*, 2 : 594

1905. *Micronecta inflatula* : Breddin, *Soc. Ent. Zurich*, 20 : 57

1910. *Micronecta merope* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 351

1934. *Micronecta haliploides* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 104

1940. *Micronecta (Dichaetonecta) haliploides* : Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 377

Material examined : 5 exs., Ichhamati stream, Shella, East Khasi Hills Dist., 3.IV. 1992 M. Ghosh coll.

Diagnosis : Adult insects may attain a length of about 3 mm.; pronotum transverse and narrow, lateral margins very short, elytra with lateral margins moderately convexly rounded. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal. Elsewhere : Bangladesh, Java.

5. *Micronecta (Mesonecta) waltoniana* Hutchinson

1940. *Micronecta (Mesonecta) waltoniana* Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 395

Diagnosis : Adults may be 2.77 to 2.95 mm in length; head dull brownish yellow; legs greyish yellow; head just under four times as wide as long; in male sixth tergite not emerginate within strigil. Other diagnostic characters as in key.

Distribution : India : Meghalaya (District - Khasi Hills)

Remarks : This species is not available in the present collection. Diagnostic characters have been incorporated in the present paper from Hutchinson (1940).

6. *Micronecta (Mesonecta) khasiensis* Hutchinson

1940. *Micronecta (Mesonecta) khasiensis* Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 396

Diagnosis : Adults may be 2.14 to 2.34 mm in length; head dull yellowish in colour; legs brownish yellow; in male sixth abdominal segment with tergite emerginate central to strigil. Other diagnostic characters as in key.

Distribution : India : Meghalaya (Khasi Hills).

Remarks : This species is not available in the present collection. Diagnostic characters have been incorporated in the present paper from Hutchinson (1940).

Genus 4. *Cymatia* Flor 1860

1860. *Cymatia* Flor, *Die. Rhynch. Livlands*, 1 : 783

7. *Cymatia apparens* (Distant)

1910. *Corixa apparens* Distant, *Fauna Brit. India, Rhynchota*, 5 : 343

1928. *Cymatia apparens* : Jaczewsky, *Ann. Mus. Zool. polon.*, 7 : 107

1940. *Cymatia apparens* : Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 405

Diagnosis : Adult insects with body length from 4.7 to 5.8 mm; pronotum with very obscure markings, hardly visible in uncleaned specimen; elytra with transverse bands more regularly developed at the base of the clavus; the clavus having relatively unbroken yellow bands narrower than the intermediate space; pronotum and elytra non-rastrate; a well defined longitudinal carina on the pronotum.

Distribution : India : Meghalaya (Khasi Hills); West Bengal; Jammu and Kashmir; Maharashtra. Elsewhere : China.

Remarks : This species is not available in the present collection. Distant (1906) reported it from Khasi Hills as *Corixa hieroglyphica*.

Genus 5. *Corixa* Geoffroy 1762

1762. *Corixa* Geoffroy, *Hist. abreg. Ins.*, 1 : 477

8. *Corixa (Vermicorixa) kempi* Hutchinson *

1940. *Corixa (Vermicorixa) kempi* Hutchinson, *Conn. Acad. Arts Sci.*, 33 : 432

Material examined : 5 exs. (3 F, 2 m); Near Elephant Falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.

Diagnosis : Adult insects may attain a length of about 6.5 to 6.83 mm; head yellow in colour, gently rounded in front and hardly produced in front of eyes; vertex with a low obscure posterior longitudinal carina between a pair of rows of six punctures; pronotum dark blackish with ten transverse yellow lines, rastrate and two-third times as wide as long, central carina forming a small tubercle anteriorly; clavus with three basal yellow lines straight and unbroken, other lines vermiculate but almost unbroken; in male pala subparallel with eight long hairs on the extensor margin and a row of about 34 pegs which runs obliquely from the middle of the base, recurves to run subparallel to the extensor margin of the pala; right paramere evenly curved, narrow and uncrested; sixth abdominal segment with rather small, subquadrate strigil.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Himachal Pradesh; U.P.

Family IV. NEPIDAE

Key to the genera of the family Nepidae

1. Body slender, subcylindrical; pronotum slender and much longer than broad; hind coxae very close; anterior femora a little incrassate without any groove beneath; anterior femora provided with one or two pairs of sharp teeth; anterior coxae very long.....*Ranatra*

Body elongately suboval and flattened; pronotum about as long as or little shorter than broad; hind coxae widely separated; anterior femora incrassate and longitudinally grooved beneath to hold the tibiae; anterior femora not provided with sharp teeth but a round tubercle at the base on each; anterior coxae very short.....2

2. Posterior margin of pronotum strongly concavely sinuate; membrane well developed; abdominal appendages well developed and long.....*Laccotrephes*

Posterior margin of pronotum less sinuate; membrane rudimentary; abdominal appendages short.*Montonepa*

Genus 6. *Ranatra* Fabricius 1790

1790. *Ranatra* Fabricius, *Skr. nat. Selsk.*, 1(1) : 227

Key to the species of the genus *Ranatra*

1. Abdominal appendages very short, nearly 1/4th of the body length; head with an acute tubercle between the eyes; anterior femora with six minute teeth arranged linearly beneath the basal half and two large teeth at the middle. *gracilis*
 Abdominal appendages much longer but a bit shorter than the body length; head with no tubercle between the eyes; anterior femora not provided with minute teeth on the basal half. 2.
2. Abdominal appendages 3-4 mm shorter than the body length; pronotum provided with an indistinct ridge at the posterior angle on each side; metasternal process posteriorly projectile with lateral concavity on each side and mid-longitudinally slightly carinated; anterior tibia shorter, not touching the inner tooth on the anterior femur. *sordidula*
 Abdominal appendages 7-8 mm shorter than the body; pronotum provided with a distinct ridge at the posterior angle on each side; metasternal process posteriorly blunt and slightly rounded with no lateral concavity, mid-longitudinal carination less distinct; anterior tibia longer and clearly touching the inner tooth on the anterior femur. *varipes*

9. *Ranatra gracilis* Dallas *

1849. *Ranatra gracilis* Dallas, *Trans. ent. Soc. London*, : 10
 1903. *Ranatra gracilis* : Montandon, *Bull. Soc. Sci. Bucarest*, 12 : 110
 1906. *Ranatra gracilis* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 22
 1934. *Ranatra gracilis* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 29

Material examined : 7 exs., Shillong, East Khasi Hills Dist., 15.XI. 1930, H.S. Rao coll.; 1 ex., Malki Forest, Shillong, East Khasi Hills Dist., 8.V. 1974, R.S. Giri coll.

Diagnosis: Adult insect may attain a length about 34 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills). Elsewhere : Bhutan.

10. *Ranatra sordidula* Dohrn *

1860. *Ranatra sordidula* Dohrn, *Stettin. ent. Ztg.*, 21 : 409
 1906. *Ranatra sordidula* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 22

Material examined : 2 exs., Motinagar, Shillong, East Khasi Hills Dist., 19.IX. 1977, M.S. Jyrwa coll.; 2 exa., Malki Forest, Shillong, East Khasi Hills Dist., 8.V. 1974, R.S. Giri coll.

Diagnosis : Adult insect may be 23-24 mm long, abdominal appendages approximately 20 mm in length; head with no tubercle on the vertex. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Orissa. Elsewhere : Malay Peninsula, Sri Lanka, Thailand.

11. *Ranatra varipes* Stal *

1861. *Ranatra varipes* Stal, *Ofvers. K. Vet.-Akad. Forh.*, 18 : 203
 1910. *Ranatra varipes* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 316
 1947. *Ranatra varipes* : Hafiz & Pradhan, *Rec. Indian Mus.*, 45 : 366
 1974. *Ranatra varipes* : Fernando & Cheng, *Fdn. Mus. J.*, 19 : 32.

Material examined : 4 exs., Shella, East Khasi Hills Dist., 3.IV.1992, M. Ghosh coll.

Diagnosis : Adult insects may attain a length of about 19-20 mm and abdominal appendages reach upto 12 mm in length. Other characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Orissa; Tamil Nadu; U.P. Elsewhere : Burma, Malay Peninsula, Nepal, Sri Lanka, Thailand.

Genus 7. *Laccotrephes* Stal 1865

1865. *Laccotrephes* Stal, *Hem. Africa.*, 3 : 186

Key to the species of the genus *Laccotrephes*

1. Adults attain a length about 36-44 mm; anterior area of prosternum provided with an indistinct tubercle; abdominal appendages either or a little longer than the body length; abdomen above red blood in colour. *robustus*

Adults less than 35 mm in length; anterior area of prosternum provided either with an indistinct tubercle or a strong acute spine like structure; abdominal appendages otherwise; abdominal colouration different. 2

2. Adults attain a length about 30-35 mm; abdomen above yellowish red in colour; prosternum provided with a small indistinct tubercle; abdominal appendages a little longer than the body *ruber*

Adults never attain a length more than 15-20 mm; abdomen above with light bluish tinge; prosternum provided with a strong acute spine like structure; abdominal appendages shorter than the body *griseus*

12. *Laccotrephes robustus* Stal *

1870. *Laccotrephes robustus* Stal, *Ofvers. K. Vet.-Akad. Forh.*, 27 : 706

1888. *Nepa robusta* : Ferrari, *Ann. Hofmus. Wien*, 3 : 182

1906. *Laccotrephes robustus* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 18

1934. *Laccotrephes robustus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 26

1974. *Laccotrephes robustus* : Fernando & Cheng, *Fdn. Mus. J.*, 19 : 34

Material examined : 1 ex., Shillong, East Khasi Hills Dist., 15.XI. 1930, H.S. Rao coll.; 2 exs., 17 kms. from Jowai, 4 kms. from Passi on the way to Mynco village, 4500 ft., Jaintia Hills Dist., 5.I. 1988, A.K. Karmakar and party coll.

Diagnosis : As in key.

Distribution : India : Meghalaya (East Khasi Hills, Jaintia Hills); Nagaland. Elsewhere : Burma, Formosa, Indonesia, Philippines.

13. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.*, : 165

1868. *Laccotrephes ruber* : Stal, *Hem. Fabr.*, 1 : 135

1906. *Laccotrephes ruber* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 18

1947. *Laccotrephes ruber* : Hafiz & Pradhan, *Rec. Indian Mus.*, 45 : 364

Material examined : 4 exs., Nongpoh, ca 5 kms. from Shillong, East Khasi Hills Dist., 5.II. 1971, R.S. Pillai coll.; 6 exs., Lalchand basti, Shillong, East Khasi Hills Dist., 6.V.1963, V.D. Srivastava coll.; 1 ex., Nongkhlaw village, West Khasi Hills Dist., 4600ft., 4.VII. 1986, C. Radhakrishnan coll.; 7 exs., Barengapara, Bakla River, West Garo Hills Dist., 5.III.1991, H.C. Ghosh and party coll.; 1 ex., ca 5 kms. after Markasa towards Nongstoin, West Khasi Hills Dist., 28.VIII. 1986, C. Radhakrishnan coll.; 1 ex., Rongrengiri, East Garo Hills Dist., 22.IV.1973, S. Biswas coll.; 5 exs., 2 kms. West Barengapara, From catchment area of a stream, West Garo Hills Dist., 7.III. 1991, H.C. Ghosh and party coll.

Diagnosis : As in key.

Distribution : India : Meghalaya (East Khasi Hills, West Khasi Hills, West Garo Hills, East Garo Hills); West Bengal; Himachal Pradesh; Jammu & Kashmir; Maharashtra ; Nagaland; Orissa. Elsewhere : China, Formosa, Japan, Sri Lanka.

14. *Laccotrephes griseus* (Guerin)*

1829. *Nepa griseus* Guerin, *Iconogr Regne Anim. Ins.*, : 352

1910. *Laccotrephes griseus* : Montandon, *Annali Mus. zool. Napoli*, 3(10) : 3

1934. *Laccotrephes griseus* : Lundblad, *Arch. Hydrobiol. Suppl.* 12 : 20

1947. *Laccotrephes griseus* : Hafiz & Pradhan, *Rec. Indian Mus.*, 45 : 364

Material examined : 2 exs., Someswari River, Baghmara, South Garo Hills Dist., 18.II. 1971, G.M. Yazdani coll.

Diagnosis : As in key.

Distribution : India : Meghalaya (South Garo Hills); West Bengal; Pondicherry; Tamil Nadu. Elsewhere : Burma, Malacca, Seychelles, Sri Lanka, Thailand.

Genus 8. *Montonepa* Lansbury 1973

1973. *Montonepa* Lansbury, *Zoological Scripta*, 2 : 111

15. *Montonepa erutus* (Montandon)

1910. *Borborophyes erutus* Montandon, *Ann. Mus. Nat. Hungarici*, 8 : 164

1910. *Borborophyes erutus* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 315

1934. *Borborophyes erutus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 19

1973. *Montonepa erutus* : Lansbury, *Zoological Scripta*, 2 : 111

Diagnosis : Adult insect may attain a length of about 15 mm.; head and pronotum darkbrown in colour; eyes small and protuberant; pronotum deeply crenulated and ridged, anterior lateral margins raised and posterior humeral angles divergent; scutellum large and triangular, apex raised with a pair of prominent ridges which almost reach the base of the scutellum; elytra with nodules, membrane clearly differentiated from the elytra with distinct venation; fore femur nodulate, fore tibia sulcate; abdominal appendages approximately 1 mm in length.

Distribution : India :Meghalaya (Khasi Hills).

Remarks : This species was not available in the present collection. Distant (1910) had no opportunity to have one for his studies but Lansbury (1973) had studied the male Holotype specimen collected from Khumis, Khasia Hills, which at present deposited in the United States national Museum, Washington, U.S.A.

Family V. NOTONECTIDAE

Key to the genera of the family Notonectidae

1. Hemelytra commissure with a definite hairlined pit at the anterior end just behind the scutellum; pronotum more longer than wide without any foveately excavation; middle femur without any anteapical protuberance; anterior leg of male with one tarsal segment but female with two segments.....*Anisops*

Hemelytra commissure without any hair-lined pit at the anterior end; pronotum more wider than long with its anterior angles foveately excavate; middle femur with an anteapical pointed protuberance; anterior leg of both male and female with three tarsal segments.....*Enithares*

Genus 9. *Anisops* Spinola 1837

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.*, : 58

16. *Anisops sardea* Herrich-Shaffer *

1850. *Anisops sardeus* Herrich-Shaffer, *Die Wanz. Ins.*, 9 : 41

1904. *Anisops sardea* : Kirkaldy, *Wein ent. Ztg.*, 23 : 114

1951. *Anisops sardea* : Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 423

Material examined : 3 exs. (2 M, 1 F), Shella, East Khasi Hills Dist. 3.IV. 1992, M. Ghosh coll.

Diagnosis : Adult males 7.5-8.4 mm and female 7.2-7.5 mm in length; greatest body width about mid way the length of body; general body colour pale yellow or brownish yellow; synthlipsis narrow, less than one-third the anterior width of vertex; male provided with much prominent caphalic horn with frons excavate of its entire length and bordered laterally by two carinae; anterior tibia of male provided with stridulatory comb which gradually narrow toward the apex, composed of about 18 teeth.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Orissa; Punjab; U.P.; South India. Elsewhere : Africa, Albania, Burma, Canary Islands, Corfu, Pakistan, Syria, Turkey.

Genus 10. *Enithares* Spinola 1837

1837. *Enithares* Spinola, *Ess. Ins. Hemipt.*, : 60

17. *Enithares fusca* Brooks *

1948. *Enithares fusca* Brooks, *J. Kans. Ent. Soc.*, 21 : 46

1968. *Enithares fusca* : Lansbury, *Pacif. Insects*, 10(2) : 412

1986. *Enithares fusca* : Thirumalai, *Rec. zool. Surv. India*, 84(1-4) : 30

Material examined : 2 exs. (M), Shillong, East Khasi Hills Dist., Oct. 1963, S. Biswas coll.

Diagnosis : Adults of both sexes 9.2-9.3 mm long and maximum width 3.5-3.6 mm.; head rounded anteriorly as seen from above; synthlipsis just over half the anterior width of vertex; male with large well developed angulate mesotrochanter; male midtibia with a large nodule on the inner surface distally.

Distribution : India : Meghalaya (East Khasi Hills); Kerala.

Family VI. BELOSTOMATIDAE

Key to the genera of the family Belostomatidae

1. Body moderate in size, generally attain a length from 12 to 27 mm, and more or less ovate or sub-ovate; head in front of eyes subtriangularly produced; hemelytra with distinct membrane, often very small, contains areas moderately convexly ampliate; anterior tarsal claws two of equal length on each ***Sphaerodema***
 Body large in size, length may vary from 40 to 110 mm and narrowly elliptical; head in front of eyes not conically produced; hemelytra with distinct membrane provided with prominent longitudinal veins and not outwardly ampliate; tarsal claw one on each.....
 ***Lethocerus***

Genus 11. *Sphaerodema* Laporte 1832

1832. *Sphaerodema* Laporte, *Ess. Hemipt.*, in *Mag. Zool.*, 2 : 18

Remarks : Authors have retained the much known and used name *Sphaerodema* in this paper. Lauck and Menke (1961) mentioned that the synonym of the genus *Diplonychus* Laporte has been confused in the literature and the genus needed a thorough revision, though they have adopted the name *Diplonychus*.

18. *Sphaerodema annulatum* (Fabricius) *

1803. *Nepa annulata* Fabricius, *Syst. Rhyngo.*, : 106

1863. *Sphaerodema annulatum* : Dufour, *Annu. Soc. ent. Fr.*, 3 : 387

1906. *Sphaerodema annulatum* : Distant, *Fauna Brit. India, Rhynochota*, 3 : 35

1939. *Sphaerodema annulatum* : Hafiz & Ribeiro, *Rec. Indian Mus.*, 41 : 431

Material examined : 8 exs., (2 M with eggs on their elytra), Shella, East Khasi Hills Dist., 3.IV. 1992 M. Ghosh coll.

Diagnosis : Adults may attain a length of about 21-22 mm and breadth about 16-17 mm; body very broad and oval in shape; greatest expanse of hemelytra together almost equal to their length, head as long as the interocular space; pronotum, scutellum and corium thickly and finely punctate; membrane small; embolium convexly ampliate with its outer margin a little reflexed; hemelytra not provided with any shining spot beyond the middle of the inner margin.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Assam; Bihar; Orissa. Elsewhere : Bangladesh, Formosa, Pakistan.

Genus 12. *Lethocerus* Mayr 1853

1853. *Lethocerus* Mayr, *Verh. zool.-bot. Ver. Wien*, 2(1852) : 17

19. *Lethocerus indicus* (Lepeletier & Serville)

1825. *Belostoma indica* Lepeletier & Serville, *Encycl. Meth.*, : 272

1909. *Lethocerus indicus* : Montandon, *Bull. Soc. Sci. Buc.*, 17 : 138

1956. *Lethocerus indicus* : Usinger, *Aquatic Insect of California*, : 204

1969. *Belostoma indicum*: Varshney & Biswas, *J. Bombay nat. Hist. Soc.*, 66(2) : 399

1974. *Lethocerus indicus* : Fernando & Cheng, *Fdn. Mus. J.*, 19 : 41

Material examined : 1 ex., Dobasipara Inspection Bunglow, Tura, West Garo Hills Dist.; 9.X. 1988, K.K. Ray coll.

Diagnosis : This giant Indian water-bug may vary in length from 62-85 mm; head between eyes with parallel sides; pronotum with a transverse faciae at the basal end and a fine mid-longitudinal carination; hemelytra with distinct membrane provided with longitudinal veins; posterior tibiae and tarsi amply compressed; intermediate and posterior legs provided with thick sets of swimming hairs on the ventral side.

Distribution : India : Meghalaya (West Garo Hills); West Bengal; Assam; Bihar; Kerala; Maharashtra; Mizoram; Orissa; U.P. Elsewhere : Burma, China, Java, Malay Peninsula, Pakistan, Philippines, Sri Lanka, Sumatra.

Family VII. NAUCORIDAE

Key to the subfamilies and genera of the family Naucoridae

1. Head more or less prominent and rounded, produced in front of eyes; pronotum anteriorly strongly and concavely excavate or wavy, posterior angles more or less acuminate; gula long and tectiform; eyes with no external process; eyes thick and placed laterally to the head..... Subfamily Cheirochelinae and genus *Cheirochela*
- Head broad but not prominently produced in front of eyes; pronotum anteriorly gradually concave, posterior angles not acuminate; gula short, neither tectiform nor tumid; eyes with an external process on each between their outer margin and the anterior angles of the pronotum; eyes flat and anteriorly convergent Subfamily Laccocorinae and genus *Heleocoris*

Genus 13. *Cheirochela* Hope 1841

1841. *Cheirochela* Hope, *Trans. Linn. Soc. London*, 18(3) : 442

20. *Cheirochela assamensis* Hope *

1841. *Cheirochela assamensis* Hope, *Trans. Linn. Soc. London*, 18(3) : 422

1897. *Cheirochela birmaninsis* : Montandon, *Annali Mus. Civ. Genova*, 37 : 369

1906. *Cheirochela assamensis* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 26

1934. *Cheirochela assamensis* : Lundblad, *Arch. Hydrobiol. suppl.*, 12 : 62

Material examined : 1 ex., Near Elephant Falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.; 4 exs., Khasi Hills, 2.XI. 1921, Nil coll.

Diagnosis : Adults attain a length of about 22-23 mm and breadth between the pronotal angles about 9-9.5 mm; body depressed and elongately ovate; head strongly and broadly produced in front of eyes, beneath with a deep excavation containing the base of rostrum; pronotum transverse with anterior margin concave and the anterior lateral angles elongately acuminate while the posterior angles transversely acuminate; hemelytra not covering the whole of the abdomen and corium completely rounded and hiding connexivum for about half its length; abdomen broad and depressed, lateral posterior segmental angles more or less spionously produced; anterior femora very strongly dilated, anterior tibiae and tarsi curved; middle and posterior tibiae clothed ventrally with long thick hairs.

Distribution : India : Meghalaya (East Khasi Hills); Assam. Elsewhere : Burma.

Genus 14. *Heleocoris* Stal 1876

1876. *Heleocoris* Stal, *K. svenska Vet.-Akad. Handl.*, **16** : 142, 146

21. *Heleocoris obliquatus* (Spinola) *

1837. *Naucoris obliquatus* Spinola, *Ess. Ins. Hemipt.*, : 54

1876. *Heleocoris obliquatus* : Stal, *K. svenska Vet.-Akad. Handl.*, **16** : 146

1906. *Heleocoris obliquatus* : Distant, *Fauna Birt. India, Rhynchota*, **3** : 31

1910. *Heleocoris obliquatus* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 322

1919. *Heleocoris obliquatus* : Paiva, *Rec. Indian Mus.*, **16** : 155

1934. *Heleocoris obliquatus* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 63

Material examined : 1 ex., Siju Cave, about 200ft. from entrance, South Garo Hills Dist., Feb., 1922, S.K. and B.N.C. coll.

Diagnosis : Adult insects attain a length about 10.5 mm; head and pronotum spotted with grey and black markings; scutellum black, apex pale; pronotum not distinctly bordered with a marginal furrow; posterior angles of pronotum terminating obliquely.

Distribution : India : Meghalaya (South Garo Hills); Bihar; Maharashtra. Elsewhere : Burma.

SERIES - AMPHIBICORISAE

Family VIII. GERRIDAE

Key to the subfamilies and genera of the family Gerridae

1. Metacetabular suture dorsally reaching to the anterior end of first abdominal tergite; intersegmental suture between mesonotum and metanotum always distinct laterally, thus metacetabular region always divided into two areas. Hind tarsus fused; middle femur of male well developed with a fringe of long hairs.....
 subfamily Ptilomerinae and genus *Ptilomera*
 Metacetabular suture dorsally not reaching to the anterior end of first abdominal tergite; intersegmental suture between mesonotum and metanotum either lost laterally or rarely present laterally this metacetabular region never divided into two areas. Hind tarsus not fused; middle femur of male otherwise.....2
2. Metasternum represented by a very short, transverse, subtriangular plate rarely reaching metacetabular region laterally. Male with anterior femur may be well built, often curved and may be provided with teeth; 7th abdominal segment of female with ventral apical margin excessively developed and modified into various shape.....
subfamily Halobatinae and genus *Metrocoris*
 Metasternum distinctly present, at least about one tenth as long as mesonotum in length. Male with anterior femur normal in shape, not curved and not provided with teeth; 7th abdominal segment of both male and female modified to form connexival spines
subfamily Gerrinae.....3

3. Hind legs longer than middle legs; claws arising apically *Eotrechus*
Hind legs nearly as long as or shorter than middle legs; claws not arising apically. 4
4. First tarsal segments of middle and hind legs shorter than the second tarsal segments; claws well developed and arising from near the middle of second tarsal segments ..*Onychotrechus*
First tarsal segments of middle and hind legs longer than the second tarsal segments; claws not well developed and arising from near the apex of the second tarsal segment.....5
5. Mesonotum with paired oblique depressions near the anterior margin; paramere of male genitalia greatly developed*Chimarrhometra*
Mesonotum without paired oblique depressions near the anterior margin; paramere not greatly developed 6
6. First tarsal segments little shorter than the second tarsal segments on the front legs; abdominal spiracles placed much closer to the anterior margin than to the posterior margin on each segment; 7th segment of male with a concave ventral apical margin and with a small median emargination; 8th segment of female always well exposed*Gerris*
First tarsal segments much shorter than the second tarsal segments on the front legs; abdominal spiracles placed nearly at the middle between the anterior and posterior margins on each segment; 7th segment of male with concave ventral apical margin and without any median emargination; 8th segment of female always basally telescoped within tubular 7th segment.*Limnogonus*

Subfamily PTILOMERINAE

Genus 15. *Ptilomera* Amyot and Serville 1843

1843. *Ptilomera* Amyot and Serville, *Hemipteres*, : 413

22. *Ptilomera laticaudata* (Hardwicke)

1825. *Gerris laticaudata* Hardwicke, *Trans. Linn.Soc.*, 14 : 134

1834. *Ptilomera laticaudata* : Amyot and Serville, *Hemipteres*, : 414

1902. *Ptilomera laticaudata* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 185

1965. *Ptilomera laticaudata* : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, 45(5) : 416

Material examined : 10 exs., Sung Song stream side, Tura. West Garo Hills Dist., 15.III. 1991, A.K. Hazra and party coll.; 39 exs., Dobasipara road side. 25 kms. of Tura, West Garo Hills Dist., 16.II. 1971, G.M. Yazdani coll.; 6 exs., Shillong, East Khasi Hills Dist., 15.XI. 1930, H.S. Rao coll.; 4 exs., Siju Cave, South Garo Hills Dist., February, 1922, S.K. and B.N.C. coll.

Diagnosis : Both apterous and macropterous adults may attain a length between 13.0-15.0 mm; antennae nearly as long as the body, first antennal segment almost as long as the other three segments together; rear margin of metacoxa provided with thorn like projection in both the sexes; almost all over the middle femur provided with fringed like hairs in male, parameres very prominent, bent and laterally directed; female with 7th abdominal segment modified and provided with long prominent connexival spines.

Distribution : India : Meghalaya (West Garo Hills, South Garo Hills, East Khasi Hills); West Bengal; Sikkim; Tamil Nadu. Elsewhere : Burma, Malay Peninsula, Sri Lanka, Thailand.

Subfamily HALOBATINAE

Genus 16. *Metrocoris* Mayr 1865

1865. *Metrocoris* Mayr, *Verh. zool.-bot. Ges. Wien*, **15** : 445

Key to the species of the genus *Metrocoris*

1. 2nd segment of antennae shorter than the 3rd segment; male front femur not much broader than that of female and not provided with prominent teeth along the inner margin at the middle and distal end.....*tenuicornis* Esaki
 2nd and 3rd segments of antennae subequal in length; male front femur much broader than that of female and provided with prominent teeth along the inner margin at the middle and distal end 2
2. Male front femur provided with two prominent teeth, one a little beyond the middle and other one at the distal end.....*femoratus*
 Male front femur provided with a prominent tooth and several small teeth at the distal end only, no tooth at the middle.....*nigrofasciatus*

23. *Metrocoris tenuicornis* Esaki *

1926. *Metrocoris tenuicornis* Esaki, *Ann. Mus. Nat. Hung.*, **23** : 125

1934. *Metrocoris tenuicornis* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 371

1969. *Metrocoris tenuicornis* : Cheng & Fernando, *Oriental Ins.*, **3**(2) : 126

1974. *Metrocoris tenuicornis* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 30

Material examined : 8 exs., Theria ghat, East Khasi Hills Dist., 25.II. 1923, R. Hodgart coll.; 3 exs., Mawsynram, West Khasi Hills Dist., 6.IV. 1992, M. Ghosh coll.

Diagnosis : Adult insects may attain a length about 4.5-6.0 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills, West Khasi Hills). Elsewhere : Borneo, China, Java, Singapore.

Remarks : Lundblad (1934) recorded this species from India without mentioning the locality.

24. *Metrocoris femoratus* (Paiva)

1919. *Metrocoropsis femorata* Paiva, *Rec. Indian Mus.*, **16** : 365

1926. *Metrocoris femorata* : Esaki, *Ann. Mus. Nat. Hung.*, **23** : 129

1934. *Metrocoris femoratus* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 371

Material examined : 2 exs., Mawsynram, West Khasi Hills Dist., 6.IV. 1992, M. Ghosh coll.; 4 exs. (TYPES, Reg. No. 8381/H1, NZC); Above Tura, 3800ft., West Garo Hills Dist., 15.VII-31.VIII. 1917, S. Kemp coll.

Diagnosis : Body length approximately 8.5 mm. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Khasi Hills, West Garo Hills).

25. *Metrocoris nigrofasciatus* Distant

1903. *Metrocoris nigrofasciatus* Distant, *Fascis. Malay.*, **48** : 257

1910. *Metrocoris nigrofasciatus* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 159

1918. *Metrocoris nigrofasciatus* : Paiva, *Rec. Indian Mus.*, **14** : 25

1934. *Metrocoris nigrofasciatus* : Lundblad, *Arch. Hydrobiol.*, Supple., **12** : 371

1974. *Metrocoris nigrofasciatus* : Fernando & Chang, *Fdn. Mus. J.*, **19** : 30

Material examined : 4 exs., Near Elephant Falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.; 1 ex., Reg. No. 9215/H2, Siju Cave, South Garo Hills Dist., February, 1922, S.K. and B.N.C. coll.

Diagnosis : Apterous and macropterous forms may be 5.5-6.0 mm. in length. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills, South Garo Hills); Assam; U.P. Elsewhere : Burma, Java, Malaya, Thailand.

Subfamily GERRINAE

Genus 17. *Eotrechus* Kirkaldy 1902

1902. *Eotrechus* Kirkaldy, *Entomologist*, **35** : 137

26. *Eotrechus kalidasa* Kirkaldy

1902. *Eotrechus kalidasa* Kirkaldy, *Entomologist*, **35** : 137

1919. *Eotrechus kalidasa* : Paiva, *Rec. Indian Mus.*, **16** : 364

1982. *Eotrechus kalidasa* : Andersen, *Semiaquatic bugs, Entomonograph*, **3** : 183

Diagnosis : Adult macropterous forms may attain a length of about 10.0-10.5 mm; head with emerginate prominent eyes; antennae with first and second segments longest and subequal in length while third and fourth segments a little shorter and subequal; anterior pronotal lobe provided with a mid-longitudinal and lateral yellow lines; pronotum with apical margin broadly rounded; each tarsus being terminated by two strong, curved, apical, aroliated claws.

Distribution : India : Meghalaya (West Garo Hills); West Bengal. Elsewhere : Burma.

Remarks : This species is not available in the present collection. Paiva (1919) recorded one apterous specimen from above Tura, Meghalaya.

Genus 18. *Onychotrechus* Kirkaldy 1903

1903. *Onychotrechus* Kirkaldy, *Entomologist*, **36** : 44

27. *Onychotrechus sakuntala* (Kirkaldy)*

1901. *Gerris sakuntala* Kirkaldy, *Entomologist*, **34** : 117

1902. *Onychotrechus sakuntala* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 183

1929. *Onychotrechus sakuntala* : Esaki, *Ann. Mag. Nat. Hist.*, (10)**4** : 418

1982. *Onychotrechus sakuntala* : Andersen, *Semiaquatic bugs, Entomonograph*, **3** : 183

Material examined : 1 apterous ex., Tun-wa-sherra stream, 2 miles from Dympep, East Khasi Hills., 21.VI. 1921, S.L. Hora coll.

Diagnosis : Adult insect may attain a length of about 5.5 mm; head with lateral yellowish margins in front of eyes and mid-longitudinal yellowish fascia; pronotum with yellowish anterior margin, lateral margins and three longitudinal discal fasciae (central one straight, the lateral ones curved); antennae with first segment longest and curved, remaining segments shorter and subequal in length; rostrum considerably surpassing the anterior coxae; middle femora slightly longer than posterior femora; tarsal claws long.

Distribution : India : Meghalaya (East Khasi Hills). Elsewhere : Burma, Sri Lanka.

Remarks : Lundlad (1934) mentioned in his voluminous work on water bugs that this species also found in India.

Genus 19. *Chimarrhometra* Bianchi 1896

1896. *Chimarrhometra* Bianchi, *Annu. Mus. St. Petersb.*, 1 : 71

28. *Chimarrhometra orientalis* (Distant)

1879. *Halobates orientalis* Distant, *Trans. ent. Soc.*, : 176

1896. *Chimarrhometra orientalis* : Bianchi, *Annu. Mus. St. Petersb.*, 1 : 71

1902. *Chimarrhometra orientalis* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 190

1910. *Gerriis monticola* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 142

1919. *Chimarrhometra orientalis* : Paiva, *Rec. Indian Mus.*, 16 : 364

1982. *Chimarrhometra orientalis* : Andersen, *Semiaquatic bugs. Entomonograph*, 3 : 183

Material examined : 3 exs., Muphlong, Shillong, East Khasi Hills Dist., 8.X. 1963, S. Biswas coll.; 4 exs., Risa Colony, Shillong, East Khasi Hills Dist., 2.VI. 1971; 2 exs., Pynursla, East Khasi Hills Dist., 29.III. 1973, S.K. Chanda and party coll.; 3 exs., Motinagar, Shillong, East Khasi Hills Dist., 12.V. 1978, M.S. Jyrwa coll.; 1 ex., Malki Forest, Shillong, East Khasi Hills Dist., 8.V. 1974, R.S. Giri coll.; 3 exs., Near Elephant Falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.; 3 exs., Mawsynram, West Khasi Hills Dist., 6.IV. 1992, M. Ghosh coll.

Diagnosis : Adult insects may attain a length of about 8.0 mm; head with semi-globular large eyes; antennae with first segment curved, robust and about the length of head and pronotum together, other segments slender, second and third segments sub-equal while fourth segment a little shorter than the third segments; pronotum truncated anteriorly with mid-longitudinal pale line and mesonotum with paired oblique depression near the anterior margin; basal joint of anterior tarsi nearly twice as long as the second joint; anterior femora much incrassate and thicker than the middle femora, parameres of male genitalia greatly developed.

Distribution : India : Meghalaya (East Khasi Hills, West Khasi Hills); West Bengal; Himachal Pradesh; Punjab; U.P.

Genus 20. *Gerris* Fabricius 1794

1794. *Gerris* Fabricius, *Ent. Syst.*, 4 : 187

29. *Gerris adelaidis* Dohrn *1860. *Gerris adelaidis* Dohrn, *Stettin. ent. Ztg.*, 21 : 4081902. *Gerris adelaidis* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 1811969. *Gerris adelaidis* : Cheng and Fernando, *Oriental Ins.*, 3(2) : 4

Material examined : 2 exs. (Nymphs), Pynursla, East Khasi Hills Dist., 29.III. 1973, S.K. Chanda and party coll.; 2 exs., Malki Forest, Shillong, East Khasi Hills Dist., 8.V. 1974, R.S. Giri coll.; 1 ex., Muphlong, Shillong, East Khasi Hills Dist., 14.III. 1963, V.D. Srivastava coll.; 6 exs., Near Elephant Falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.

Diagnosis : Adults may attain a length of about 11.5 mm; head with a basal semi-lunar pale yellow spot; antennae with first joint longest and slightly shorter than the remaining three joints together; rostrum short, slightly surpassing base of head; posterior lobe of pronotum with a distinct brownish carina althrough the length; first tarsal segment of middle leg about four times as long as the second tarsal segment; hind leg with first tarsal segment about twice the length of the second tarsal segment.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal. Elsewhere : borneo, Burma, Cambodia, China, Malaya, Sri Lanka, Thailand.

Genus 21. *Limnogonus* Stal 18681868. *Limnogonus* Stal, *K. svenska Vet.-Akad. Handl.*, 7 : 132Key to the species of the genus *Limnogonus*

1. Pronotum with mid-longitudinal carination moderately prominent; posterior tip of pronotum remarkably angular; anterior lobe of pronotum with a pair of linear, small yellowish patches; 4th antennal segment slightly smaller than the 1st segment; 7th abdominal segment provided with convexival spines *nitidus*

Pronotum with mid-longitudinal carination indistinct; posterior tip of pronotum more or less convexly rounded; anterior lobe of pronotum with a single roundish yellow patch; 4th antennal segment nearly half in length than the 1st segment; 7th abdominal segment not provided with convexival spines *parvulus*

30. *Limnogonus nitidus* (Mayr)*1865. *Hydrometra nitida* Mayr, *Verh. zool.-bot. Ges. Wien*, 15 : 4431910. *Gerris nitida* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 1421934. *Limnogonus nitidus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 3871969. *Limnogonus nitidus* : Cheng and Fernando, *Oriental Ins.*, 3(2) : 1011979. *Limnogonus nitidus* : Polhemus, *Bull. Fish Res. Stn., Sri Lanka*, 29 : 90

Material examined : 6 exs., Shillong, East Khasi Hills Dist., 15.XI. 1930, H.S. Rao coll.; 2 exs., Cherrapunji, 4400ft., East Khasi Hills Dist., 2-8.X. 1914, S.W. Kemp coll.; 1 ex., Motinagar, Shillong, East Khasi Hills Dist., 12.V. 1978, M.S. Jyrwa coll.

Diagnosis : Body length of adult insects from 6.0-8.0 mm; antennae with 2nd and 3rd segments shortest and nearly subequal in length. Other diagnostic characters as in key.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Assam; Bihar; Kerala; Orissa; U.P. Elsewhere : Bangladesh, Burma, Java, Malaya, Sri Lanka, Sumatra.

31. *Limnogonus parvulus* (Stal)

1859. *Gerris parvula* Stal, *K. svenska Eug. zool.*, 4 : 265

1868. *Limnogonus parvulus* : Stal, *K. svenska Vet.-Akad. Handl.*, 7 : 133

1899. *Gerris tristan* : Kirkaldy, *Rev. d'Ent.*, 18 : 88

1902. *Gerris tristan* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 179

1934. *Limnogonus parvulus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 384

1969. *Limnogonus parvulus* : Cheng and Fernando, *Oriental Ins.*, 3(2) : 102

Material examined : 9 exs., Near Elephant falls, Shillong, East Khasi Hills Dist., 4.XI. 1991, R.C. Basu and party coll.; 7 exs., Shella, East Khasi Hills Dist., 3.IV. 1992, M. Ghosh coll.

Diagnosis : Body length of adult insects may be 6.0-6.5 mm; antennal 1st segment longest and as long as or little longer than the 2nd and 3rd segments together. Other diagnostic characters as is key.

Distribution : India : Meghalaya (East Khasi Hills); West Bengal; Assam; Bihar; Kerala; Orissa; U.P. Elsewhere : Bangladesh, Burma, China, Java, Malay Peninsula, Pakistan, Singapore, Sri Lanka.

Family IX. VELIIDAE

Key to the genera of the family Veliidae

1. Body elongate; eyes relatively large; antennae long with 3rd and 4th segments moderately slender; middle tarsus three segmented with terminal segment deeply clefted containing a series of long plumose hairs and leaf like claws.....***Rhagovelia***

Body short and subovate; eyes small; antennae moderately short and stout; middle tarsus either two or three segmented but terminal segment not clefted and armed with paired normal claws 2

2. Middle tarsus two segmented; pronotum subangularly posteriorly produced; hemelytra not divided into distinct corium and membrane ***Microvelia***

Middle tarsus three segmented; pronotum convexly posteriorly produced; hemelytra divided by a straight vein to corium and membrane ***Perittopus***

Genus 22. *Rhagovelia* Mayr 1865

1865. *Rhagovelia* Mayr, *Verh. zool.-bot. Ges. Wein*, 15 : 445

32. *Rhagovelia nigricans* (Burmeister)

1835. *Velia nigricans* Burmeister, *Handb. Ent.*, 2 : 213

1903. *Rhagovelia maculata* : Distant, *Ann. Mus. nat. Hist.*, (7) 12 : 472

1910. *Rhagovelia nigricans* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 137

1919. *Rhagovelia nigricans* : Paiva, *Rec. Indian Mus.*, 16 : 362

1950. *Rhagovelia nigricans* : Pradhan, *Rec. Indian Mus.*, 48 : 102

1989. *Rhagovelia* (*Rhagovelia*) *nigricans* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper*, 118 : 51

Material examined : 14 exs., Tura, 1200-1500 ft., West Garo Hills Dist., October, 1917, Mrs. Kemp coll.; 2 exs., Tura, 1200-1500 ft., West Garo Hills Dist., June - July, 1917, S. Kemp coll.

Diagnosis : Body length of adult insects may be 3.0-4.0 mm; body colour piceous black; anterior margin of pronotum yellowish red with a narrow median interruption; antennae, legs and margins of pronotum longly pilose; antennae with 1st segment longest and outwardly curved, 2nd and 4th segments subequal and each slightly shorter than the 3rd segment.

Distribution : India : Meghalaya (West Garo Hills); Bihar; Himachal Pradesh; Maharashtra; Punjab; Tamil Nadu; U.P. Elsewhere : Egypt, Jordan, Palestine, Seychelles, Sri Lanka, Syria.

Genus 23. *Microvelia* Westwood 1834

1834. *Microvelia* Westwood, *Ann. Soc. ent. France*, 3 : 647

Key to the species of the genus *Microvelia*

1. Antennae with 2nd segment shortest while remaining segments subequal in length; pronotum with a reddish yellow anterior margin interrupted medially by a black mid-longitudinal streak extending posteriorly; no black spot at the basal angle of pronotum

.....*lineatipes*

Antennae with 2nd segment shortest while 4th longest, 1st and 3rd segments subequal in length; pronotum with anterior margin yellowish and a transverse dark patch produced narrowly and medially backward; two jet black spots at the basal angle of pronotum

.....*atromaculata*

33. *Microvelia lineatipes* Paiva

1919. *Microvelia lineatipes* Paiva, *Rec. Indian Mus.*, 16 : 362

1925. *Microvelia lineatipes* : Bueno, *Spolia Zeylan.*, 13 : 229

1934. *Microvelia lineatipes* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 285

Material examined : 3 exs. (Types, Reg. No. 8377/H1, NZC); Damalgiri, West Garo Hills Dist., IX. 1917., S. Kemp coll.

Diagnosis : Adults may attain a length from 2.3 to 2.5 mm; head with a mid-longitudinal fine sulcation extending from near base to the apex. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills).

34. *Microvelia atromaculata* Paiva

1919. *Microvelia atromaculata* Paiva, *Rec. Indian Mus.*, 16 : 362

1925. *Microvelia atromaculata* : Bueno, *Spolia Zeylan.*, 13 : 229

1934. *Microvelia atromaculata* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 285

Material examined : 3 exs. (Types, Reg. No. 8578/H1, NZC); Damalgiri, West Garo Hills Dist., IX. 1917, S. Kemp coll.

Diagnosis : Adults may attain a length about 1.75 mm; apex of head, anterior margin of pronotum and posterior portion of lateral angles of pronotum reddish yellow. Other diagnostic characters as in key.

Distribution : India : Meghalaya (West Garo Hills).

Genus 24. *Perittopus* Fieber 1861

1861. *Perittopus* Fieber, *Eur. Hem.*, 1860 : 33

35. *Perittopus maculatus* Paiva

1919. *Perittopus maculatus* Paiva, *Rec. Indian Mus.*, 16 : 363

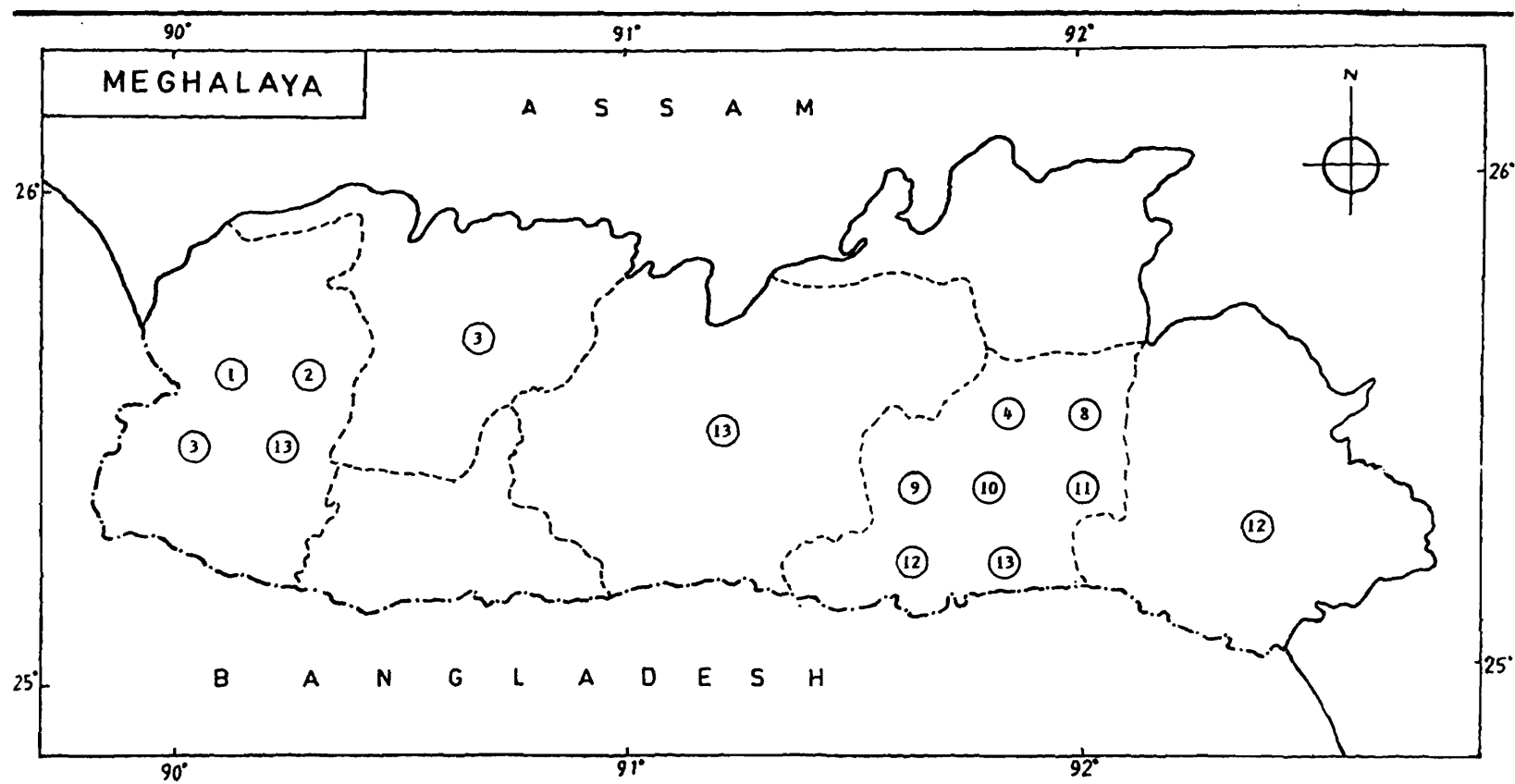
1934. *Perittopus maculatus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 285

Material examined : 4 exs. (Types, Reg. No. 8379/H1, NZC); Above Tura, West Garo Hills Dist., 15.VII-30.VIII. 1917, S. Kemp coll.; 9 exs., Tura, 1200-1500 ft., West Garo Hills Dist., October, 1917, Mrs. Kemp coll.

Diagnosis : Adults bright reddish yellow in colour and may attain a length about 2.0 mm; head globosely arched, a short longitudinal sulcation between the eyes; antennae with 1st joint stout, curved outwardly and longest, 2nd and 4th joints subequal and slightly longer than the 3rd joint; a large black patch on each antero-lateral margin of pronotum.

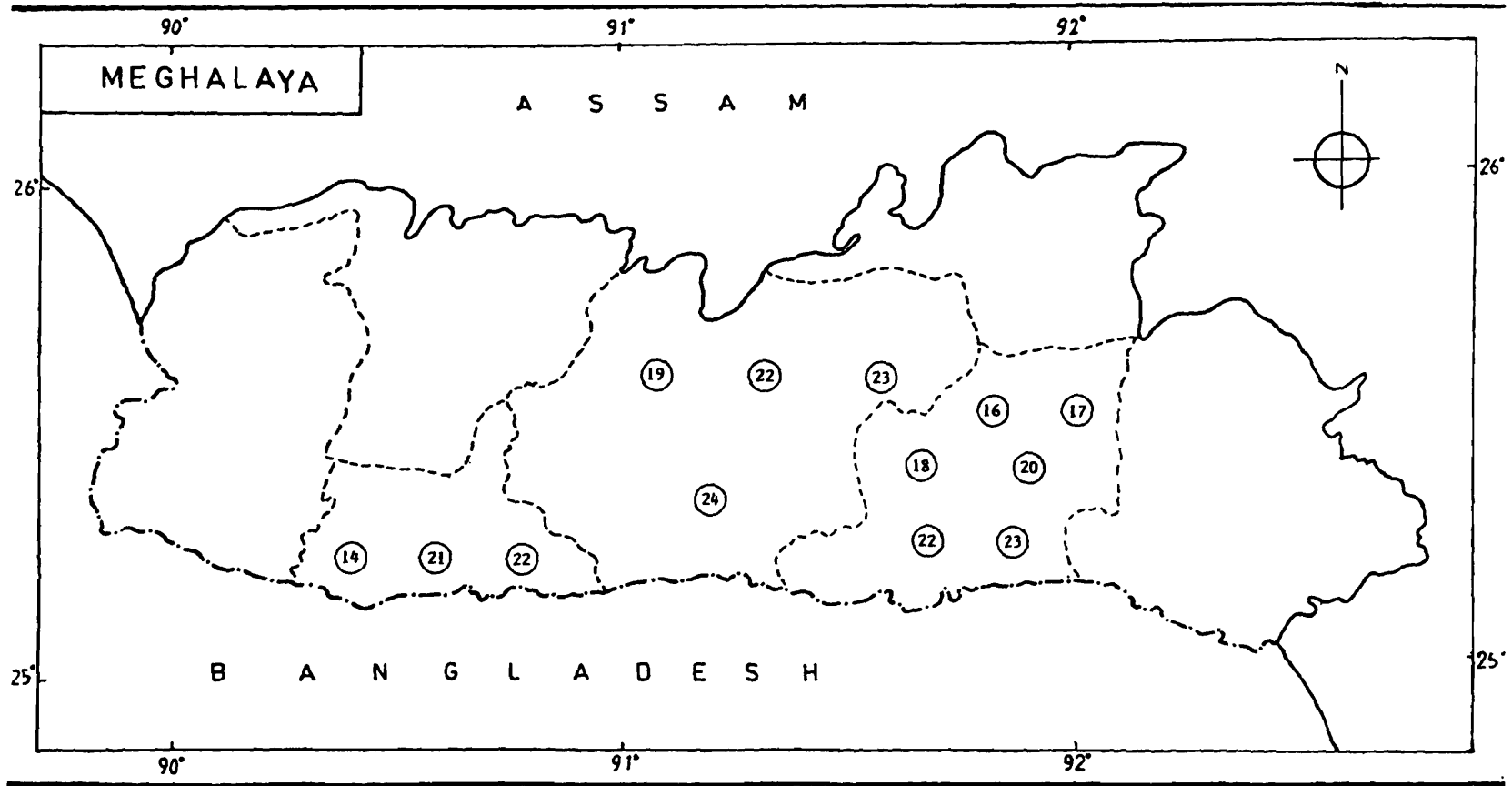
Distribution : India : Meghalaya (West Garo Hills).

MAP-1 : SHOWING DISTRIBUTION OF WATER-BUGS (ORDER-HEMIPTERA)



1. <i>Ochterus marginatus</i> (Latreille)	9. <i>Ranatra gracilis</i> Dallas
2. <i>Nerthra indica</i> (Atkinson)	10. <i>Ranatra sordidula</i> Dohrn
3. <i>Nerthra spissa</i> (Distant)	11. <i>Ranatra varipes</i> Stal
4. <i>Micronecta (Dichaetonecta) halliploides</i> Horvath	12. <i>Laccotrephes robustus</i> Stal
8. <i>Corixa (Vermicorixa) kempi</i> Hutchinson	13. <i>Laccotrephes ruber</i> (Linnaeus)

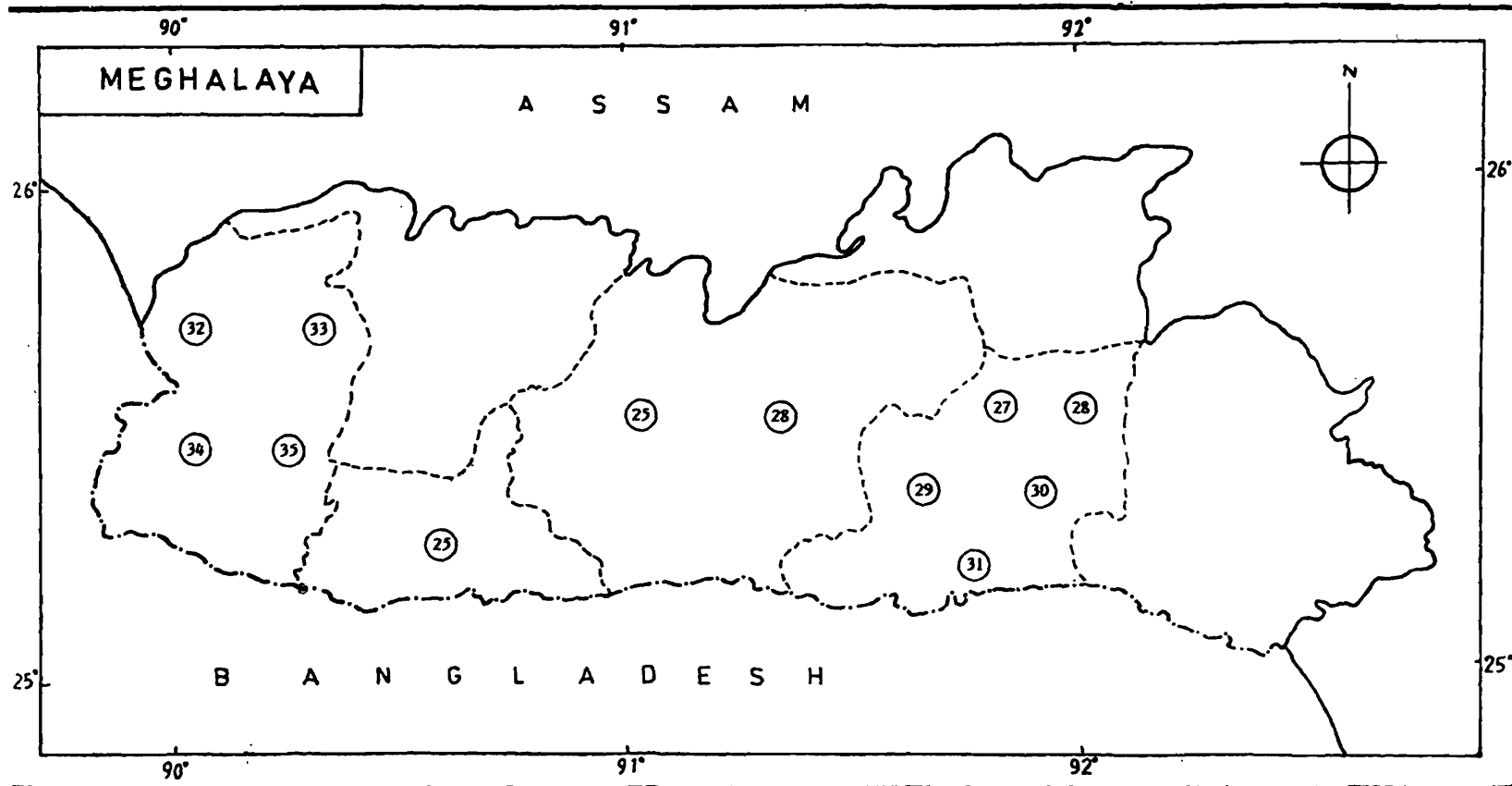
MAP-II : SHOWING DISTRIBUTION OF WATER-BUGS (ORDER-HEMIPTERA)



14. *Laccotrephes griseus* (Guerin)
 16. *Anisops sardea* Herrich-Shaffer
 17. *Enithares fusca* Brooks
 18. *Sphaerodema annulatum* (Fabricius)
 19. *Lethocerus indicus* (Lepeletier & Serville)

20. *Cheirochela assamensis* Hope
 21. *Heleocoris obliquatus* (Spinola)
 22. *Ptilomera laticaudata* (Hardwicke)
 23. *Metrocoris tenuicornis* Esaki
 24. *Metrocoris femoratus* (Paiva)

MAP-III : SHOWING DISTRIBUTION OF WATER-BUGS (ORDER-HEMIPTERA)



- 25. *Metrocoris nigrofasciatus* Distant
- 27. *Onychotrechus sakuntala* (Kirkaldy)
- 28. *Chimarrhometra orientalis* (Distant)
- 29. *Gerris adelaidis* Dohrn
- 30. *Limnogonus nitidus* (Mayr)

- 31. *Limnogonus parvulus* (Stal)
- 32. *Rhagovelia nigricans* (Burmeister)
- 33. *Microvelia lineatipes* Paiva
- 34. *Microvelia atromaculata* Paiva
- 35. *Perittopus maculatus* Paiva

SUMMARY

The present work consists of water-bugs belonging to nine families of the Order-Hemiptera from Meghalaya. They are Ochteridae, Gelastocoridae, Corixidae, Nepidae, Notonectidae, Belostomatidae, Neucoridae, Gerridae and Veliidae. A total number of 35 species under 24 genera belonging to the above mentioned nine families have been included in the study, out of which 17 species with asteric marks in the text, are being recorded for the first time from the State of Meghalaya. Necessary taxonomic keys for families, subfamilies, genera and species of water-bugs have been constructed in the present work. Distribution of each species is also shown in the present paper in the map.

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INSECTA : HEMIPTERA : HOMOPTERA : CERCOPOIDEA

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INTRODUCTION

The Cercopids or the frog hoppers or Cuckoospits are one of the economically important insects belonging to Auchenorrhynchos Homoptera.

The group is characterised chiefly by ocelli two on vertex; hind tibiae with stout teeth and with short spines at the tip. The nymphs live on grasses of spittle-like froth on the arial shoots of plants or underground at the roofs of plants in cavities filled with froth. Postclypeus greatly expanded, hind coxae mobile, short, conical, tegmina opaque.

The group is represented by about 2368 species belonging to 326 genera in the world (Animal Resources of India, State of the Art, 1991). In India, nearly 190 species belonging to 37 genera are known through the works of Gardiner, 1974; Atkinson, 1885; Distant, 1908; Lallemand, 1949, Metcalf, 1960, 1962; Datta and Ghosh, 1962, 1972, and Biswas, Ghosh and Basu (in press).

Our knowledge on Cercopid fauna from Meghalaya is scanty. The present work is an attempt to provide a comprehensive account of 29 species belonging to 15 genera from the state. Of these, 10 species (marked *) in 5 genera constitute new record from Meghalaya State. The account deals with general diagnosis of each species, keys to various taxa for easy recognition of the species, geographical distribution of each species and literature reference. Distribution maps of the species are also provided.

The work is based on the recent collections made by different party members and also the old collections represented in Zoological Survey of India.

The classification has been mainly adopted after Distant (1908) and Lallemand (1949).

MATERIAL AND METHOD

Cercopids, like most other hemipteran insects, are phytophagous in habit and feed on agricultural crops, vegetables etc. They are usually collected by sweeping with the help of insect net or by light trap at night.

The collected materials are killed in a killing jar using benzene or chloroform vapour and preserved dry with paradichlorobenzene and naphthalene. The specimens are kept in the insect envelope and labelled properly mentioning locality, altitude, date of collection and name of collector with ecological notes etc. In laboratory, the specimens are set, pinned and mounted to display properly for easy handling under the binocular microscope during the process of identification.

SYSTEMATIC ACCOUNT

- Superfamily CERCOPOIDEA
- Family CERCOPIDAE Westwood, 1838
- Subfamily Callitettixnae Metcalf, 1939
- Genus I. ***Callitettix*** Stal
1. *Callitettix versicolor* (Fabricius)
- Genus II. ***Abidama*** Distant
2. *Abidama producta* (Walker)
- Genus III. ***Caloscarta*** Breddin
3. *Caloscarta* (= *Phymatostetha*) *signifera* (Walker)
- Subfamily Cercopinae Oshanin, 1916
- Genus IV ***Eoscarta*** Breddin
4. *Eoscarta borealis* Distant
 5. *E. semirosea* Walker
- Genus V ***Phymatostetha*** Stal
6. *Phymatostetha stalli* Butler
- Genus VI ***Cosmoscarta*** Stal
7. *Cosmoscarta dimidiata* var *affinis* (Atkinson)
 8. *C. dimidiata* var. *tripunctata* (Atkinson)
 - * 9. *C. dorsimaculata* (Walker)
 10. *C. egens* (Walker)
 - * 11. *C. fuscipennis* (St. Farg & Serv.)
 12. *C. metallica* Distant
 - * 13. *C nigrofasciata* Atkinson
 14. *C. septapunctata* (Walker)
 15. *C. trigona* (Walker)
- Genus VII ***Leptataspis*** Schmidt
- * 16. *Leptataspis fulviceps* (Dallas)
 17. *L. specialis* Lallemand
- Genus VIII ***Simeliria*** Schmidt
18. *Simeliria funeralis* (Butler)
- Subfamily Aphrophorinae Licent, 1912
- Genus IX ***Poophilus*** Stal
19. *Poophilus costalis* (Walker)

- Genus X ***Clovio*** Stal
 * 20. *Clovio bipunctata* Kirby
 * 21. *C. conifera* (Walker)
 * 22. *C. lineaticollis* (Motsch)
 * 23. *C. puncta* (Walker)
- Genus XI ***Ptyelus*** St. Farg & Serv.
 24. *Ptyelus nebulosus* (Fabr.)
- Genus XII ***Peuceptyelus*** Sahlberg
 * 25. *Peuceptyelus sigillifer* (Walker)
- Genus XIII ***Jembrana*** Distant
 * 26. *Jembrana costalis* Distant
- Genus XIV ***Philagra*** Stal
 27. *Philagra fusiformis* (Walker)

* New record from Meghalaya

Family CERCOPIDAE

Subfamily CALLITETTIXNAE.

Key to the genera of the subfamily Callitettixnae

- 1(2) Anterior femora distinctly longer than the intermediate femora..... 3
 2(1) anterior femora not or only slightly longer than the intermediate femora..... ***Caloscarta***
 3(4) Head not elongately produced in front of eyes, face less than twice as long as broad;
 tegmina moderately amplified towards apices..... ***Callitettix***
 4(3) Head in male longly acutely produced in front of eyes..... ***Abidama***

Genus I ***Callitettix*** Stal, 1865

1865. *Callitettix* Stal, *Ofv. Vet. Ak. forth.*, : 152.

1. ***Callitettix varsicolor*** (Fabricius)

1794. *Cicada varsicolor* Fabricius, *Rynchota Ent. Syst.*, 4 : 50.

1869. *Callitettix varsicolor* : Stal, *Hem. Fabr.*, 2 : 11.

1908. *Callitettix varsicolor* : Distant, *Fauna Brit. India*, 4 : 113.

1952. *Callitettix varsicolor* : Lallemand, *Belgique Inst. Roy. Sci. Nat. Bul.*, 28 : 24.

Material examined : 1 ex., Songsak, East Garo Hills, 20.ix.1973, N. Muraleedharan coll; 1 ex., Garam Pani, Jowai, Jaintia hills, 19.ix.1979, P.T. Cherian & C. Radhakrishnan coll; 1 ex., Darugiri, East Garo hills, 19.v.1979, S. B. roy & Party coll; 1 ex., Tura, 15.vi. 15.vii.17, coll.

Diagnostic characters : Body shining black; tegmina with two white spots, one before the middle of the small clavus and other subtransverse spot between the middle of upper claval margin and the costal margin; two sanguineous spots beyond the middle of the tegmen, the external one large and transverse, the internal small.

Length : Excluding tegmina 9 mm; Expanse tegmina 20 to 22 mm.

Distribution : India : Meghalaya (East Garo hills, Jaintia hills), Assam, Bihar, Jammu & Kashmir, Maharashtra, Tamil Nadu, Uttar Pradesh, Sikkim. Elsewhere : Burma; China; Malay Peninsula; Siam.

Genus II *Abidama* Distant, 1908

1908. *Abidama* Distant, *Fauna Brit. India*, 4 : 114.

2. *Abidama producta* (Walker)

1851. *Sphenorhina producta* Walker, *List. Hom. Brit. Mus.*, 3 : 696.

1885. *Abidama producta* : Atkins J. A. S. B., 14 : 18.

1976. *Abidama producta* : Datta and Ghosh, *Eos, Revista Espanola De Entomologia, Tomol., ano.* : 54.

Material examined : 7 exs., Shillong, East Khasi hills, 20.x.1974, S. K. Gupta & Party coll; 4 exs., Garobadha, West Garo hills, 1.iv.1990, M. S. Shishodia coll; 2 exs., Nongpoh, Ribhoi, 30.ix.1988, A. R. Lahiri coll; 1 ex., Elephant falls, Shillong, East Khasi hills, 4.xi.1991, R. C. Basu & Party coll.

Diagnostic characters : Head, pronotum, body beneath black, apex of scutellum and tegmina rufotestaceous, the apical margin of later broadly black, metasternum and legs dark sanguineous; face laterally longitudinally striate.

Length : Including tegmina, ♂ & ♀, 7 to 9 mm.

Distribution : India : Meghalaya (East Khasi hills, West Garo hills, Ribhoi), Assam, Bengal, Bihar, Uttar Pradesh. Elsewhere : Burma.

Genus III *Caloscarta* Bredd, 1903

1903. *Caloscarta* Bredd, *Soc. Ent.*, 17 : 99.

3. *Caloscarta* (= *Phymatostetha*) *signifera* (Walker)

1851. *Cercopis signifera* Walker, *List. Hom.*, 3 : 655.

1870. *Phymatostetha signifera* : Stal, *tom. citl.*, : 721.

Material examined : 1 ex., East Khasi hills, Shillong peak, 20.vii.1962, S. N. P. coll; 1 ex., East Khasi hills, Shillong, Elephant falls, 17.ix.1991, R. K. Varshney coll.

Diagnostic characters : Base of head and two broad angulated fasciae to finely wrinkled pronotum, black; tegmina with basal half stramineous containing three fuscous spots and a much waved and broken testaceous fascia, apical margin dark ochraceous; abdomen above violaceous black and lateral marginal spots ochraceous; tegmina nearly three times as long as broad.

Length : Excluding tegmina 14 to 15 mm; Expanse tegmina 38 to 40 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Nagaland, West Bengal.

Subfamily Cercopinae

Key to the genus of the subfamily Cercopinae

- 1(2) Face with a longitudinal furrow, pronotum not laterally dialated *Eoscarta*
 2(1) Face without a furrow 3

- 3(4) Anterior margin of pronotum foliaceous, without protruberances *Leptataspis*
 4(3) Anterior margin of pronotum not foliaceous 5
 5(6) Mesosternum posteriorly with two conical tubercles 7
 6(5) Tubercles of the mesosternum not conical; anterior margin of mesosternum prominent.....
 *Simeliria*
 7(8) Pronotum with the posterior lateral margins straight and sinuate its greatest width a little
 more than half of its length *Phymatostetha*
 8(7) Pronotum with the posterior lateral margins not sinuate, its greatest width about two-thirds
 of its length *Cosmoscarta*

Genus IV *Eoscarta* Bredd, 1902

1902. *Eoscarta* Bredd., *Soc. Ent.*, **17** : 58.

Key to the species of the genus *Eoscarta*

- 1(2) Legs ochraceous, strongly pilose; tegmina pale, semihyaline, apical area of the tegmina
 rosaceous with a few small fuscous spots in the cellular area..... *semirosae*
 2(1) Legs pale luteous, tegmina roseate, shortly and finely greyishly pilose..... *borealis*

4. *Eoscarta borealis* (Distant)

1878. *Comoscarta borealis* Distant, *Ent. Soc. London Trans.* : 321.

1903. *Eoscarta borealis* : Breddin, *Deutsche Ent. Zeitschr.*, : 100.

1952. *Eoscarta borealis* : Lallemand, *Expl. Prac. National Albert.*, **77** : 25.

Material examined : 3 exs., East Khasi hills, Cherrapunjee, 7.v.1959, A. P. Kapur coll; 1 ex., East Khasi hills, Shillong, 6.v.1959, A. P. Kapur coll; 1 ex., Jaintia hills, Jowai, Dawki, 25.ix.1988, V. D. Srivastava coll; 3 exs., Jaintia hills, Jowai, Mooralong, 27.ix.1988, V. D. Srivastava coll; East Khasi hills, Shillong, Mawphlang, 15.v.1964, S. Biswas coll.; 1 ex., East Khasi hills, Cherrapunjee, 14.ix.1988, A. R. Lahiri and party coll.

Diagnostic characters : Head and pronotum pale luteous, eyes luteous more or less suffused with black, antennae and ocelli black, abdomen beneath and tegmina roseate, face compressed, before middle broadly longitudinally sulcate, finely transversely striate on the flattened lateral areas.

Length : Excluding tegmen 6 mm; Expanse tegmina 16 to 17 mm.

Distribution : India : Meghalaya (East Khasi hills, Jaintia hills); Assam, Tamil Nadu. Elsewhere : Burma; China; Philippines; Siam; Malay Peninsula.

5. *Eoscarta semirosea* (Walker)

1857. *Cercopis semirosea* Walker, *Journ. Linn. soc. Zool.*, **1** : 165.

1903. *Eoscarta semirosea* Bredd., *Deutsche Ent. Zeitschr.* : 100.

1939. *Eoscarta semirosea* : Lall., *Mus. Nat. Hungarici Ann.*, **32** : 59.

Material examined : 1 ex., West Garo hills, above tura, Date - ?, coll. ?

Diagnostic characters : Body, legs, tegmina with base, claval area and sometimes costal area ochraceous, apical area of tegmina rosaceous with a few small fuscous spots in the cellular areas; face - transversely striate on its compressed sides and finely pilose above; legs strongly pilose; tarsal claws black.

Length : Excluding tegmina 7; expanse tegmina 18 mm.

Distribution : India : Meghalaya (West Garo hills); Assam. Elsewhere : Borneo; Java; Malay Peninsula.

Remarks : The species is so far known from eastern Himalayas in India.

Genus V *Phymatostetha* Stal, 1870

1870. *Phymatostetha* Stal, *Ofv. Vet. Ak. Forth.* : 72.

6. *Phymatostetha stalii* Butler

1874. *Phymatostetha stalii* Butler, *Cist. Ent.*, 1 : 267.

1953. *Phymatostetha stalii* : Mathur, *Indian Forest leaflet (Ent.)* 12 (3) : 151.

Material examined : 2 exs., East Khasi hills, Cherrapunji, 2-8.x.1914, S. W. Kemp coll.

Diagnostic characters : Scutellum, lateral margins and anterior area of pronotum, vertex of head before eyes and legs ochraceous; tegmina piceous, a basal costal claval streak, two transverse fasciae, the first before middle the second before apical area, the apical margin pale testaceous; scutellum foveate at base; posterior tibiae with a moderately strong spine near base and a very strong spine a little beyond middle; tegmina about two and half times as long as broad.

Length : Excluding tegmina 14 to 15; Expanse tegmina 29 to 37 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Nagaland, Sikkim, Uttar Pradesh. Elsewhere : Burma.

Genus VI *Cosmoscarta* Stal, 1869

1869. *Cosmoscarta* Stal, *Hem. Fab.*, 2 : 11.

Key to the species of the genus *Cosmoscarta*

- 1(2) Tegmina with transverse pale fasciae 7
- 2(1) Tegmina not transversely fasciated, apical area ochraceous, basal area spotted..... 3
- 3(4) Tegmina testaceous red..... 5
- 4(3) Tegmina black or piceous; greater part of costal area luteous.....*fuscipennis*
- 5(6) Pronotum usually with four spots, the smaller near anterior margin the larger discal; tegmina about twice as broad as long *dorsimaculata*
- 6(5) Pronotum with sometimes two small black spots near anterior margin, tegmina about two and a half times as long as broad *septapunctata*
- 7(8) Pronotum black, bluish black or castaneous 9

- 8(7) Pronotum red or luteous..... *nigrofasciata*
- 9(10) Pronotum with a pale transverse fascia and with pale discal spots..... 11
- 10(9) Pronotum unicolorus..... 13
- 11(12) Tegmina with the basal pale area and the first transverse pale fascia obliterated, and the second fascia broken into three spots *dimidiata* var *tripunctata*
- 12(11) Tegmina with Rufous testaceous bands at the base and in the middle reduced to narrow lines, and the apical band to three somewhat distant spots arranged in a triangle
..... *dimidiata* var. *affinis*
- 13(14) Body dark indigo-blue, rostrum reaching the intermediate coxae; mesosternum with two moderate-sized tubercles; apex, lateral margin or abdomen, coxae and femora coral red
..... *metallica*
- 14(13) Body black; rostrum not quite reaching the intermediate coxae..... 15
- 15(16) Tegmina piceous, about two and a half times as long as broad; crossed by two testaceous or sanguineous transverse fasciae, first near middle and second before apical area connected with base at claval and costal area; mesosternum with two broad compressed tubercles
..... *trigona*
- 16(15) Tegmina black, not quite two and half times as long as broad with a basal slender longitudinal streak and a broader curved fascia at base of clavus, and a transverse fascia before apical area; mesosternum with two short acutely pointed tubercles *egens*

7. *Cosmoscarta dimidiata* var. *affinis* (Atkinson)

1889. *Cosmoscarta undata affinis* Atkinson, *Asiatic Soc. Bengal Jour.*, **57** : 334.
1908. *Cosmoscrata dimidiata affinis* : Distant, *Fauna Brit. India*, **4** : 136.
1934. *Cosmoscrata dimidiata affinis* : Wu, *Catalogue insectorium sineusium*, **2** : 46.

Material examined : 1 ex., East Khasi hills, Upper Shillong, 24.iv.1979, S. N. Chandra coll.; 1 ex., Jaintia hills, Jowai, Tirkhela, 29.ix.1988, V.D. Srivastava and Party coll.

Diagnostic characters : Tegmina black with rufous testaceous bands at the base and in the apical band to three somewhat distant spots arranged in a triangle.

Length : Excluding tegmina 11 to 13 mm; Expanse tegmina 29 to 31 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam. Elsewhere : China; Java; Siam; Singapore; Sumatra; West Indies.

8. *Cosmoscarta dimidiata* var. *tripunctata* Atkinson

1889. *Cosmoscarta undata* var. *tripunctata* Atkinson, *J. A. S. B.*, **18** : 333 & 334.
1956. *Cosmoscrata undata* var. *tripunctata* : Wu, *Catalogue insectorium sinensium*, **2** : 46.

Material examined : 3 exs., West Garo hills, Tura, 15.ii. 15.vii.1917, coll. ? 1 ex., East Khasi hills, upper Shillong, 24.ix.1979, S. K. Chandra coll; 2 exs., East Khasi hills, Mawpat, 3.ix.1970, G.

M. Yzdani coll; 3 exs., West Garo hills, Tura, 15.iii.1991, A. K. Hazra and Party coll.; 1 ex., East Khasi hills, Cherrapunji, Mausma, 21.ix.1991, R.K. Varshney and Party coll., 1 ex., East Khasi hills, Shillong, Old Barapani Road, 18.ix.1991, R.K. Varshney and party coll.; 1 ex., East Khasi hills, Shillong, Mawroh, 17.x.1963, M. Rynth col.; 2 exs., Jaintia hills, Jowai, Mooralong, 27.ix.1988, V.D. Srivastava and party coll.; 1 ex., East Khasi hills, Insectory, Blang compound, 11.viii.1971, R. Giri coll.; 1 ex., East Khasi hills, Shillong, Mowroh, 26.ix.1963, M. R. Rynth coll; 7 exs., East Khasi hills, Shillong, Limsingh, 5.viii.1911, G. M. Yazdani coll.

Diagnostic characters : Tegmina with the basal pale arch and the first transverse pale fascia obliterated and the second fascia broken into three spots.

Length : Excluding tegmina 11 to 13 mm; Expansion of tegmina 29 to 31 mm.

Distribution : India : Meghalaya (East Khasi hills, West Garo hills, Jaintia hills), Assam, Nagaland, Sikkim. Elsewhere : Bhutan; China; Malay Peninsula; Siam; Singapore; Sumatra.

9. *Cosmoscarta dorsimacula* (Walker)*

1834. *Cercopis bifasciata* Guerin-Meneville, *Zoologie Insects* : 502.

1874. *Cosmoscarta dorsimacula* Butler, *Cist. Ent.*, 1 : 259.

1976. *Cosmoscarta dorsimaculata* : Datta and Ghosh, *Eos. Revista Espanola De Entomologia Tomol. ano* : 57.

Material examined : 2 exs., Ri-Bhoi, Umran, 26.v.1975, S. Biswas coll.; 1 ex., Tura, x.1917.

Diagnostic characters : Tegmina, body, legs testaceous red, four spots to pronotum, the smaller two near anterior and the larger two discal; tegmina with seven large spots, six in two irregular transverse series, the seventh subapical and subcostal; mesosternal tubercles transverse; compressed, a double longitudinal series of black spots on each side of abdomen beneath.

Length : Excluding tegmina 13 to 15 mm; Expansion tegmina 36 to 38 mm.

Distribution : India : Meghalaya (Ri-Bhoi, West Garo hills), Assam, Himachal Pradesh, Nagaland, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Borneo; China; Java; Japan; Malacca; Malay Peninsula; Tibet.

10. *Cosmoscarta egens* (Walker)

1858. *Cercopis egens* Walker, *Suppl. List. Hom. Brit. Museum* : 171.

1874. *Cosmoscarta egens* Butler, *Cist. Ent.*, 1 : 255.

1976. *Cosmoscarta egens* : Datta and Ghosh, *Revista Espanola De Entomologia Tomol, ano* : 59.

Material examined : 1 ex., East Garo hills, Rongrengiri, 29.v.1990, M.S. Shishodia and party coll.; 2 exs., West Garo hills, above Tura, Date ? coll. ?

Diagnostic characters : Tegmina, body black; legs, scutellum, abdominal segmental, and lateral margins testaceous of sanguineous; tegmina with a short slender basal longitudinal streak, a broader curved fascia at base of clavus, and transverse fascia before are testaceous or sanguineous; rostrum not reaching the intermediate coxae.

Length : Excluding tegmina 5 to 8 mm, Expansion tegmina : 27 to 33 mm.

Distribution : India : Meghalaya (East Garo hills, West Garo hills), Assam, Nagaland, Sikkim, West Bengal. Elsewhere : Burma; China.

11. *Cosmoscarta fuscipennis* (St. Farg. & Serv.)*

1825. *Cercopis fuscipennis* St. Farg. & Serv., *Enc. Meth.*, 10 : 605.

1869. *Cosmoscarta fuscipennis* Stal, *Hem. Fabr.*, 2 : 11.

1908. *Cosmoscarta fuscipennis* : Distant, *Fauna Brit. india*, 4 : 153.

Material examined : 1 ex., West Garo hills, above tura, 15.vii - 30.viii.1917, S. Kemp coll.

Diagnostic characters : Legs, lateral margins of pronotum, head luteous; scutellum and abdomen above purplish black; body beneath and posterior femora piceous; tegmina black, basal two third of costal area luteous; rostrum reaching the intermediate coxae; posterior tibiae with a long spine beyond middle; tegmina less than two and a half times as long as broad.

Length : Excluding tegmen 12 to 14; Expansion tegmina : 31 to 40 mm.

Distribution : India : Meghalaya (West Garo hills). Elsewhere : Malay Peninsula.

12. *Cosmoscarta metallica* Distant

1900. *Cosmoscarta metallica* Distant, *Ent. Soc. London Trans* : 671.

1934. *Cosmoscarta metallica* : Metcalf and Horton, *Lingnan Sci. Jour.* 13 : 384.

Material examined : 1 ex., East Khasi hills, Pynursla, 29.viii.1972, H.K. Ghosh coll., 1 ex., East Khasi hills, Upper Shillong, 30.v.1972, S. Biswas coll.

Diagnostic characters : Body indigo-blue; coxae, femora, apex and the lateral margins of abdomen coral red; tegmina black, with two irregularly shaped and angulate sanguineous transverse fasciae, the first at about one third from base, the other before apical area, connected with base by a sanguineous longitudinal fascia, mesosternum with two moderate-sized tubercles; rostrum reaching the intermediate coxae; posterior tibiae with a single moderate-sized spine beyond middle.

Length : Excluding tegmina 11 mm; Expansion tegmina : 26 mm.

Distribution : India : Meghalaya (East Khasi hills). Elsewhere : Burma.

13. *Cosmoscarta nigrofasciata* Atkinson*

1888. *Cosmoscarta nigrofasciata* Atkinson, *J. A. B.*, viii : 333.

1912. *Cosmoscarta nigrofasciata* : Lall.; *Gen. Insect.*, 143 : 135.

Material examined : 1 ex., East Garo hills, Sangsok, 20.ix.1973, N. Muraleedharan coll.

Diagnostic characters : Body orange-yellow; two black bands one before the other on the middle of each tegmen; feet yellow ochraceous; mesosternal tubercles broad, compressed but prominently raised; apex of the tegmina blackish and finely reticulated.

Length : 15 mm. Expansion tegmina 39 mm.

Distribution : India : Meghalaya (East Garo hills), Sikkim.

14. *Cosmoscarta septapunctata* (Walker)1851. *Cercopis septapunctata* Walk, *List. Hour*, 3 : 359.1896. *Cosmoscarta septapunctata* : Distant, *Fauna Brit. India* 4 : 148 : 257.1976. *Cosmoscarta septapunctata* : Dutta and Ghosh, *Eos. Revista Espanola De Entomologia Tomol. ano* : 62.

Material examined : 2 exs., Jaintia hills, Jowai, Garam Pani, 19.ix.1979, P. T. Cherian & C. Radhakrishnan coll; 1 ex., Tura, 15.vi.-15.vii.17, coll. ?

Diagnostic characters : Body, tegmina, legs, testaceous red, pronotum thickly finely punctate, sometimes with two small black spots on its anterior margin; mesosternal tubercles broad, a double series of broad, compressed, spot on each side of abdomen; tegmina with six spots arranged in two irregular transverse series and sometimes with a seventh subapical and subcostal black spots.

Length : Excluding tegmina 10 to 11 mm, Expansion tegmina : 23 to 31 mm.

Distribution : India : Meghalaya (Jaintia hill, West Garo hills), West Bengal. Elsewhere : Burma; Java; Siam.

15. *Cosmoscarta trigona* (Walker)1821. *Cercopis trigona* Walker, *List Hom. Brit. Museum*, 3 : 660.1874. *Cosmoscarta trigona* Butler, *Cist. Ent.*, 1 : 258.1976 *Cosmoscarta trigona* : Datta & Ghosh, *Eos. Revista Espanola De Entomologia Tomol. ano* : 62.

Material examined : 3 exs., East Khasi hills, Upper Shillong, Elephant falls, 27.v.1975, M. S. Jyruea & K. Deb coll; 1 ex., East Khasi hills, Upper Shillong. 20.vii.1971, R. S. Pillai coll.

Diagnostic characters : Tegmina piceous, crossed by two testaceous or sanguineous transverse fasciae the first near middle, the second just before apical area, the first connected and nearly connected with base along claval area and also along the costal area by the same colour; abdomen beneath and above black; posterior tibiae with a single short spine beyond middle.

Length : Excluding tegmina 9 mm; Expansion tegmina 25 mm.

Distribution : India : Meghalaya (East Khasi hills); Assam, Sikkim, Tamil Nadu, West Bengal. Elsewhere : China; Hong Kong; Tibet.

Genus VII *Leptataspis* Schmidt, 19101910. *Leptataspis* Schmidt, *Arch. f. Naturgesch.*, 76 : 63.Key to the species of the Genus *Leptataspis*

- 1(2) Mesosternal tubercles compressed, moderately angularly prominent, pronotum luteous; scutellum piceous wings fuliginous, tegmina black with a sanguineous basal streak to clavus.....*fulviceps*
- 2(1) Mesosternal tubercles absent, pronotum, scutellum yellowish ochraceous, wings blackish with the base yellowish Ochraceous, tegmina with one black band another ochraceous yellow band.....*specialis*

16. *Leptataspis fulviceps* (Dallas)*1850. *Cercopis fulviceps* Dallas, *Ent. soc. London Trans.*, 2(1) : 10.1886. *Cosmoscarta fulviceps* : Distant, *Asiatic Soc. Bengal Jour.*, 55 : 194.1976 *Cosmoscarta fulviceps* : Datta & Ghosh, *Eos. Revista Espanola De Entomologia Tomol. ano* : 62.

Material examined : 1 ex., West Garo hills, Rongram, 8.iii.1978, K. P. Singh coll.; 2 exs., Ri-Bhoi, Nongpoh, 30.ix.1988, A. R. Lahiri and Party coll; 2 exs., West Garo hills, Tura, 15.vi.-15.vii.17, coll ?

Diagnostic characters : Head, pronotum luteous; abdomen above and beneath bluish black; tegmina black, with a short sanguineous basal streak to clavus.

Length : Excluding tegmina 14 to 16 mm; Expansion tegmina : 38 to 40 mm.

Distribution: India : Meghalaya (Khasi hills, Garo hills), Assam, Sikkim, West Bengal. Elsewhere : Bharno; Bhutan; Burma; Hong Kong; Malaya Peninsula; Siam.

17. *Leptataspis specialis* Lallemand1927. *Leptataspis specialis* Lallemand, *Ent. Soc. London Trans.* : 110.

Material examined : 1 ex., West Garo hills, above Tura (3500-3900 ft.), 15.vii,30.viii.1917, S. Kemp coll.

Diagnostic characters : Pronotum, scutellum, base of tegmina, legs ochraceous yellow, tegmina with one wide black band and a narrow ochraceous yellow band broadening towards the external broader and lastly reticulate at the apical portion with clear brown colour; pronotum without longitudinal carinae, mesosternum without protuberances.

Length : Length of tegmina 10 mm, width, 3.5 mm.

Distribution : India : Meghalaya (West Garo hills), Sikkim.

Genus VIII *Simeliria* Schmidt, 19091909. *Simeliria* Schmidt, *Stettin Ent. Ztg.*, 70 : 285.18. *Simeliria funeralis* (Butler)1874. *Cosmoscarta funeralis* Butler, *Cist. Ent.*, 1 : 247.1921. *Simeliria funeralis* : Jacobi, *Arch. f. Naturgesch.*, 87 : 53.

Material examined : 1 ex., West Garo hills, Tura, 15.vi. 15.vii.17, coll ?

Diagnostic characters : Pronotum with a faint longitudinal carination on anterior half, transversely foveate on each side before anterior margin; abdominal segments transversely banded and laterally spotted with black; tegmina uniformly black or piceous.

Length : Excluding tegmina 12 to 15; expansion tegmina 33 to 43 mm.

Distribution : India : Meghalaya (West Garo hills); Assam, Sikkim, West Bengal. Elsewhere : Burma; Malaya; Malacca.

Subfamily Aphrophorinae

Key to the genera of the subfamily Aphrophorinae

1(2) Vertex of head broader than long, convexly rounded anteriorly 3

- 2(1) Vertex of head as long as or longer than broad strongly prolonged in front of eyes, head centrally and laterally carinate; ocelli a little nearer to eyes than to each other, face centrally carinate.....**Philagra**
- 3(4) Head and pronotum not centrally longitudinally carinate..... 5
- 4(3) Head and pronotum distinctly centrally longitudinally carinate..... 9
- 5(6) Face more or less convexly produced..... 7
- 6(5) Face more or less flattened, not convexly produced.....**Clovia**
- 7(8) Clypeus slightly passing the apices of the anterior coxae.....**Poophilus**
- 8(7) Clypeus reaching but not extending beyond the apices of the anterior coxae.....**Ptyelus**
- 9(10) Pronotum with a single central carination..... **Peuceptyelus**
- 10(9) Pronotum tricarinate **Jembrana**

Genus IX **Poophilus** Stal, 1866

1866. *Poophilus* Stal, *Hem. Afr.*, 4 : 72.

19. **Poophilus costalis** (Walker)

1851. *Ptyelus costalis* Walker, *List. Hom.*, 3 : 707.

1885. *Poophilus costalis* Atkinson, *J. A. S. B.*, 54 : 114.

1976. *Poophilus costalis* : Datta and Ghosh, *Eos. Revista Espanola De Entomologia Tomol. ano* : 52.

Material examined : 1 ex., East Khasi hills, Shillong, Mawpal, 30.v.1964, S. Biswas coll., 4 exs., East Khasi hills, Pynursla, 11.xi.1991, R.C. Basu coll.; 1 ex., Jaintia hills, Mooralong, 27.ix.1988, V.D.Srivastava coll., 1 ex., East Garo hills, Narangiri, 29.v.1990, M. S. Shishodia coll.; 1 ex., East Khasi hills, Shillong Polo hill forest, 20.ix.1991, R.K. Varshney and party coll., 2 exs., East Khasi hills, Shillong fruit garden, 13.vi.1978, M.S. Jyrwa coll.

Diagnostic characters : Tegmina with apical area and costal margin paler; central apical margin to vertex with five very small black spots; apices of the femora pale, disk of sternum and the anterior and intermediate legs fuscous or piceous.

Length : 9 to 10 mm.

Distribution : India : Meghalaya (East Khasi hills, East Garo hills, Jaintia hills), Bihar, Gujarat, Karnataka, Maharashtra, West Bengal. Elsewhere : Bangladesh; Pakistan; Singapore; Sri Lanka and South-West Africa.

Genus X **Clovia** Stal, 1866

1866. *Clovia* Stal, *Hem. Afr.*, 4 : 75.

Key to the species of the Genus **Clovia**

- 1(2) Head about as long as the medial length of the pronotum..... 3
- 2(1) Head a little shorter than the medial length of pronotum; with some very indistinct darker longitudinal lines..... **puncta**

- 3(4) Longitudinal ochraceous fasciae between the eyes and an outer one on each side interrupted by the eyes and continued through pronotum, scutellum and basal area of tegmina *lineaticollis*
- 4(3) Longitudinal ochraceous fasciae on head, pronotum and scutellum absent 5
- 5(6) Tegmina with a large median and larger apical, costal, hyaline or subhyaline spot.... *conifera*
- 6(5) Tegmina with apical area subhyaline and crossed by two irregularly bent oblique twany fasciae, a black spot at posterior angle of inner margin *bipunctata*

20. *Clovia bipunctata* Kirby*

1891. *Clovia bipunctatus* Kirby, *J. Linn. Soc., Zool.*, **24** : 163.

1903. *Clovia bipunctata* : Melichar, *Hom. Fauna. Ceylon* : 163.

1949. *Clovia bipuncatata* : Muller, *Biol. Centralbl.* **68** : 355.

Material examined : 1 ex., Jaintia hills, Garampani, Luchook, 2.x.1988, V.D. Srivastava, coll.

Diagnostic character : The apical area of tegmina subhyaline and crossed by two oblique tawny fasciae, a black spot at posterior angle of inner margin of tegmina, head as long as the medial length of pronotum.

Length : 6 to 8 mm.

Distribution : India : Meghalaya (Jaintia hills); Bihar, Pondicherry, West Bengal. Elsewhere : Java; Japan; Sri Lanka.

21. *Clovia conifera* (Walker)*

1851. *Ptyelus conifer* Walker, *List. Hom. Brit. Museum*, **3** : 711.

1885. *Clovia conifer* : Atkinson, *Asiatic Soc. Bengal Jour.*, **54** : 114.

1976. *Clovia conifera* : Dutta & Ghosh, *Eos. Revista Espanola De Entomologia Tomol ano* : 42.

Material examined : 1 ex., East hills, Mawphlong, 2.iii.1991, K.K. Roy & Party coll.; East Khasi hills, Shillong, 16.iii.1991, B.C. Das & Party coll.

Diagnostic characters : Tegmina with a large median and larger apical, costal, hyaline or subhyaline spot; head almost as long as centre of pronotum and subtriangularly rounded between the eyes; lateral area of sternum castaneous with a longitudinal ochraceous fascia.

Length : 6 to 8 mm.

Distribution : India : Meghalaya (East Khasi hills), Assam, Sikkim, Tamil Nadu. Elsewhere : Bangladesh; Burma; Java; Malay Peninsula; Philippines.

22. *Clovia lineaticollis* (Motsch)*

1859. *Aphrophora lineaticollis* Motsch, *Etud. Ent* : 110.

1903. *Clovia lineaticollis* : Melichar, *Hom. Fauna. Ceylon* : 135.

1967. *Clovia lineaticollis* : Datta and Ghosh, *Eos, Revista Espanola De Entomologia Tomol ano* : 42.

Material examined : 1 ex., Jaintia hills, Jowai, Reithsesim, 29.ix.1988, V.D. Srivastava and party coll.

Diagnostic characters : Longitudinal ochraceous fasciae continued posteriorly through the pronotum, scutellum, and basal area of tegmina; tegmina with a large costal spot before middle and two longitudinal ochraceous fasciae on apical area, a large oblique subapical spot join the inner apical fascia with costal margin; a large spot occupying central base of face and disk of prosternum.

Length : 10 mm.

Distribution : India : Meghalaya (Jaintia hills), Karnataka, Tamil Nadu.

23. *Clovia puncta* (Walk) *

1851. *Ptyelus puncta* Walker *List. Hom.*, 3 : 718.

1885. *Clovia puncta* : Atkinson, *J. A. S. B.*, 14 : 115.

1976. *Clovia puncta* : Dutta and Ghosh, *Eos. Revista Espanola De Entomologia TomoL, ano* : 42.

Material examined : 1 ex., Jaintia hills, Jowai, Khllhrnei Ghat, 18.ix.1988, V.D. Srivastava and party coll.

Diagnostic characters : Pale tawny brown tegmina with a small black spot at posterior angle of inner margin, head a little shorter than the medial length of pronotum, anterior central area with three pale longitudinal lines, a piceous spot behind each anterior coxae.

Length : 6 mm.

Distribution : India : Meghalaya (Jaintia hills), Bihar, Gujarat, Maharashtra, Sikkim.

Genus XI *Ptyelus* St. Farg. & Serv.

1825. *Ptyelus* St. Farg. & Serv., *Enc. Meth.* 10 : 602.

24. *Ptyelus nebulosa* (Fabr.)

1794. *Cercopis nebulosus* Fabr., *Syst. Ent.*, 4 : 50.

1896. *Clovia nebulosus* : Stal, *Hem. Fabr.* 2 : 16.

1976. *Ptyelus nebulosa* : Dutta and Ghosh, *Eos, Revista Espanola De Entomologia TomoL, ano* : 47.

Material examined : 1 ex., East Garo hills, Nongal, 28.v.1990, M.S. Shishodia coll.

Diagnostic characters : Body pale yellowish grey, two small black spots on anterior margin of head, tegmina with a very oblique anterior fascia, a somewhat large spot at the commissure, an obliquely transverse spot beyond the middle of the costal margin and a minute costal spot towards the apex.

Length : 9 to 10 mm.

Distribution : Meghalaya (East Garo hills); Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, West Bengal; Bangladesh; Java; Sri Lanka.

Genus XII *Peuceptyelus* Sahlberg, 1871

1871. *Peuceptyelus* Sahlberg, *Not. Fenn. (N.S)* 9(12) : 84.

25. *Peuceptyelus sigillifer* (Walker)*1851. *Aphrophora sigillifera* Walker, *List Hom. Ins. Brit. Mus.*, 3 : 700.1921. *Peuceptyelus sigilliferus*: Jacobi, *Arch. f. Naturgesch.*, 87 : 25.1953. *Peuceptyelus sigillifer* : Mathur, *Indian Forest Leaflet* 121(3) : 147.

Material examined : 15 exs., East Khasi hills, Shillong, Happy valley, 26.xii.1958, A. P. Kapur coll.; 1 ex., West Khasi hills, Mawphlang, 15.iv.1959, A.P. Kapur coll.

Diagnostic characters : Testaceous but covered with brown pits; head brown with a central carina; some pale smooth spaces surrounded by brown in front of the pronotum and an indistinct pale spot surrounded by darker in the middle of the costa of tegmina; legs brown indistinctly banded with paler striations.

Length : 7 to 7.5 mm.

Distribution : Meghalaya (East Khasi hills, West Khasi hills), Karnataka, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh; Burma; Borneo; China; Philippine island; Sumatra.

Genus XIII *Orolditids* Distant, 19081908. *Jembrana* Distant, *Fauna Brit. India*, 6 : 104.26. *Jembrana costalis* Distant*1916. *Jembrana costalis* Distant, *Fauna Brit. India*, 6 : 192.

Material examined : 1 ex., West Garo hills, above Tura, 15.vi.30. viii.1917, S. Kemp coll.; 1 ex., Jaintia hills, Jowai, date ?, coll. ?

Diagnostic characters : Tegmina with extreme costal margin from base to about middle narrowly pale ochraceous, spotted with black and the costal area beyond base pale dull ochraceous; scutellum blackish; legs with pale annulation.

Length : 7.5 - 8 mm.

Distribution : India : Meghalaya (West Garo hills, Jaintia hills); Kerala, Tamil Nadu, West Bengal. Elsewhere : Burma; Nepal; Sri Lanka.

Genus XIV *Philagra* Stal1863. *Philagra* Stal, *Ent. Soc. London Trans.*, (3) 1 : 593.27. *Philagra fusiformis* (Walker)1858. *Cyrene fusiformis* Walker, *List Hom. Brit. Mus.*, : 57.1908. *Cyrene fusiformis* Distant, *Fauna Brit. India*, 4 : 108.1953. *Philagra fusiformis* : Mathur, *Indian Forest Leaflet* 121(3) : 147.

Material examined : 4 exs., Jaintia hills, Jowai, Thadlaskeir lake, 21.ix.1988, V. D. Srivastava and party coll., 3 exs., Jaintia hills, Jowai, Mooralong, 27.ix.1988, V.D. Srivastava coll.

Diagnostic character : Head above strongly tricarinate, about half as long as pronotum, its apex slightly upwardly recurved; body and legs ochraceous, tegmina ochraceous with pale irregular scattered fuscous markings.

Length : Excluding tegmina 10 to 14 mm. Expansion tegmina 18 to 27 mm.

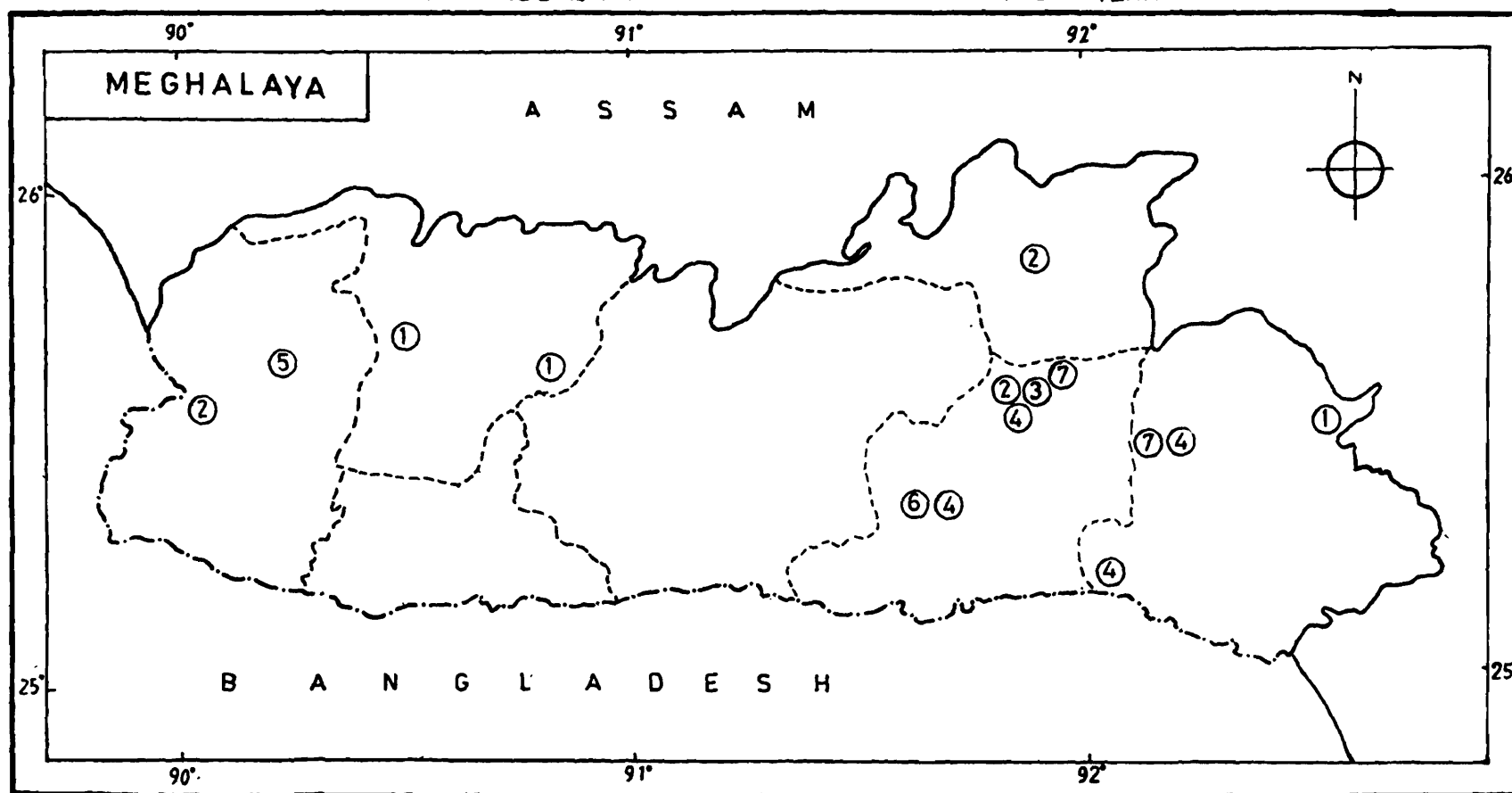
Distribution : India : Meghalaya (Jaintia hills); Assam, Sikkim. Elsewhere : Burma; North China.

A list of Cercopid species so far recorded from the state of Meghalaya.

- 1) *Abidama producta* (Walker)
- 2) *Callitettix versicolor* (Fabricius)
- * 3) *Clovia bipunctata* Kirby
- * 4) *C. conifera* (Walker)
- * 5) *C. lineaticollis* (Motsch.)
- * 6) *C. puncta* Walker
- 7) *Caloscarta (Phymatostetha) signifera* (Walker)
- 8) *Cosmoscarta dimidiata* var. *affinis* (Atkinson)
- 9) *C. dimidiata* var. *tripunctata* (Atkinson)
- * 10) *C. dorsimaculata* (Walker)
- 11) *C. egens* (Walker)
- * 12) *C. fuscipennis* (St. Farg & Serv.)
- 13) *C. metallica* Distant
- * 14) *C. nigrofasciata* Atkinson
- 15) *C. septapunctata* (Walker)
- ** 16) *C. shillongana* Distant
- 17) *C. trigona* (Walker)
- 18) *Eoscarta borealis* Distant
- 19) *E. semirosa* Walker
- * 20) *Jembrana costalis* Distant
- * 21) *Leptataspis fulviceps* (Dallas)
- 22) *L. specialis* Lall.
- * 23) *Peuceptyelus sigillifer* (Walker)
- 24) *Philagra fusiformis* (Walker)
- 25) *Phymatostetha stalli* Butler
- 26) *Poophilus costalis* (Walker)
- 27) *Ptyelus nebulosa* (Fabricius)
- 28) *Simeliria funeralis* (Butler)

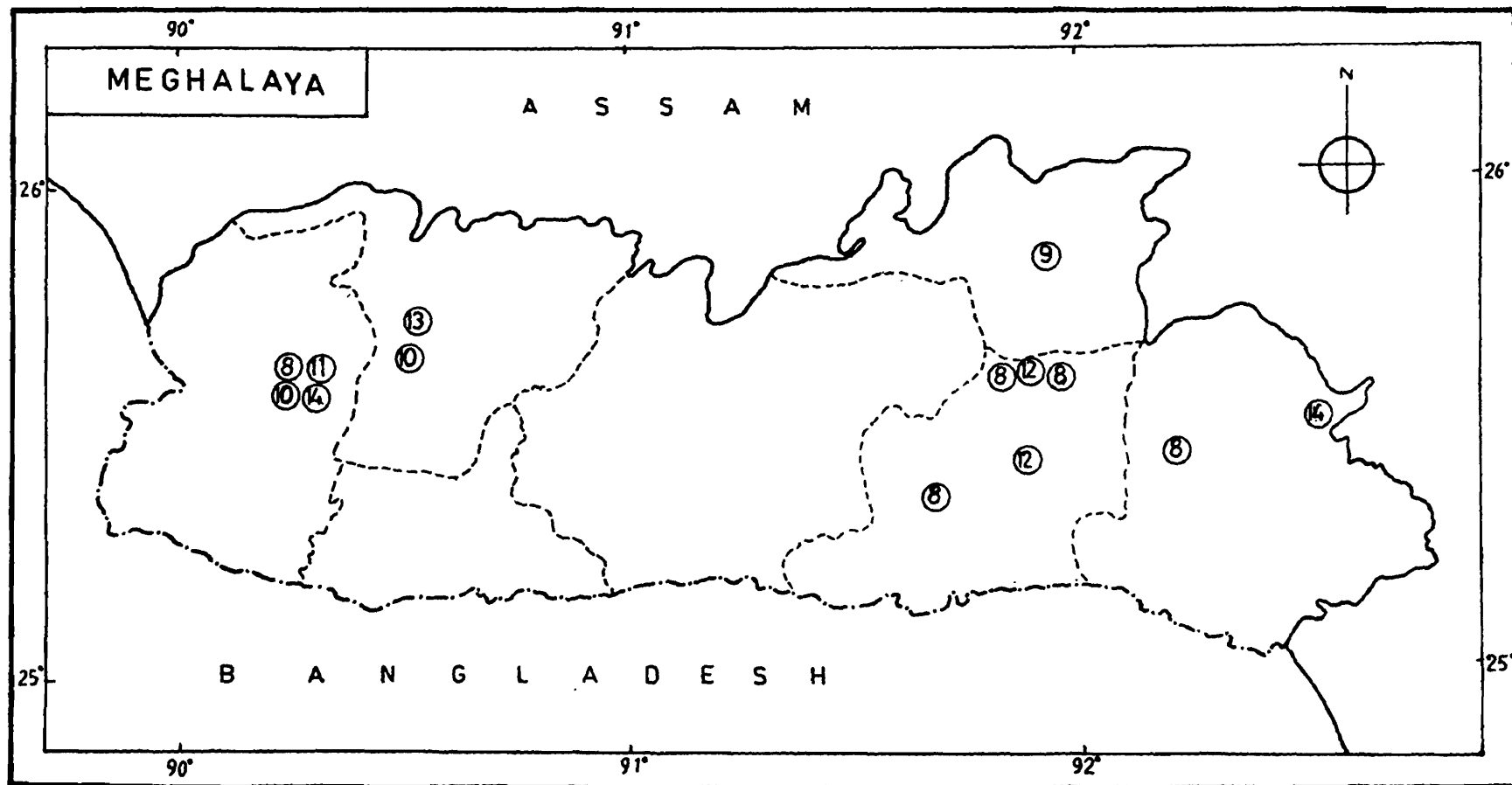
* New record from Meghalaya, ** Not examined.

MAP-1: DISTRIBUTION OF CERCOPID SPECIES (NO.1-7); HEMIPTERA

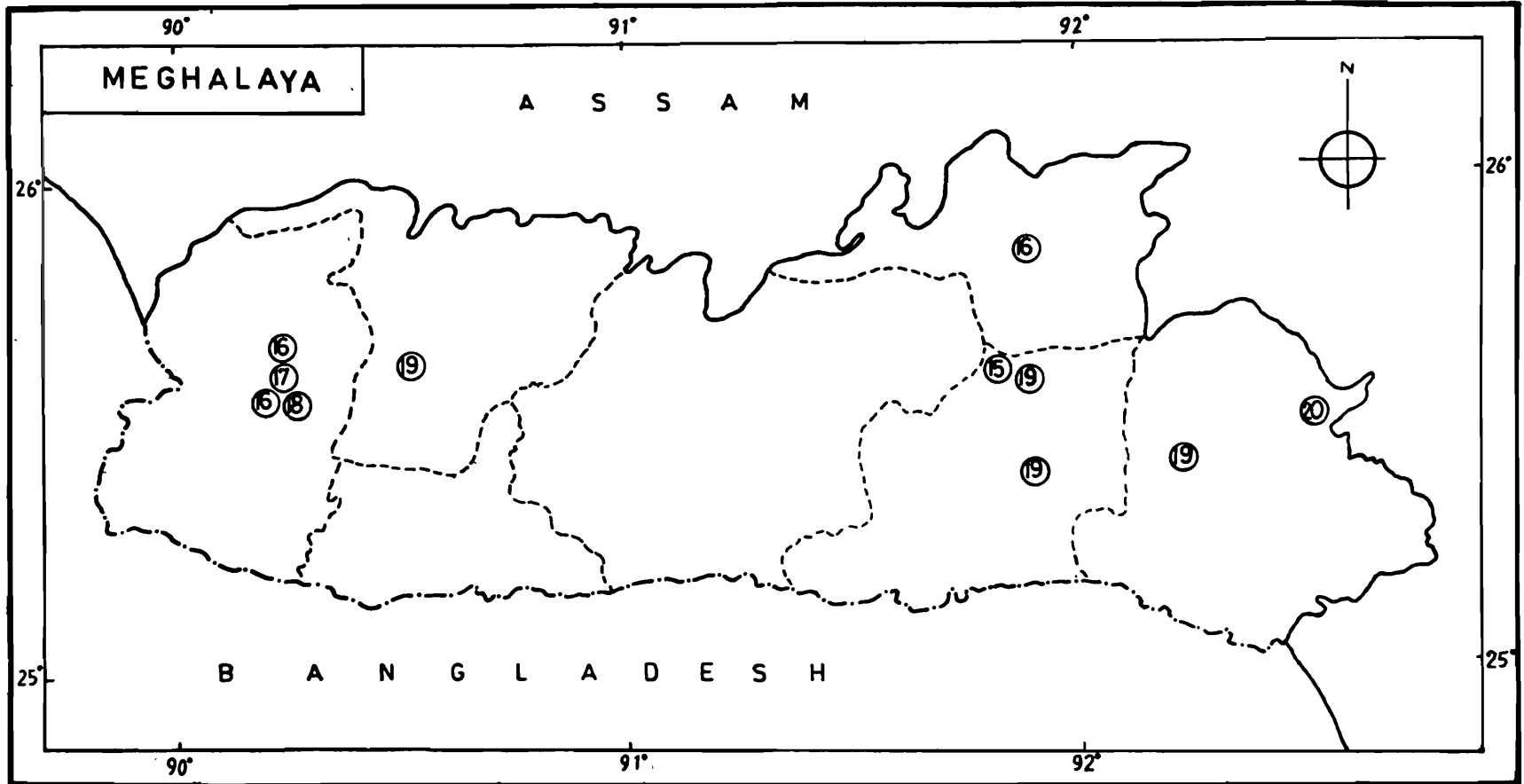


1. <u>Callitettix versicolor</u> (Fabricius)	4. <u>Eoscarta borealis</u> Distant	7. <u>Cosmoscarta dimidiata</u> var. <u>affinis</u> (Atkinson)
2. <u>Abidama producta</u> (Walker)	5. <u>Eoscarta semirosea</u> Walker	
3. <u>Caloscarta</u> (=Phymatostetha) <u>signifera</u> (Walker)	6. <u>Phymatostetha stalli</u> Butler	

MAP-2: DISTRIBUTION OF CERCOPID SPECIES (NO. 8-14): HEMIPTERA

8. Cosmoscarta dimidiata var. tripunctata (Atkinson)9. Cosmoscarta dorsimaculata (Walker)10. Cosmoscarta egens (Walker)11. Cosmoscarta fuscipennis (St. Farg. & Serv.)12. Cosmoscarta metallica Distant13. Cosmoscarta nigrofasciata Atkinson14. Cosmoscarta septapunctata (Walker)

MAP-3: DISTRIBUTION OF CERCOPID SPECIES (NO:15-20): HEMIPTERA



- 15. Cosmoscarta trigona (Walker)
- 16. Leptataspis fulviceps (Dallas)
- 17. Leptataspis specialis Lallemant

- 18. Simeliria funeralis (Butler)
- 19. Poophilius costalis (Walker)
- 20. Clovía bipunctata Kirby

MAP-4: DISTRIBUTION OF CERCOPID SPECIES (NO:21-27): HEMIPTERA

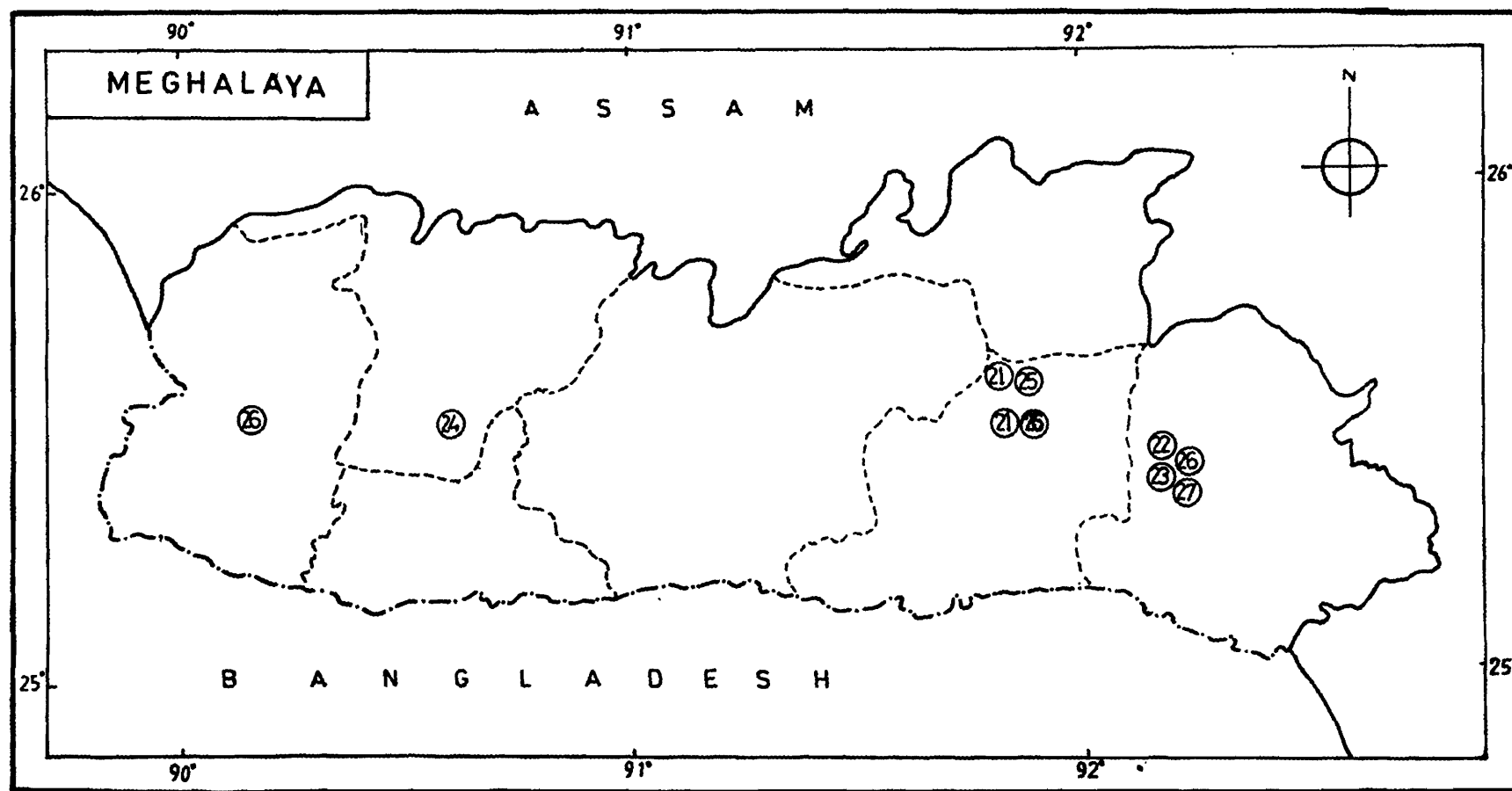
21. Clovio confera (Walker)22. Clovio lineaticollis (Motsch)23. Clovio puncta (Walker)24. Ptyelus nebulosus Distant25. Peuceptyelus sigillifer (Walker)26. Jembrana costalis Distant27. Philagra fusiformis (Walker)

Table - 1. Distribution of Cercopid species in different districts of Meghalaya

Name of the species	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	JAINTIA HILLS
	1	2	3	4	5	6	7
1. <i>Callitettix varicolor</i> (Fabr.)	+	-	-		-	-	+
2. <i>Abidama producta</i> (Walk.)		+		+		+	
3. <i>Caloscarta (Phymatostetha) signifera</i> (Walk.)		-		+		-	-
4. <i>Eoscarta borealis</i> (Distant)		-	-	+			-
5. <i>Eoscarta semirosea</i> (Walker)		+	-	-		-	
6. <i>Phymatostetha stalii</i> Butler	-	-	-	+	-	-	
7. <i>Cosmoscarta dimidiata</i> var. <i>affinis</i> Atkinson	-	-	-	+	-	-	+
8. <i>Cosmoscarta dimidiata</i> var. <i>tripunctata</i> Atkinson	-	+		+		-	+
9. <i>Cosmoscarta dorsimaculata</i> (Walker)	-		-	-	-	+	
10. <i>Cosmoscarta egens</i> (Walker)	+	+	-	-	-		
11. <i>Cosmoscarta fuscipennis</i> (St. Farg & Serv.)		+				-	
12. <i>Cosmoscarta metallic</i> Distant	+	-		-			
13. <i>Cosmoscarta nigrofasciata</i> Atkinson	+				-	-	-
14. <i>Cosmoscarta septapunctata</i> (Walker)	-	+	-				+
15. <i>Cosmoscarta trigona</i> (Walker)	-	-		+		-	
16. <i>Leptataspis fulviceps</i> (Dallas)		+				+	-

Table - 1. Distribution of Cercopid species in different districts of Meghalaya

Name of the species	EAST GARO HILLS	WEST GARO HILLS	SOUTH GARO HILLS	EAST KHASI HILLS	WEST KHASI HILLS	RI-BHOI	JAINTIA HILLS
17. <i>Leptataspis specialis</i> Lammemand	-	+	-	-	-	-	-
18. <i>Semiliria funeralis</i> (Butler)	-	+	-	-	-	-	-
19. <i>Poophilus costalis</i> (Walker)	+	-	-	+	-	-	+
20. <i>Clovia bipunctata</i> Kirby	-	-	-	-	-	-	+
21. <i>Clovia conifera</i> (Walker)	-	-	-	+	-	-	-
22. <i>Clovia lineaticollis</i> (Motsch)	-	-	-	-	-	-	+
23. <i>Clovia puncta</i> (Walker)	-	-	-	-	-	-	+
24. <i>Ptyelus nebulosa</i> (Fabricius)	+	-	-	-	-	-	-
25. <i>Peuceptyelus sigillifer</i> (Walker)	-	-	-	+	+	-	-
26. <i>Jembrana costalis</i> Distant	-	+	-	-	-	-	+
27. <i>Philagra fusiformis</i> (Walker)	-	-	-	-	-	-	+

SUMMARY

The paper incorporates the account of 29 species of Cercopids belonging to 15 genera distributed over three subfamilies from the state of Meghalaya. Ten species (marked *) in five genera constitute new record from Meghalaya. Besides, necessary keys to various taxa, general diagnosis of each species, measurements, geographical distribution, reference to original literature have been provided. Distribution of each species is also shown in the maps.

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